



Edited by:

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T. Bas Rodenburg

4-8 August 2025
Utrecht, The Netherlands

PROCEEDINGS OF THE
58th CONGRESS OF THE ISAE

ISAE
2025



A good life for all animals



A good life for all animals

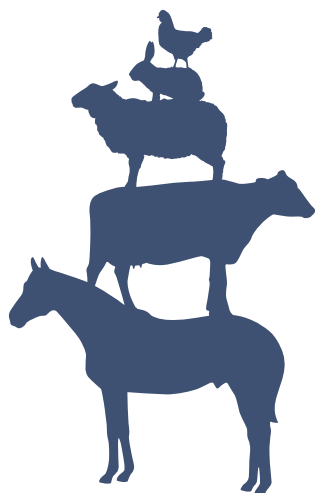
58TH CONGRESS OF THE INTERNATIONAL SOCIETY FOR APPLIED ETHOLOGY

PROCEEDINGS

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Welcome to ISAE 2025

We welcome you to Utrecht, The Netherlands, for the 58th congress of the International Society for Applied Ethology! We hope that you enjoy the congress, both scientifically and socially and that you also find time to enjoy the beautiful city of Utrecht! Utrecht was chosen because of its central location and its welcoming atmosphere and rich history. Utrecht is also the home of the only Faculty of Veterinary Medicine in The Netherlands. The last time ISAE was organized in The Netherlands was in 2002, in Egmond aan Zee. It is high time for the Dutch team to welcome you again!

The congress theme for 2025 is 'A good life for all animals'. We see that thinking about animal welfare is shifting from a focus on reducing welfare problems towards a focus on the quality of life of an animal, including positive welfare experiences. This also brings new questions to the world of applied ethologists, for instance on behavioural measures of emotional state, but also on redesigning animal husbandry systems to meet the behavioural needs of the animals we keep. In the congress program, we aimed to include varied species from farm animals to companion animals, lab animals and zoo animals.

The congress sessions fit well under our overall theme. The session topics range from more fundamental topics, such as affective states and animal cognition to more applied topics, such as housing and management and the relationships between animal breeding and animal behaviour. Other sessions focus on behavioural problems in veterinary practice, automated monitoring of behaviour and human-animal interactions. Together with UFAW, we also organize a session on global challenges to animal welfare. Finally, there is also room for free papers on other topics of interest to the ISAE audience.

We look forward to an exciting scientific program, with five excellent plenary speakers, over 90 oral presentations, ten workshops on a wide range of topics and over 300 posters. Students will also have the opportunity to present their poster in a poster pitch, to draw your attention to the poster sessions.

With the welcome reception, the excursions and the networking dinner, we also hope to offer you an exciting social program. And of course, the city of Utrecht has also plenty of experiences to offer if you have some free time available, from paddling around the city in a canoe to climbing the Dom tower (the highest church tower in The Netherlands)!

On behalf of the organising and scientific committees,

Bas Rodenburg,
Chair of the Organising Committee

Liesbeth Bolhuis,
Chair of the Scientific Committee



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Bas Rodenburg (chair), Monique Bestman, Jasper Heerkens, Saskia Kliphuis, Marko Ruis, Hans Spoolder, Lenny van Erp, Heleen van de Weerd

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Thriving cows lead
to thriving farms



ISAE 2025

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PROVINCIE UTRECHT



ISAE 2025 programme



Monday, 4 August

10:00	European COST Action LIFT Satellite Workshop Theatron	The Welfare Footprint of the Egg Satellite Workshop Megaron
16:30	ISAE 2025 Welcome reception Restaurant	Meet and Greet Restaurant

Tuesday, 5 August

09:00	Congress opening Theatron	
09:30	Wood-Gush Memorial Lecture Theatron <i>Chaired by: T. Bas Rodenburg and Inonge Reimert</i> Horizons of animal welfare: insects in farming and research Meghan Barrett	
10:30	Tea and coffee break	
	Assessing affective states Theatron <i>Chaired by: Emma Fàbrega and Mathilde Coutant</i>	Animal breeding and behaviour Megaron <i>Chaired by: Courtney Daigle and Malou van der Sluis</i>
11:00	When pigs lend a hoof: a comparative study of helping across two research institutes Alvaro Lopez Caicoya, Kaleiah Schiller, Marie Bordes, Jean-Loup Rault, Liza Moscovice	The social brain under selection: tameness and its behavioural consequences in Red Junglefowl Johanna Gjøn, Per Jensen
11:15	Coming of age: changes in laying hen pullets' fearfulness and aggression Ana Rentsch, Kelly Tremblay, Sachin Gautamadasa, Charlene Hanlon, Grégory Bédécarrats	Genetic determination of maternal behaviour in Swiss Landrace sows Nicole Maffezzini, Negar Khayatzadeh, Simon Turner, Rainer Roehe, Ricardo Pong-Wong, Rick D'Eath
11:30	Combining QBA, behaviour tests, and physiological measures to assess positive affect in dairy cattle Ashlyn Scott, Gabriel Dallago, Heather W. Neave, Jamie Ahloy-Dallaire, Joao H.C. Costa, Jan C Plaizier, Meagan TM King	Play stimulation modifies behaviour and brain development in chickens – effects of domestication Per Jensen, Claudia Alsager
11:45	The BIBAGO: A new behavioural test to assess reward sensitivity in non-human animals Susana C. M. Ferreira, Fabiana De Angelis, Sarah Ambruosi, Giulia Ferroni, Matteo Chincarini, Charlotte Goursoot	Socially-mediated arousal in two behavioural phenotypes of domestic laying hens Joanne Edgar, Elizabeth Paul
12:00	Bored broilers? Assessing two novel measures for boredom in broiler chickens Chloe Phelps, Alexandra Ulans, Leonie Jacobs	Identification of early behavioural traits to predict injurious pecking in laying hens Lucille Dumontier, Vitor Ferreira, Auriane Foreau, Maxime Quentin, Vanessa Guesdon, Aude Kleiber, Maryse Guinebretière, Michel Sourdioux, Ludovic Calandreau
12:15	The pain echo chamber effect: how cages and barren environments may amplify pain perception in animals Cynthia Schuck-Paim, Wladimir J. Alonso, Kate Hartcher	Comparative study of fear responses and oral – related behaviour in two turkey breeds Rukoyat Akinyemi, Samuel Durosaro, Michael ozoje, Oluwaseun Iyasere, Hezekiah Toyinbo, Lateef Shobayo
12:30	Lunch break Restaurant	Eating with Ethologists Restaurant

	Assessing affective states Theatron <i>Chaired by: Lorenz Gyga and Allyson Ipema</i>	Housing and management meeting behavioural needs Megaron <i>Chaired by: Stephanie Buijs and Vitor Ferreira</i>
14:00	The welfare significance of stereotypic behaviours in rhesus macaques (<i>Macacca mulatta</i>): Do certain forms reflect cumulative negative affect over the lifespan? <i>Georgia Mason, Kristine Coleman, Brenda McCowan, Lee Niel, David Pearl, Ori Pomerantz</i>	Three-step reduction of contact time between dairy cows and their calves does not result in low stress levels at the time of total separation <i>Anina Vogt, Susanne Waiblinger, Kerstin Barth, Uta König von Borstel</i>
14:15	Insights into inactivity: effects of enrichment and coping style on pigs' inactivity patterns <i>Giulia Ferroni, Leonie Kampshoff, Fabiana De Angelis, Christoph Winckler, Sara Hintze</i>	Playing music to animals: an interdisciplinary approach to improving our understanding of animals' responses to music <i>Buddhamas Pralle Kriengwatana, Ruedi Nager, Alex South, Martin Ullrich, Emily Doolittle</i>
14:30	Goats who stare at wolves – first steps in the development of an affect-driven attention bias test for small ruminants <i>Jana Deutsch, Steve Lebing, Anja Eggert, Christian Nawroth</i>	Regular but temporary access to an enriched room modifies activity and social behavior of gestating sows <i>Caroline Clouard, Raphaël Comte, Nolwenn Valentin, Helene Frizet, Christine Baly, Elodie Merlot</i>
14:45	Poster pitches Theatron <i>Chaired by: Lorenz Gyga and Allyson Ipema</i>	Poster pitches Megaron <i>Chaired by: Stephanie Buijs and Vitor Ferreira</i>
	Play responsiveness in an arena test is affected by feed restriction in calves <i>Amelia St John Wallis, Michael Mendl, Benjamin Lecorps, Suzanne Held</i>	Genetics and early life effects on ear biting and the genetic correlations with growth, survival and fertility in pigs <i>Bernadett Hegedűs, Natália Galoro Leite, Liesbeth Bolhuis, Piter Bijma</i>
	Can we use the Broaden-and-Build-Theory to assess cow happiness? Behavioural diversity and social relationships <i>Evelien Smits, Louise Kremer, Kees van Reenen, Laura Webb</i>	Domestication and early stress resilience: Insights from White Leghorns and Red Junglefowl <i>Enya Van Poucke, Per Jensen</i>
	Applying Qualitative Behaviour Assessment to investigate what a change in environmental conditions means for pigs <i>Fabiana De Angelis, Giulia Ferroni, Christoph Winckler, Sara Hintze</i>	Suitability assessment of a non-invasive cortisol measurement method for season-dependent stress levels in horses <i>Anna Mańkowska, Łukasz Zasiadczyk, Dorota Witkowska</i>
	Relationships between behavioural and brain variables putatively reflecting positive and negative affective states of weanling piglets <i>George Troupakis, Ilaria Minussi, Yannick Vermeiren, Walter J.J. Gerrits, Alfons J.M. Jansman, Marlies Diepeveen-de Bruin, Liesbeth Bolhuis</i>	It's not black and white: Perspectives of Western Canadian beef farmers on dairy-beef production <i>Bianca Vandresen, Daniel Weary, Marina von Keyserlingk</i>
	Use of a feed motivation test as a potential indicator of hunger in pregnant beef cows with varying body condition scores <i>Iona Smith, Bernadette Earley, Alastair Macrae, Kenny Rutherford, Simon Turner</i>	Behavioral, welfare, production pattern of unique black meat poultry breed kadaknath in different housing systems <i>Mandeep Azad, Kowardeep Kour, Lalit Upadhyay</i>
	Behavioral responses of dairy cows to temporary separation and reunion <i>J. Levi Byrd, Mattie DeHaven, Kyleigh Turner, Heather, W. Neave</i>	Exploring the behavioral effects of fennel essential oil-enhanced environmental enrichment in rabbits <i>Mariana Blanc Taques, Isabela Bez, Juliana Melo Pankratz, Iasmin Leoni Rocha Salles, Anna Clara Marques Souza, Leandro Batista Costa</i>
	A spatial judgement bias task to assess affective states in horses <i>Johanna Stenfelt, Björn Forkman, Vincent Bombail, Hanna Sassner, Rebecca Grut, Maria Vilain Rørvang</i>	Bibliometric insights into the research on behavior and welfare of domestic turkeys <i>Anna Cristina Souza, Thiago Bernardino, Cristiane Titto</i>

Effects of a synthetic analogue of bovine appeasing pheromone on dairy calf welfare from birth through to weaning <i>Juliana Garcia, Annabelle Beaver, Mark Rutter</i>	Feather pecking and feather damage of mature laying hens supplemented with prebiotic galacto-oligosaccharides during times of social stress <i>Anna Lea Nicklas, Nienke van Staaveren, A. Michelle Edwards, A. Kate Shoveller, Paul Forsythe, Alexandra Harlander</i>
Using conditioned place preference testing to assess how laboratory rats perceive tickling <i>Lamia Benabed, Vincent Bombail, Sarah Brown, Ruth Newberry, Alistair Lawrence</i>	Analyzing the behavioral responses of broiler chicks to different commercial feeder types <i>Anusha Gautam, Jeremiah Davis, Joseph Purswell, Martha S. Rueda, Bethany Baker-Cook</i>
Reading between the ears: exploring ear postures as an indicator of affective state in dairy cows and calves during temporary separation and reunion <i>Mattie DeHaven, J. Levi Byrd, Kyleigh Turner, Kevan Cote, Heather W. Neave</i>	Slow-growing versus fast-growing broiler behavior in a silvopasture environment <i>Athena D. He-DeMontaron, Jesse L. Grimes, Yan L. Campbell, Lin L. Walker, Allison N. Pullin</i>
Unravelling the functions of allogrooming in domestic cats using video-observations <i>Morgane Van Belle, Christel Moons, Daniel Mills, Bart Broeckx, Frank Tuytens, Noema Gajdoš Kmecová</i>	Evaluating the prevalence of injurious pecking and foraging behaviors in two genetic strains of turkeys with or without environmental enrichment <i>Brittany N. Bolger, Jesse L. Grimes, Allison N. Pullin</i>
Affective states of dogs in animal-assisted services: a principal component analysis approach <i>Sandra Haven-Pross, Kathalijne Visser, Lianne Jens, Kyra Maarleveld, Peter van Honk</i>	A preliminary exploration of spatial relationships in an indoor dairy dam-rearing system <i>Claire S. Wegner, Hanna Eriksson, Emma Ternman, Hector Marina</i>
Exploring behavioural demand for foraging choices in piglets: a pilot study <i>Giovanna Andrade Corrêa, Linda Keeling, Torun Wallgren, Liesbeth Bolhuis, Else Verbeek</i>	Assessing animal welfare standards in slaughter facilities in Ghana: a checklist-based evaluation <i>Daniel Abiliba, Worlah Akwetey, Vitus Burimuah, Emmanuel Awuni, Derrick Asare, Kasim Suraj Mohammed, Prince Takyi, Johnson Opoku Bannor, Benjamin Emikpe</i>
The effect of choice on horse behaviour, heart rate and heart rate variability during human-horse touch interactions <i>Amir Sarrafchi, Elodie Lassalette, Katrina Merkies</i>	Do farm animals like music? A systematic review for farm animal welfare <i>Esther Van Haver, Tomas Norton, Buddhamas Pralle Kriengwatana</i>
Chickens at work: exploring avian agency and resistance in agricultural systems <i>Lille Dumortier, Eline Jammaers</i>	Using oral firocoxib to improve the welfare of sows after farrowing <i>Jessica Carnal, Todd Williams, Misty Bear, Johann Coetzee, Abbie Viscardi</i>
Harmonizing Animal-Based Measures: Criteria for a comparable animal welfare assessment <i>Jihed Zemzmi, Gerard Eduard Martin Valls, Pol Llonch, Océane Girardie, Virginie Michel, Antonio Velarde</i>	Living conditions of broiler chickens in Suriname: is there attention for animal welfare? <i>Sharita Jharap, T. Bas Rodenburg, Rosita Sobhie, Yolanda Grift</i>
Preliminary assessment of the physical welfare of tethered and free-ranging Lagune cattle in the Oueme Valley region of southeast Benin, West Africa <i>Maurice Cossi Ahozonlin, Serge Alindekon, Luc Hippolyte DOSSA</i>	Association between farrowing duration, gut microbiota composition, and postural changes in primiparous sows <i>Jua Woo, Juho Lee, Cheolju Park, Minseok Kim, Jinhyeon Yun</i>
Gut microbiota alteration in response to social behaviours and skin lesions in growing pigs after regrouping <i>Woohee Chung, Junsik Kim, Cheolju Park, Minseok Kim, Jinhyeon Yun</i>	The effects of oxidizing air purification technology on swine barn air quality, piglet performance, and piglet behavior during the farrowing phase <i>Keara Leong-Machielse, Jennifer Young, Xiaoyu Feng, Samat Amat, Christopher Byrd</i>
Dog ethogram (Part I): review of existing ethograms <i>Laura Saiz, Xavier Manteca</i>	Evaluating mental health support strategies of UK organisations for rural and research-based animal caregivers <i>Kleita Sergiou, Beth Clark, Lucy Asher</i>
Bridging the gap: aligning zoo signage with visitor interests to promote conservation action <i>Lisa Lundin, Jenny Loberg, Elin Torgersson, Maria Andersson</i>	Stockpeople's attitudes and calf welfare on dairy farms with cow- calf contact or early separation <i>Anna Rademann, Marie Louise Schneider, Susanne Waiblinger</i>

15:15 Tea and coffee break - sponsored by Elsevier

	Assessing affective states Theatron <i>Chaired by: Marek Špinka and Laura Whalin</i>	Housing and management meeting behavioural needs Megaron <i>Chaired by: Maria Camila Ceballos and Severine Parois</i>
16:00	Assessing the emotions of dairy cows: Relationships between infrared temperature of key external body surfaces, lateralised behaviour, and milk production <i>Jashim Uddin, David McNeill, Clive Phillips</i>	Exploring the role of dietary energy in the expression of play behaviour in pigs <i>Eleanor Hewett, Jos Houdijk, Andrea Wilson, Craig Lewis, Simon Turner</i>
16:15	Welfare assessment of dairy herds in Sweden including positive welfare indicators <i>Lise Pinaqui, Björn Forkman, Else Verbeek, Ann Nyman, Louise Winblad von Walter, Linda Keeling</i>	Effects of gestational olfactory enrichment on adaptation to weaning in pigs <i>Emmanuelle Briard, Marie Couasnon, Mariana Mescouto, Patrick Touanel, Raphaël Comte, Christine Baly, Elodie Merlot, Celine Tallet, Caroline Clouard</i>
16:30	Sentience in non-human animals: what can we learn from judgement bias tests? <i>Elizabeth Paul, Vikki Neville, Michael Mendl</i>	Dried black soldier fly larvae (<i>Hermetia illucens</i>) as environmental enrichment for laying hens – a full-scale commercial study <i>Faye Tahamtani, Kathe Kittelsen, Guro Vasdal</i>
16:45	Workshops	
	Exploring the impact of early experiences on canine and feline behavior <i>Maria Andersson, Elin Hirsch</i> Beta	
	Activism in animal welfare – yay or a no-go? <i>Roi Mandel, Eva Read</i> Restaurant	
	Providing a good life to all animals: the importance of recognising, understanding and managing individual differences <i>Ellen Williams, Holly Vickery</i> Balkon Pi	
	A hands-on approach to bioacoustics in applied ethology <i>Patricia de Carvalho, Oluwaseun Iyasere, Buddhadas Pralle Kriengwatana</i> Restaurant	
	Animal welfare progress: co-creating effective solutions to improve animals' lives <i>Jean-Loup Rault, Laura Whalin</i> Restaurant	
	Bridging AI and animals – Are we In? <i>Borbala Foris, Andrea Sommese</i> Theatron	
	From debate to dialogue – improving collaboration between animal welfare and genetics <i>Roos Zaalberg, Catherine Williams, Emily Leishman</i> Restaurant	
	CSR reporting on animal health and welfare in dairy cows <i>Rozan van Rossum, Judith Vollerling</i> Restaurant	
	Where do you draw the line? A conversation about how we use animals in our research as applied ethologists and welfare scientists <i>Katy Proudfoot, Bianca Vandresen, Caroline Ritter, Beth Ventura</i> Alfa	
	Observer reliability in animal behavior research: a workshop <i>Cassandra Tucker, Sarah Adcock, Jennifer Van Os, Carly Moody, Blair Downey</i> Megaron	
18:15	Poster viewing reception Gamma	

Wednesday, 6 August

09:00 **Plenary talk - Global challenges to animal welfare**

Theatron

Chaired by: Birte Nielsen and Anne-Marieke Smid

The WOAHA animal welfare commitment and challenges in a diverse world

Leopoldo Stuardo

Global challenges to animal welfare

Theatron

Chaired by: Birte Nielsen and Anne-Marieke Smid

Assessing affective states

Megaron

Chaired by: Anna K. Johnson and Charlotte Goursoot

09:30 **Wild and unseen: Addressing the welfare crisis in global wildlife trade**

Helen Lambert, Angie Elwin, Neil D'Cruze

Physiological and behavioural indicators to evaluate pigs' positive emotions in an outdoor context

Marc Bagaria, Liza Moscovice, Yulixaxis Ramayo, Emma Fàbrega

09:45 **Behavioural changes relating to thermal stress and transport quality during the transport of finisher pigs**

Ena Dobrić, Miroslav Kjosevski

Validation of the calf grimace scale following COSMIN guidelines

Mostafa Farghal, Ed Pajor, Stelio Pacca, Daniel Pang, Maria Camila Ceballos

10:00 **Effects of transportation methods on the behavior, welfare, and meat quality of Japanese Black Cattle**
Gianne Bianca Manalo, Jitsuo Mizowaki, Masayuki Nagase, Makoto Iwamoto, Kenta Koike, Mitsushi Kobayashi, Ninomiya Shigeru

Play ontogeny in young chickens – individual variation and connection to affective state

Rebecca Oscarsson, Per Jensen

10:15 **Influence of two different feeding intensities on behaviour in organically kept Holstein cows**

Noemi Kim Santo, Karolin Gondolf, Svenja Isabel Kaiser, Océane Schmitt, Uta König von Borstel

Affective bias testing confirms sex differences in rats' preference for how they are tickled

Catalina Gonzalez, Alistair Lawrence, Vincent Bombail, Sarah Brown, Emma Robinson, Michael Mendl

10:30 **Tea and coffee break - sponsored by Humane World for Animals**

Global challenges to animal welfare

Theatron

Chaired by: Sarah Adcock and Mariam Logunleko

Housing and management meeting behavioural needs

Megaron

Chaired by: Jen-Yun Chou and Fleur Hoorweg

11:15 **Navigating welfare challenges in China's livestock industry: from intensive farming to higher welfare practices**

Siyao Shi, Amélie Legrand

The presence of enrichment promotes positive welfare in dairy calves, increases play, activity and leads to more relaxed feeding with fewer interruptions
Francesca Occhiuto, Jorge Vázquez-Diosdado, Matthew Thomas, Andrew King, Jasmeet Kaler

11:30 **Preference of laying hens for synbiotic-supplemented water under stressful conditions**

Anna Naim, Nienke van Staaveren, Emily Leishman, Dan Tulpan, Paul Forsythe, Alexandra Harlander

Effect of pair housing on behaviour and gut microbiota of pre-weaned dairy calves
Gaia Pesenti Rossi, Marco Bovo, Emanuela Dalla Costa, Laura Filippone Pavesi, Martina Penati, Maria Filippa Addis, Filippo Biscarini, Paola Cremonesi, Bianca Castiglioni, Sara Barbieri, Elisabetta Canali

11:45 **Pig behaviour during transit – welfare hazards in assembly centres**

Cecilie Kobek-Kjeldager, Line D. Jensen, Leslie Foldager, Marianne Kaiser, Karen Thodberg, Mette S. Herskin

I can't get no sleep – Effects of husbandry and sex on sleep quantity in dairy calves
Sarah Mösel, Lukas Lindenberg, Moritz Fölsing, Jenny Stracke

12:00 **Identification and characterization of mismothering types in beef cattle and their associated risk factors**

Emma Roux, Jennifer Pearson, Maria Camila Ceballos, Claire Windeyer, Ed Pajor

The impact of social isolation on laboratory rodent health, replicability and translatability: a systematic review and meta-analysis
Jessica Cait, Marc T. Avey, Georgia Mason

12:15 **Consistent explorers: daily ranging variability, not duration or frequency, is linked to range motivation in meat chickens**

Peta Taylor, Derek Schneider, Jean-Loup Rault

Feather pecking and cannibalism prevalences on laying hen farms with mobile or stationary houses
Katrin Dorkewitz, Christiane Keppler, Daniel Gieseke, Simon Horbach, Ute Knierim

12:30 **Lunch (Packed lunch for excursion participants) Restaurant**

13:00 **Excursions:**

- AAP: Exotic mammal rescue centre
- Guided walk in nature reserve Oostvaardersplassen
- Explore Utrecht
- Farm visit 'Hoeve Boveneind' and outdoor farm golf

- Farm visit 'Veld en Beek'

- Fish welfare and insect breeding

- Visit the Faculty of Veterinary Medicine

- DierenPark Amersfoort (zoo) through the lens of animal behavior science

Thursday, 7 August

09:00 **Plenary talk - Animal cognition****Theatron***Chaired by: Liesbeth Bolhuis and Rebecca Nordquist***Lessons learned – the past, present, and (potential) future of farm animal cognition research***Christian Nawroth***Animal cognition****Theatron***Chaired by: Liesbeth Bolhuis and Rebecca Nordquist***Housing and management meeting behavioural needs****Megaron***Chaired by: Maria Diez-Leon and Lara van Veen*09:30 **Exploring the role of inhibitory control in horses' coping behaviour***Marie von der Tann, Rupert Palme, Uta König von Borstel, Désirée Brucks***Housing and management of backyard ducks in the US***Maja Makagon, Carly Moody*09:45 **Paying attention to attention: the effect of attention states on word learning in typical family dogs***Irisz Legendy, Csenge Jáger, Dorottya Júlia Ujfalussy***Odourised straw prolongs straw-engagement, and increases play and rubbing behaviour in growing pigs***Maria Vilain Rørvang, Johanna Stenfelt, Sarah-Lina Aagaard Schild, Rebecca Grut, Cady W. Chan, Heta Rautiainen, Madeleine Ketner, Anna Wallenbeck, Anna Valros, Birte Nielsen*10:00 **What key features makes the goat's face so unique to its fellow goats?***Jan Langbein, Anja Eggert, Katrin Siebert***Effective environmental enrichment for group-housed calves in pastoral dairy systems***Rhiannon Cox, Peta Taylor, Sarah Andrewartha, Oliver Radford, Megan Verdon*10:15 **Can house crickets (*Acheta domesticus*) weigh costs and benefits? Cognitive tests that inform insect sentience***Amber Goede, Alexander Haverkamp, Dominique Tolsma, Laura Webb***Positive behavioral and welfare effects of structural enrichment on captive European seabass***Noelia Rodríguez López, Alba María Orgaz Ávalos, Esther Hoyo-Alvarez, Héctor García Palencia, Diego Aceituno Seoane, Nicolás Sáenz Lechón, Juana María Gutiérrez Arriola, Pablo Arechavala-Lopez*

10:30

Biopolymer-based nesting material enhances nest-building behavior and welfare in farrowing sows*Thiago Bernardino, Matheus Saliba Monteiro, Bruno B.D. Muro, Marcos Vinicius Batista Nicolino, Ana Lígia Braga Mezzina, Rafaella Fernandes Carnevale, Roberta Yukari Hoshino, Giovanni Luis Santos de França, Erich Herzongenrath Cavaca Inácio, Cesar Augusto Pospissil Garbossa*10:30 **Tea and coffee break - sponsored by Nederlandse Voedsel- en Warenautoriteit****Animal Cognition****Theatron***Chaired by: Oluwaseun Iyasere and Vivian Goerlich***Housing and management meeting behavioural needs****Megaron***Chaired by: Maria Vilain Rørvang and Christina Rufener*11:15 **Standing in the way of control: physiological predictors of performance in horses in a stop-signal paradigm***Louise Evans, Heather Cameron-Whytock, Annika Paukner, Carrie Ijichi***Aquaculture-related soundscapes increase startle response, latency to feed, and aggression rate but not the feed intake or physiology of *Clarias gariepinus****Oluwaseun Ojelade, Ikililu Abdulraheem, Abiodun Akinde, Aminat Tijani, Mubarak Bamgbopa, Bosede Fasiku, Adeyemi Oluwaseyi*11:30 **Dogs experiencing chronic pain from osteoarthritis may experience inhibited improvement in cognitive test paradigms over time despite pain relief compared to healthy dogs***Maggie Creamer, Zoe Loh, Eleanor McNamee, KyShaun Bowie, Briana Dopfel, Nicole Harris, Sera Hill, Javian McMillan, Urwa Rashid, Lauren Sneed, Jennifer Thompson, Masataka Enomoto, Liubov Arbeeveva, Duncan Lascelles, Margaret Gruen***Early life matters: intensification of smolt production in Recirculating Aquaculture Systems (RAS) fundamentally compromises salmon welfare at sea***Patricia Alves Pereira, Cynthia Schuck-Paim*

11:45	Chickens may perceive humans as social buffers and attend to human-given cues <i>Vitor Ferreira, Calesse Elise, Lucille Dumontier, Fabien Cornilleau, Julie Lemarchand, Auriane Foreau, Maxime Quentin, Léa Lansade, Celine Tallet, Xavier Boivin, Ludovic Calandreau</i>	Play behaviour of dairy calves in different housing systems <i>Pernille Olsen, Laura Whalin, Julie Føske Johnsen, Ruth Newberry</i>
12:00	Do welfare-enhancing conditions and measures on stress relate to cognitive training performance in weaned piglets? <i>Gwendoline Karoui, Celine Tallet, Jamie Ahloy-Dallaire</i>	Do laying hens show a rebound effect after the closure of a covered veranda? <i>Sabine G. Gebhardt-Henrich, Matthew Petelle, Michael Toscano</i>
12:15	Poster pitches Theatron Chaired by: Oluwaseun Iyasere and Vivian Goerlich	Poster pitches Megaron Chaired by: Maria Vilain Rørvang and Christina Rufene
	Assessment of inhibitory control in horses - development of a test battery <i>Marie von der Tann, Uta König von Borstel, Désirée Brucks</i>	The effects of pelleted forage on cross-sucking surrounding milk meals in pair-housed dairy calves <i>Gillian Plaugher, Emily Hiott, Melissa Cantor</i>
	Anticipatory behavior of post-weaned sows prior to feed delivery <i>Sarah Ibach, Thomas D. Parsons</i>	Foraging for flavour: how edible enrichment shapes behaviour in brown- and white- feathered birds on commercial rearing farms in Ontario <i>Jasmin Schiestel, Nienke van Staaveren, Mike Petrik, A. Michelle Edwards, Tina M. Widowski, Alexandra Harlander</i>
	Integrating behavioral health into veterinary care: a national survey in Belgian companion animals <i>Sofie Salden, Morgane Van Belle, Gaëlla van Walraven, Christel Moons, Jimmy Saunders, Anouck Haverbeke</i>	Behavioral changes in captive Bengal slow lorises (<i>Nycticebus bengalensis</i>) with enrichments <i>Kareem Said Ismail, Stephen Chan, Jeffrey Chu, Yuanyuan Zhang</i>
	Is the animal in pain? A pilot-study on the communication between animal owners and veterinarians <i>Anja Pedersen, Elsa Lindström, Olivia Bäckström, Anna Bergh</i>	Moving individually housed dairy calves early (11 days of life) rather than late (56 days of life) to group-housing: effects on behaviour, stress levels and health - A pilot study <i>Karolin Gondolf, Anina Vogt, Uta König von Borstel</i>
	Dogs' (<i>Canis lupus familiaris</i>) reactions to high volume ultrasonic stimuli: evaluating its potential as a non-lethal deterrent for wolves (<i>Canis lupus</i>) <i>Annika Held, Anna Lena Blaschke, Melissa Vanderheyden, Franziska Kuhne, Henrik Wagner, Katja Trinkaus, Uta König von Borstel</i>	Barn climate advice and pig tear staining: preliminary insights into an emerging welfare indicator <i>Kenny van Langeveld, Nienke van Staaveren, Noémie van Noten, T. Bas Rodenburg, Frank Tuytens</i>
	The welfare assessment of goats: an abattoir-based study in Pakistan <i>Asfa Sakhawat, Rebecca Doyle, Muhammad Hayat Jaspal, Peter Thomson</i>	Pecking blocks reduce feather pecking and improve plumage condition of hens in enriched colony systems <i>Madeleine McAuley, Nienke van Staaveren, Alexandra Harlander, A. Michelle Edwards, Tina M. Widowski</i>
	Comparing training methods to promote better animal welfare, pain management, and the 3Rs for animals in the research and teaching industry using the Grimace Scales <i>Shari Cohen, Sabrina Lomax, Lauren Hemsworth, Joy Tripovich, Kate Brandis, Eve Slavich, Joy Becker</i>	Perching requirements for pullets: preferences for grasping and elevation <i>Madison Penney, Alexandra Harlander, Vicky Sandilands, Janice Siegford, Tina M. Widowski</i>
	Can they adjust? Understanding the behaviour of adopted northern Canadian community dogs from the perspective of their new owners <i>Dani Sorbie, Andrew Cooke, Beth Ventura</i>	Dairy cow-calf contact systems: a characterization of practices in USA and Canada <i>Marine Durrenwachter, Emeline Nogues, Dave L. Renaud, Joao H.C. Costa, Kate Creutzinger</i>
	Feeding behavior patterns and performance: within-calf starter intake variability is associated with solid feed intake <i>Ekaterina Lopez-Bondarchuk, Tadeu Eder Da Silva, Joao Vitor Ribeiro Lovatti, Joao H.C. Costa</i>	Early peer housing allows for behavioural opportunities in dairy calves <i>Michail Moroz, Laura Whalin, Joao H.C. Costa, Ruan Daros</i>
	A descriptive study of beef cow reactivity consistency over time <i>Eva Mutua, Ed Pajor, Manuel Juárez, Aline Sant'anna, Claire Windeyer, Maria Camila Ceballos</i>	Perch use of male layer chickens under experimental rearing conditions <i>Nadja Zimmermann, Yamenah Gomez</i>

Rethinking temperament trait evaluation: a scoping review of tests and methodologies used to assess temperament traits in livestock animals <i>Guadalupe Ceja, Peyton Roberts, Courtney L. Daigle</i>	Effects of two free farrowing systems on the productive performance and welfare of sows <i>Nancy Huanca, Laura Estévez Moreno, Genaro Miranda- de la Lama, Adriana de Pilar Pastrana Camacho</i>
Small but mite-y: Influence of northern fowl mite infestation level on laying hen behavior <i>Hayley Sutherland, Luiz Brito, Amy Murillo, Marisa Erasmus</i>	Optimizing nestbox design: the impact of airflow and visual seclusion on farmed mink (<i>Neogale vison</i>) behaviour and welfare <i>Rosemarijn van Schaik, Rebecca Meagher, Maria Diez- Leon</i>
Falling down or falling asleep: nocturnal behaviours of horses with sleep disorders <i>Iina Brotherus, Anna Mykkänen, Marianna Norring, Tarja Pääkkonen, Aino Rehn, Henna-Kaisa Wigren, Laura Hänninen</i>	Spotting the signs: early life traits associated with tail damage in pigs <i>Rutu Galea, Mark Stevenson, Megan Lucas, Kate Plush, Rebecca Morrison, Paul Hemsworth, Lauren Hemsworth</i>
Continuous recording of oral abnormal repetitive behaviors in Jersey and Holstein post-weaned heifers <i>Isabelle McDonald-Gilmartin, Chloe Bolanos, Blair Downey, Cassandra Tucker</i>	Giving donkeys a good life: an applied example of designing housing to meet the behavioural needs of donkeys <i>Sarah Worth, Craig Dunton, Maxine Carter, Ben Hart, Stuart Norris, Jo Hockenhill, Hannah Bryer, Ruth Angell</i>
Changes in the frequency of social interactions in captive shoebills after separation of male and female <i>Izumi Narasaki, Toshihiro Nagashima, Noriko Katsu, Kazunori Yamada</i>	Care of the elderly hen: Do keel bone damage and foot problems affect the roosting preferences of older laying hens? <i>Steeley Ellis, Linda Caston, Alexandra Harlander, Madison Penney, Vicky Sandilands, Janice Siegford, Tina M. Widowski</i>
Effects of swine appeasing pheromone on weaning stress: physiological evaluation of plasma glucose levels in piglets <i>Jade Pellenz, Yuso Tutida, Fabricio Beker, Cleandro Pazinato Dias</i>	Comparing the influence of housing conditions and age at the start of preparation for stallion licensing on the horses' behavior during a novel object test <i>Tina Engler, Katharina Kirsch, Lara Klitzing, Fabienne Eichler, Mechthild Wiegand, Gundula Hoffmann, Christa Thöne-Reineke</i>
An evaluation of the relationship between beef cattle grazing activity traits and conception methods during the breeding season <i>Jason Dubowsky, Amelia Katz, Julie Huzzey, Zachary McFarlane</i>	Farmed fish welfare in Egypt: Surveying current practices and future directions for tilapia culture <i>Wasseem Emam, Mohamed Bakr, Charlotte Flores, Christopher Bryant</i>
Effects of selection for divergent levels of social motivation on behavioral repertoire and synchronization in Japanese quail (<i>Coturnix japonica</i>) <i>Jeanne SERESSIA, Marie Gellé, Fabien Cornilleau, Julie Lemarchand, Léa Lansade, Ludovic Calandreau, Vitor Ferreira</i>	Comparative behavioral analysis of Berkshire and LWD piglets in Free Farrowing System <i>Yuki Tokunaga, Haruki Kimoto, Anju Shimizu, Saya Takayama, Takeshi Yamanaka, Toshiaki Inenaga, Shuichi Ito</i>
A pilot study of physical activity and sleep in dogs and dog owners participating in a joint outdoor exercise program <i>Klara Smedberg, Anna Bergh, Erika Roman, Sören Spörndly-Nees, Jan Eriksson, Lena Kallings, Josefin Söder</i>	3D Pose estimation reveals variations in discomfort-alleviating motions when getting up in restrictive cubicles <i>Adrien Kroese, David Berthet, Lena-Mari Tamminen, Nils Fall, Moudud Alam, Niclas Höglberg</i>
A systematic review of public perspectives of zoo animal behaviour and welfare <i>Nicki Phillips, Laëtitia Maréchal, Beth Ventura, Jonathan Cooper</i>	Effect of a new fennel essential oil composed environmental enrichment on the feeding behavior of rabbits <i>Leandro Batista Costa, Isabela Bez, Juliana Melo Pankratz, Anna Clara Marques Souza, Mariana Blanc Taques, Iasmin Leoni Rocha Salles</i>
Effect of a specific sensory additive on human fear test response and wellbeing in broilers production before catching <i>Juliette Foglio, Aline Flament, Elisa Arnaud, JeanFrançois Gabarrou</i>	Assessing owner ratings of dog pain sensitivity and their association with everyday dog behavior through questionnaires <i>Felicia Palm, Eva Hydbring-Sandberg, Erika Roman, Katja Nilsson, Anna Bergh, Katja Höglund, Eva Kosek, Kenth Svartberg</i>
12:45 Lunch Restaurant	Table Topics Restaurant

14:15	Plenary talk - Behavioural problems in veterinary practice Theatron <i>Chaired by: Saskia Arndt and Océane Schmitt</i>	
	Essentials of Clinical Ethology <i>Claudia Vinke</i>	
	Behavioural problems in veterinary practice Theatron <i>Chaired by: Saskia Arndt and Océane Schmitt</i>	Housing and management meeting behavioural needs Megaron <i>Chaired by: Vicky Sandilands and Lu Luo</i>
14:45	Genetics of anxiety and OCD in dogs <i>Alexandra Dwulit, Megan Dillon, Rachael Thomas, Julia Labadie, Rajendra Morey, Matthew Breen</i>	Care to share? Using social feeding behaviour as a novel method of assessing social motivation <i>Sarah Kappel, Emeline Nogues, Daniel Weary, Nina von Keyserlingk</i>
15:00	Exploring cat quality of life: bridging subjective perceptions and objective assessments <i>Andrea Sommesse, Katharina Galunder, Christine Arhant, Raffaella Lesch, Akos Pakozdy, Zsófia Viranyi, Ines Windschnurer</i>	Do trees matter? A comparison of pig behaviour in agroforestry and grassland systems in a temperate maritime climate <i>Stephanie Buijs, Nicola Mitchell, Rodrigo Olave, Ramon Muns</i>
15:15	Effects of single- or pair-housing on the welfare of shelter dogs: behavioral and physiological indicators <i>Erica Feuerbacher, Grace Hecker, Katherine Martineau, Mariah Scheskie, Rhonda Hammerslough</i>	Novel insights into lactating sow behavior after release from temporary crating <i>Thomas D. Parsons, Zachary Royle</i>
15:30	Clicking with cats: assessing socialization methods on Domestic Cat (<i>Felis catus</i>) behaviour in the animal shelter environment <i>Katie Burt, Julie Posluns, Carolyn Walsh</i>	The effect of fermentable diets fed to pigs on startle reflex and response to a novel arena <i>Kate Plush, Lauren Staveley, Sally Tritton, Edward Clayton, Robert Hewitt, Darryl D'Souza</i>
15:45	Does cat's personality and behaviour during veterinary consultations influence their physiological parameters? <i>Paula Cieslinski, Ruan R. Daros</i>	Impact of limited and unequal wing use on resource utilization and keel bone integrity in laying hens <i>Renee Garant, Bret Tobalske, Neila BenSassi, Nienke van Staaveren, Dan Tulpan, Tina M. Widowski, Donald Powers, Alexandra Harlander</i>
16:00	Tea and coffee break	
	Free papers Theatron <i>Chaired by: Else Verbeek and Laura Hänninen</i>	Free papers Megaron <i>Chaired by: Cassandra Tucker and Isabela Bez</i>
16:45	Stability of social network metrics for indoor-housed pigs (<i>Sus Scrofa</i>) after group disruption <i>Jen-Yun Chou, Abigail Tillton, Sarah Ambruosi, Jean-Loup Rault, Irene Camerlink, Keelin O'Driscoll</i>	A first look at the ear directed behaviours of weaner pigs after the development of ear necrosis <i>Lucy Markland, Keelin O'Driscoll, Finola Leonard, Laura Boyle</i>
17:00	Boosting statistical power in ethology: continuous data are superior to ordinal and binomial data <i>Frank Tuytens, Bart Ampe</i>	Seeking social touch: the involvement of the opioid reward system on the hedonic response of fish <i>Marta Soares, Heloysa Araújo-Silva, Inês Rodrigues, Ana Luchiari, João Saraiva, Caio Maximino</i>
17:15	Full repertoire of Pekin duck vocalizations & effects of specific vocalizations on conspecifics suggest alarm and calming calls <i>Jenna Schober, Gregory Fraley</i>	Comparison of different dominance indices for determining social rank positions in groups of weaned piglets <i>Michaela Fels, Swetlana Herbrandt, Nicole Kemper</i>
17:30	Annual General Meeting ISAE Theatron	
19:30	Congress dinner Fort Voordorp	

Friday, 8 August

09:00 **Plenary talk****Theatron***Chaired by: Eddie Bokkers and Sabine Dippel***Let's be Open: Improving Data Sharing Practices in Applied Ethology***Sarah Adcock***Automated monitoring of behaviour****Theatron***Chaired by: Eddie Bokkers and Sabine Dippel***Human-animal interactions****Megaron***Chaired by: Janne Winther Christensen and Kathalijne Visser*09:30 **Tracking broiler breeder movements: examining sex differences in space use with UWB technology***Annemarie Mens, Malou van der Sluis, Rick van Emous***Development of sheep responsiveness to human body odor, specifically odor cues driven by emotional states***Iz'ia Larrigaldie, Fabrice Damon, Léa Lansade, Benoist Schaal, Alexandra Destrez*09:45 **Standing out from the flock: using automated assessment of behaviour to understand individual sheep behaviour and welfare***Cathy Dwyer, Michelle Reeves, Ann McLaren, Nicola Lambe, Aimee Walker, Fiona Kenyon, Claire Morgan-Davies***Manners over mood? Dogs' trainability—not their emotion—earns them office access***Joni Delanoëje*10:00 **Behavioural and cardiac responses of European seabass in sea-cages: Insights for welfare states assessment***Esther Hoyo-Alvarez, María J. Cabrera-Álvarez, Margalida Vanrell, Arjan P. Palstra, Pablo Arechavala-Lopez***Behavioural reactivity of indigenous and commercial lambs towards humans***Maud Bonato, Jasper Cloete, Schalk Cloete*10:15 **Monitoring flock-level spatial behavior for stress detection in commercial laying hens***Lara van Veen, Anne van den Oever, Henry van den Brand***Emotional contagion from humans to horses through odors***Plotine Jardat, Alexandra Destrez, Fabrice Damon, Noa Tanguy-Guillo, Anne-Lyse Laine, Céline Parias, Reigner Fabrice, Vitor Ferreira, Ludovic Calandreau, Léa Lansade*10:30 **Poster pitches****Theatron***Chaired by: Eddie Bokkers and Sabine Dippel***Poster pitches****Megaron***Chaired by: Janne Winther Christensen and Kathalijne Visser***Identification and classification of pig vocalisations in the context of tail-biting***Adèle Denis, Océane Amichaud, Alexandre Poissonnet, Johan Thomas, Patrick Touanel, Carole Guerin, Celine Tallet, Valérie Courboulay***Can riders identify sleep deprivation in their horses prior to competitions?***Angela Perrone Barbosa, Tiago Marcelo Oliveira, Sarah Sarah Raphaëla Torquato Seidel, Paula Keiko Anadão Tokawa, Fernando Mosquera Jaramillo, Neimar Vanderlei Roncati, Raquel Yvonne Arantes Baccarini***Expression of sickness behaviors is linked to personality traits in dairy calves with neonatal diarrhea***Allison Welk, Heather Neave, Joao Henrique Cardoso Costa, Melissa Cantor, Charlotte Winder, Dave L. Renaud***Impact of rider levels and horse experience on heart rate variability in riding lesson horses***Caleigh Copelin, Lais Rabel, Katrina Merkies***Associations between feed efficiency and feeding patterns in yearling Angus bulls***Amelia Katz, Jason Dubowsky, Julie Huzzey, Zachary McFarlane***Methods for improving shelter cat welfare during routine nail trims***Jennifer Link, Julie Posluns, Carly Moody***Development of an automated tool for monitoring tail length and lesions in pig slaughterhouses***Angela Ramon-Perez, Sofia Gol, Joan Arbat, Josep Reixach, Pol Llonch***Effects of maternal rearing on the emotional reactivity of goat kids and their relationship with humans before and after weaning***Marianne Berthelot, Nadège Aigueperse, Maylis Duminil, Aurélie Lecacheur, Flavien Delvaux, Blanche Deloupy-Dobin, Jérôme Boucherot, Anthony Retord, Thierry Fassier, Elodie Chaillou, Raymond Nowak, Marie-Madeleine Mialon*

Automated detection and classification of laying hen vocalizations using a pre-trained transformer <i>Antonis Golfidis, Buddhadas Pralle Kriengwatana, Mina Mounir, Tomas Norton</i>	Is there vertical social transmission of the animal-human relationship in pigs? <i>Marietta Amann, Susanne Waiblinger, Paul Hemsworth, Lena Lidfors, Stephanie Lürzel</i>
Relative changes in feeding behavior as indicators of calf training success on robotic milk feeders <i>Breanna Bone, Robert James, Melissa Cantor</i>	Integrating temperament and physiology: A strategic approach to white-lipped peccary (<i>Tayassu pecari</i>) conservation <i>Lucas Rossini, Sérgio Nogueira-Filho, José Maurício Duarte, Selene Nogueira</i>
Identifying tail-biters before damage occurs: A tracking-by-detection approach <i>Clémence A.E.M. Orsini, Shoujun Huo, Jacinta Bus, Patrick P.J.H. Langenhuizen, Peter H.N. De With, Piter Bijma, Liesbeth Bolhuis, Inonge Reimert</i>	Bark to the future: a mixed-method investigation of dog owners' views on dog monitoring technologies <i>Luís Fernando Costa Garrido, Ruan R. Daros, Bianca Vandresen, Courtney Graham, Beth Ventura</i>
Dynamics of milking behavior and performance of Holstein cows affected by mastitis in an automatic milking system <i>Constanza Hernandez-Gotelli, Pablo Pinedo</i>	Behavior and personality of Holstein dairy and dairy × beef crossbred calves <i>Madison Pinkerton, Heather W. Neave, Jessica Pempek</i>
Exploring the use of a computer vision-based mapping technique to estimate laying hen position in cage-free housing environments <i>Gideon Ajibola, Logan Orians, Javier Garcia, Esteban Fernandez-Juricic, Deana Jones, Gregory Fraley, Patrick Zollner, Darrin Karcher, Marisa Erasmus</i>	Using the Behaviour Change Wheel to understand practice change in the Australian sheep industry <i>Madeleine Woodruff, Stuart Barber, Carolina Hess, Grahame Coleman, Rebecca Doyle</i>
Measurement of dogs' activity pre- & post-adoption <i>Grace Phillips, Lisa Gunter</i>	Snack-based administration of Neem Cake in calves: a strategy to reduce physical restraint <i>Juliana Melo Pankratz, Saraane Cristina da Costa, Matheus de Freitas Nascimento, Michail Moroz, Daniel Ollhoff</i>
Connecting ear motions to emotions: the use of computer vision to detect ear postures in dairy cows <i>Imran Ullah Gondal, Jan C Plaizier, Christopher Henry, Meagan TM King, Gabriel Dallago</i>	Feline stakeholder attitudes and opinions on community cat welfare (Part II) <i>Nattawipa Ampaiwan, Jacquelyn Jacobs</i>
Multi-camera tracking of Jersey cattle in calving pens <i>Mahejabeen Hossain Nidhi, Chuanyi Guo, Li Lyu, Zheng He, Zhaojin Guo, Kai Liu, Kate Flay</i>	Do topical gels containing oleic acid and fish oil reduce the piglet pain response following surgical castration? <i>Omowumi Olatinwo, Jennifer Young, Tetiana Shevtsova, Andriy Voronov, Christopher Byrd</i>
Using data from automated calf feeders to predict weaning performance of dairy calves <i>Malina Suchon, Théo Quemener, Laura Field, Marina von Keyserlingk, Daniel Weary</i>	Getting close up: the influence of dominance, sex and kinship on physical contact in pigs <i>Piero Seddaiu, Simon Turner, Irene Camerlink</i>
Milking behaviour dynamics in cows affected by lameness in a multibreed batch milking dairy with automated milking units <i>Pablo Munoz Boettcher, Juan Velez, Nelson Rodriguez, Pablo Pinedo</i>	Improving laboratory pig welfare in high-impact infectious disease studies <i>Rachel Layton, David Beggs, Peter Mansell, Andrew Fisher, Daniel Layton, Sarah Riddell, Grace Taylor, Teegan Allen, Elisha Soldani, David Williams, Kelly Stanger</i>
Preference in milking robot station throughout the lactation of Holstein, Jersey, and Holstein x Jersey crossbred cows in an automatic batch milking system <i>Richard Weng Zheng, Juan Velez, Nelson Rodriguez, Pablo Pinedo</i>	Effect of plumage colour on fear behaviour in intensively raised guinea fowl keets <i>Afusat Ladejobi, Oluwaseun Iyasere, Samuel Durosaro, Mathew Wheto, Damilola Adebambo, John Shoyombo, Olayinka Alabi, Olayanju Adebisi, Abdulmojeed Yakubu, Osamede Osaiyuwu, Mustapha Popoola, Comfort Ukim, Babatunde Illori, Olufunmilayo Adebam</i>

	Evaluating geolocation collar data for monitoring livestock health and parturitions in mountainous areas <i>Roger Vidal, Emma Fàbrega, Antoni Dalmau</i>	Associating behavioral and physiological biomarkers with judgment bias test outcomes in weaned pigs <i>Vivian Witjes, Ingrid de Jong, Francisca Velkers, Liesbeth Bolhuis, Annemarie Rebel, Arjan Stegeman, Ellen Meijer</i>
	Technology vs. tradition: analyzing foraging enrichment use in laying hens with RFID and video observations <i>Violet Hipkin, Alexandra Harlander, Elijah G. Kiarie, A. Michelle Edwards, Tina M. Widowski</i>	Evaluating the impact of age and diurnal rhythm on the development of the behavioral repertoire of broiler chicks <i>Alexandra Jackson, Denise Landers, Dianna Bourassa, Joseph Purswell, Bethany Baker-Cook</i>
	Accelerometers as a tool for studying aviary style and age effects on laying hen activity <i>Xiaowen Ma, Janice Siegford, Vrinda Ambike, Jacquelyn Jacobs, Janice Swanson, Tina M. Widowski, Ahmed Ali</i>	
	Effects of age and diet on calf activity during ferry and road transportation <i>Susanne Siegmann, Luca van Dijk, Niamh Field, Gearoid Sayers, Katie Sugrue, Kees van Reenen, Eddie Bokkers, Muireann Conneely</i>	
11:00	Tea and coffee break	
	Automated monitoring of behaviour Theatron <i>Chaired by: Iris Boumans and Clémence A.E.M. Orsini</i>	Human-animal interactions Megaron <i>Chaired by: Sabine Gebhardt-Henrich and Bianca Vandresen</i>
11:45	Assessing ewe welfare: ewe-lamb distance measured by Bluetooth Low Energy data <i>Michelle C. Reeves, Aimee Walker, Fiona Kenyon, Tony Waterhouse, Ann McLaren, Claire Morgan-Davies, Nicholas Jonsson, Emma Baxter, Cathy Dwyer</i>	Do not disturb: Daily handling prolongs development, reduces survival, and decreases body size in farmed adult black soldier flies (<i>Hermetia illucens</i>; Diptera: Stratiomyidae) <i>Samuel Durosaro, Mariangeles Zacarias, Erin Atkinson, Alexander Glica, Angie Gomez, Ellie Jones, Elijah Persson-Gordon, Rodrigo Rodriguez-Guevara, Meghan Barrett</i>
12:00	Automated video-based recognition of tail and ear biting in pigs <i>Qinghua Guo, Clémence A.E.M. Orsini, Patrick P.J.H. Langenhuizen, Yue Sun, Shoujun Huo, Inonge Reimert, Liesbeth Bolhuis, Piter Bijma, Peter H.N. De With</i>	High rank, low stress – hierarchy-dependent behavior of dogs in the Strange Situation Test <i>Viktória Bakos, Kata Vékony, Péter Pongrácz</i>
12:15	Validation of a 3D camera system to monitor pig behaviour in response to vaccines and other challenging events <i>Rick D'Eath, Emma Baxter, Simone Foister, Gita Utama</i>	Can a novel on-site behavioral test identify new personality traits for weaned piglets? <i>Isabela Bez, Gabriel K. Nakamura, Beatriz Soares Souza, Leandro Batista Costa, Heather W. Neave, Ruan R. Daros</i>
12:30	Development and computer-assisted validation of an RFID system for monitoring night-time perching behaviour in chickens <i>Serge Alindekon, T. Bas Rodenburg, Jan Langbein, Birger Puppe, Olaf Wilmsmeier, Sebastian Wille, Helen Louton</i>	What can rats teach us about positive animal welfare? <i>Alistair Lawrence</i>
12:45	Closing ceremony Theatron	
13:30	Lunch Restaurant	
14:30	Excursion Lely Farm	

POSTERS

Giraffe networking: how do changes in group composition affect social networks amongst male bachelor groups?*Bieke Beris, Stijn Berger, Vivian Goerlich***Insights on key actions to reduce lameness in dairy cattle: perspectives across Canada's dairy industry***Anne-Marieke Smid, Steven Roche, Daniel Weary, Herman Barkema, D. Santschi, Laura Solano***Errorless learning in the laboratory: teaching rhesus macaques in brain-computer interfacing studies***Kylie Thurman, Autumn Sorrells***Single housing of laboratory mice – are legal requirements being met?***Elin Weber***Habits, happiness or having no time? Exploring why 'enrichments' reduce stereotypic behaviour to different extents in different mice***Shay Forget, Lindsey Kitchenham, Georgia Mason***Daily life animal behavior and human affect: insights from experience sampling***Mayke Janssens, Jannes Eshuis, Karin Hediger, Nele Jacobs, Sanne Peeters***The welfare potential of cage-free farming systems***Eimear Murphy, Amélie Legrand***Feeling good? Positively-valenced behavior of fast- and slow- growing broilers in low- or high-complexity environments***Leonie Jacobs, Samantha Vitek, Alexandra Ulans***Impact of calf creep area position on lying behavior and hair cortisol level in Swiss suckler cow systems***Christopher Geßenhardt, Antonia Ruckli, Ariane Stratmann, Adrian Steiner, Christina Rufener***Welfare-relevant indicators of ear disease in a pedigree rabbit population***Maria Jackson, Michaela Betts, Joanna Hedley, Charlotte Burn***Will you trust me? Behaviour of calves towards their caretakers and vice versa in cow-calf contact rearing systems with pasture***Susanne Waiblinger, Denise V. Hebesberger***The effect of unpredictable chronic mild stress on the neurogenesis of laying hens***Lubor Kostal, Lenka Plšková, Katarína Pichová, Ľubica Niederová***Insights from a 31-year study demonstrate an inverse correlation between recreational activities and red deer fecundity, with bodyweight as a mediator***Martijn J.A. Weterings, Estella Y.C. Ebbinge, Beau N. Strijker, Gerrit-Jan Spek, Henry J. Kuipers***Comparing physiological responses and behaviour of exercising horses in the automated horse walker and on the lunge***Rebeka Zsoldos, Theresia Licka, Brittany Nurse, Anne Beasley, Maria Vilain Rørvang***Two restraining devices in connection to surgical castration with or without local anesthesia: effects on piglet stress***Ann-Helena Hokkanen, Mathilde Coutant, Mari Heinonen, Marianna Norring, Magdy Adam, Tiina Bergqvist, Claudio Oliviero, Anna Valros***Towards a threshold for the ammonia concentration in pig barns***Marc Bracke***Effect of equine-assisted therapy sessions on horse stress parameters***Imène Ilès, Yasmine Bencharef***Voluntary toilet training of dairy heifers***Lena Skånberg, Anette Wichman, Elke Hartmann, Daiana de Oliveira, Else Verbeek, Kirste McCrea, Harry Blokhuis***Animal welfare challenges and solutions in agroecology***Agnese Balzani, Patrick Muinde, Hannah Larsen, Monica List, Beryl okumu, Paew Pirom***Can strategic collaboration make 'A Good Life' possible for chickens on a global scale?***Mia Fernyhough, Giovanni Fabris***The effects of mare-foal attachment, parity, and foal sex on mare welfare at weaning***Aline Bouquet, Christine Nicol, Ambre Amandine Emilie Jacquart, Janne Winther Christensen, Maria Diez-Leon***The use of anti-sucking rings in cattle: assessments at the slaughterhouse***Livia Dumont, Marc Kirchhofer, Adrian Steiner, Christina Rufener*

Does grooming enrichment enhances social interaction in indigenous Binjharpuri calves (*Bos indicus*)?*Shaswat Das, Bhagirathi Panigrahi, Rajashree Rath, Jayant Kapgate***Sternal evaluation by palpation as an animal-based indicator of comfort around resting***Ricard Parés, Pol Llonch, Xavier Such, Xavier Manteca***Analysis of IACUC rejections of animal experiment in Korea (2019- 2023) with a focus on animal welfare***Sinae Cheon, Soohee Leem, Sinae Cheon, Seongeun Jang***Impact of aviary enclosure on wing flapping in cage-free laying hens***Valentina Bongiorno, Tina M. Widowski, Ahmed Ali, Janice Siegford***Intramuscular temperature and behaviour change as an early indicator of heat stress in operational police dogs in Queensland, Australia.***Jayne McGhie, Rebeka Zsoldos, Vincent Mellor, John Gaughan***Decoding behavioral and physiological cow variability through precision dairy technologies: a comprehensive analysis***Tadeu Eder Da Silva, Joao H.C. Costa***Gaushalas (cow shelters) in India - Current scenario and future perspectives***Arvind Sharma, Clive Phillips***Bovine appeasing substance minimally impacts behavioral and physiological indicators of welfare in beef calves purchased at auction***Elle Johnston, Robin Cheek, Jana Reynolds, Rosemary Whittle, Jeremy Powell, Beth Kegley, Shawna Weimer***Smoothing the way forward: a new approach to broiler mobility analysis***Rosemary Whittle, Shawna Weimer***Semi-open water sources minimally affect positive behaviors, but may influence negative behaviors in Pekin ducks depending upon the number of ducks per source***Jenna Schober, Gregory Fraley***Effects of farrowing crate enrichment placement on the behavior and welfare of suckling and post-weaned piglets***Katherine Klassen, Jessica Pempek, Brian Richert, Kristina Horback, Kara Stewart, Jeremy Marchant, Marisa Erasmus***The use of firocoxib and bupivacaine liposome injectable suspension to reduce pain in piglets surgically castrated and tail docked using a CO2 surgical laser***Abbie Viscardi, Maria Lou, Jessica Carnal, Misty Bear, Robin Schroeder, Kelly Lechtenberg, Michael Kleinhenz, Johann Coetzee***Description of toe-pecking behaviour in laying hens***Alex Johnny, Nina Wiese, Michael Toscano***Natural weaning in extensively managed suckler beef herds: effects on next year's calf***Dorit Albertsen, Peter Plate, Suzanne Held***Underwater hide and seek by a freshwater prawn***Chayan Munshi, Ishika Pal, Swapnanil Mondal***Weighing of mastitis and bluetongue welfare impairments in dairy cows using the Five Domains Model***Bart van den Borne, Floor Biemans, Mariska van-der- Voort, Quirine ten Bosch, T. Bas Rodenburg, Henk Hogeveen***Assessing heat stress in dairy cows by using three thermal comfort indices***Paula R. Huenchullán, Rodrigo Arias, Maximiliano Pizarro, Reinaldo Pinto Pinuer***Evaluating the impact of age and diurnal rhythm on the development of the behavioral repertoire of broiler chicks.***Alexandra Jackson, Denise Landers, Dianna Bourassa, Joseph Purswell, Bethany Baker-Cook***Can social behaviours of piglets inform us on their affective state? An experimental approach under contrasted housing conditions***Sarah Ambruosi, Ninon Le Scour, Loane Cabon, Frédéric Paboeuf, Elodie Merlot, Nicolas Rose, Severine Parois***Cow-calf contact and parity may affect the behaviour of cows as measured with Nedap activity sensors***Laura Whalin, Sabine Ferneborg, Stine G. Kischel, Julie Föske Johnsen***Excess deaths during global avian conservation translocations: estimating the extent of welfare compromise and identifying risk factors***Emma Mellor, Georgia Mason***Major changes required to improve welfare of veal calves in the Netherlands: a risk assessment***Lodi Lameris, Annika Voogt***Agrivoltaics in dairy farming: Conflicting concerns between animals' quality of life, and electricity generation***Matheus Deniz, Linley Viana Maciel, Karolini De-Sousa, Lenira El Faro, Maria J. Hötzel, Ricardo Ruthier*

Gilts are motivated to exit a stall*Thomas Ede, Thomas D. Parsons***What are we talking about when we talk about animal welfare in sustainable livestock systems?***Dengsheng SUN, Maria Vilain Rørvang, Laurence Smith***Happy farmers and happy cows: the relationship between positive animal welfare, farmer's attitudes and the economic potential of the farm***Else Verbeek, Björn Forkman, Lise Pinaqui, Linda Keeling***Human behavior change and animal welfare: large scale low stress handling implementation for mice and rats***Carly O'Malley, Sarah Thurston, Judy Murray, Patricia Turner, Elizabeth Nunamaker***Enhancing owner understanding and treatment success: the role of advanced imaging in canine behavioral and neurological disorders***Anouck Haverbeke, Gaëlla van Walraven, Sofie Salden, Jan Waelkens, Sofie Bhatti, Ine Cornelis, Emmelie Stock, Kathelijne Peremans, Jimmy Saunders***Effects of reward type and previous social experience on cognitive testing outcomes of weaned dairy calves***Jessica Bonney-King, Emily Miller-Cushon***Who's hogging the brush? Exploring pig brushing behaviour in a commercial environment***Niclas Högberg, Lena Skånberg, Oleksiy Guzhva, Rebecka Westin, Axel Sannö, Anna Wallenbeck, Maria Vilain Rørvang***Oxytocin and cortisol concentrations in milk from dairy goats with different social environment***Manja Zupan Šemrov, MA JA Peretin, Nina Kadunc-Čebulj***Tail and tunnel handling in female C3H mice: effects on behavior, eye- and tail temperatures***Hetty Boleij, José Lozeman-van 't Klooster, Saskia Arndt***Evaluation of alternatives to straw bedding for grower and finisher pigs commercial in indoor systems***Richard Mott, Nicola Mitchell, Marieke Fastovsky, Ramon Muns, Stephanie Buijs***From a pile of videos to a pile of hens?***Arjen van Putten, T. Bas Rodenburg, Mona Giersberg***Early detection of calf diarrhea using sensor technology***Hyungwook Kang, Vicky Sandilands, Marie Haskell, Susan Jarvis***Piglets play more when sow is free, all other things being equal***Marek Špinka, Anna Bennetová, Veronika Sekyrová, Gudrun Illmann***Cognitive enrichment for laying hens: A pilot study***Katarína Pichová, Lubor Kostal***Optimizing enrichment strategies to enhance hen longevity***Tom Van Hertem, Niels Demaitre, Sam Willems, Karen Vermeulen, Sabine Gebhardt-Henrich, Tomas Norton, Nathalie Sleeckx***Tricky trainees and troubled teachers: challenges in live laboratory animal handling classes***Andreia Costa, Júlio Borlido Santos, Anna Olsson***Size does matter – a visual discrimination-based judgement bias task for pigs***Sandra Dupjan, Annika Krause, Jan-Niklas Jordt***Sexually dimorphic symptoms of happiness: using rat tickling to investigate the biology of positive welfare and resilience***Vincent Bombail, Salvatore Galgano, Sarah Brown, Jos Houdijk, Alistair Lawrence***Evaluating scratching brush use in pasture-based dairy heifers***Laura Hunter, Cheryl O'Connor, Karin Schutz***A systematic review and meta-analysis of lameness scoring methods and the prevalence of lameness and claw disorders of dairy cows in North-West Europe***Wesley Wessels, Eddie Bokkers, Imke de Boer, Ellen Meijer, T. Bas Rodenburg, Miel Hostens, Gerrit Koop***Factors contributing to the prevalence of dairy cow lameness in selected milk shed areas of Bangladesh***M. Ariful Islam, Solama Akter Shanta***The association between body weight and hip and elbow dysplasia in Labrador retrievers of companion and gundog type***Karolina Engdahl, Sara Ringmark, Josefin Söder, Sanna Wiik, Joanna Engström, Linda Andersson, Sofia Malm, Charlotte Reinhard Bjørnvad, Åke Hedhammar, Katja Höglund*

Development of a welfare assessment strategy for gene-edited farm animals*Marie Haskell, Bingjie Li, Pamela Prentice, Cathy Dwyer***Growth performance, iron concentration and behavioural response of weaned pigs raised on different bedding materials***Adesina Ogunbode, Olufemi Adebisi, Temitope Bankole, Ismail Adamolekun, Ayoola Oluyemi, Funmilayo Adebisi***Activity and social behaviour of cows in Swiss dairy farming with confinement or pasture-based strategy***Janine Braun, Beat Reidy, Eddie Bokkers***By your side - Social support in a Judgement Bias Task decreases stress-related behaviours while not affecting task performance in pigs***Sara Hintze, Martina Kroell, Christoph Winckler***Can a one-shot session of a spatial discrimination task inform us on the affective states of pigs?***Sarah Ambruosi, Océane Mazan, Frédéric Paboeuf, Elodie Merlot, Nicolas Rose, Severine Parois***Judgment bias in turkey (*Meleagris gallopavo domestica*) when housed in a small versus very large group***Uta König von Borstel, Anina Vogt, Laura Mueller***Animal caretaker perceptions and experiences of the use of local anaesthesia in piglet castration in Finland***Saara Kupsala, Ann-Helena Hokkanen, Mari Heinonen, Laura Hänninen, Anna Valros***Prevalence of keel bone damages in layer chicken reared under different production systems within Njoro Sub county***Collins Kirui***OinkScope – a computer vision-based spatial intelligence tool for monitoring behaviour of group-housed pigs***Oleksiy Guzhva, Sarah-Lina Aagaard Schild, Anna Wallenbeck, Anna Valros, Birte Nielsen, Maria Vilain Rørvang***Effects of transport on end-of-breeding parent stock chickens***Yuko Moroki, Shoji Fukamachi***An exploratory study of factors influencing stress in mares of Hokkaido native horses during weaning process***Ayaka Takimoto, Rin Nakamura, Kotaro Yoshioka, Yusuke Hori, Masahito Kawai, Masayuki Nakamichi***The frequency of conflict behaviour in Icelandic competition horses is related to the prevalence of oral lesions***Janne Winther Christensen, Mette Uldahl***The maternal-offspring relationship in tailed and docked ewes and their lambs***Jocelyn Woods, Sarah Adcock***Physiological response of bucks of varying coat colours to diurnal changes in temperature and relative humidity***Femi Oyeniyi, Emmanuel Ewuola***Animal welfare indicators at the slaughterhouse (aWISH)***Helen Lambert, Frank Tuytens***Impact of stress triggered by wildfire on the ingestive behavior of beef cattle in São Paulo state, Brazil***Karolini De-Sousa, Matheus Deniz, Lenira El Faro, Sarah Bonilha***Effect of feed and water provision strategies on broiler breeder pullet drinking behavior***Allison D. Weaver, Lisa R. Bielke, Ramon D. Malheiros, Sara K. Orlowski, Allison N. Pullin***Can we predict cat behaviour in veterinary consultations through personality assessment?***Paula Cieslinski, Ruan R. Daros***Cow Agency: Investigating self-regulated dry-off for cows in an automatic milking system***Megan Woodrum Setser, Elizabeth McGuire, Jennifer Van Os, Jimena Laporta, Ryan Pralle, Joao Dorea, Kate Creutzinger***Evidence of negative effects of piglet tail-docking and castration on sow welfare***Katarína Bučková, Lainey J. Tomko, Kailey M. Arnold, Anna K. Johnson***Providing uniform or gradient light intensity to broilers and layer pullets and its effects on behaviour, activity level and distribution within pens***Jerine van der Eijk, Thea van Niekerk, Rodania Bekhit, Henk Gunnink, Merel de Boer, Ingrid de Jong***Vocal correlates of negative emotional arousal in lambs (*Ovis aries*): relationship with behavioural and physiological indicators***Stefania Celozzi, Zoé Miot, Paul Renaud-Goud, Silvana Mattiello, Elodie Floriane Mandel-Briefer, Avelyn S. Villain***Suckling behaviour of dairy calves in two types of dam-rearing systems using automatic milking***Hanna Eriksson, Cady W. Chan, Lars Rönnegård, Sigrid Agenäs, Lena Lidfors, Claire S. Wegner***Mitigation of heat stress in dairy cows via building adaptations under current and future heatwaves***Chunde Liu, Zhiwen Luo*

Optimizing environmental enrichment for stress resilience in laying hens*Aleksei Podturkin, Emma Malcolm, Lucy Asher***Why do hens pile? Cracking the case of smothering and piling behavior in UK egg-layers***Lucy Asher, Helen Gray, Jack O'Sullivan, David Armstrong***Automated annotation of inter-individual distances to assess goats' social behaviours***Océane Schmitt, Nick Westendorff, Asanga Udugama, Jens Dede, Anna Förster, David Wewetzer, Jens Wilkens, Clara Piefke, Viktor Fairuschin, Christian Manteuffel, Uta König von Borstel***Cat owners' assessment of pain in cats based on a video material- a pilot study***Anna Bergh, Josefin Sunding, Kajsa Stenhammar, Anja Pedersen***Dog owners' assessment of pain in dog based on a video material- a pilot study***Erika Roman, Anna Bergh, Josefine Reiner, Julia Svensson Rosenlund, Anja Pedersen***Real-time detection of vocal distress in weaner pigs as a welfare indicator***Erik Vranken, Sreenivasa Upadhyaya, Wim Buyens, Alvaro Jorge Penas, Kristina Machat, Maciej Oczak, Johannes Baumgartner, Sebastian Vetter***Effective strategies for debunking myths in animal welfare policy discussions***Ines Ajuda, Helen Lambert, Elena Nalon***Friend or Foe: understanding public perception of stray dogs in India***TEJVEER SINGH, Bilal Ur Rehman, Anurag Parida, Ravi Dabas, Oluwaseun Iyasere, Vijay Pal Singh***Inter-observer reliability using Welfare Quality® to assess sow welfare in Maternity Rings and farrowing crates***Kirsty Chidgey, Kate Plush, Lauren Hemsworth, Jessica Zemitis, Patrick Hurley, Darryl D'Souza***The effect of ventilation systems on layer performance***Yun-Jung CHIU, Ho-Ching Tsai, Che-Ming Hung, Ming- Yang Tsai, Cheng-Yung Lin, Yi-Chun Chou***Thermal perches as cooling devices for reducing heat stress in laying hens***Xiangwang Gong, Hayley Sutherland, Marisa Erasmus, Heng-Wei Cheng***Comparing continuous observation and subsampling for pain related behaviors after disbudding in dairy calves***Alycia Drwencke, Ariana Martin, Sarah Adcock, Cassandra Tucker***Associating behavioral and physiological biomarkers with judgment bias test outcomes in weaned pigs***Vivian Witjes, Ingrid de Jong, Francisca Velkers, Liesbeth Bolhuis, Annemarie Rebel, Arjan Stegeman, Ellen Meijer***Veterinarians' and technical experts' perspectives on the adoption of immunocastration in Brazil: preliminary results***Victor Brusin, Maria J. Hötzel, Beth Ventura, Guillaume Lhermie, Juliana Cristina Rego Ribas, Maria Camila Ceballos***Growth, behaviour and stress response of weaned pigs to different space utilization on elevated platforms***Olufemi Adebisi, Tayo Adepo, Ayoola Oluymi, AYOMIDE AKINYOSOTU, Temitope Bankole***Mom is calling! Sows nursing vocalization changes with the housing system***Leandro Sabei, Marisol Parada Sarmiento, Thomas D. Parsons***Gilts transitioning from a group pen to individual crates express an increase in abnormal behaviors***Marisol Parada Sarmiento, Leandro Sabei, Sarah Ibach, Thomas D. Parsons***The relationship between foraging enrichment and contrafreeloading behaviour in laying hens***Saskia Kliphuis, T. Bas Rodenburg, Carlos E. Hernandez***Measuring horse welfare during Equine-Assisted Interactions with military veterans with PTSD***Chantal Kapteijn, Eva Rozendaal, Hans Vernooij, Nienke Endenburg, T. Bas Rodenburg***Assessing the importance of relationship parameters on Human- Animal interactions – Insights from leisure horses and working Asian elephants***Océane Liehrmann***The Influence of Co-Housing on the Welfare of Shelter-Living Dogs***Lisa Gunter, Jenifer Reed, Emily Blade, Rachel Gilchrist, Rebecca Barber, Erica Feuerbacher, Clive Wynne***Perspectives on cow-calf contact by early adopters in North America***Emeline Nogues, Marine Durrenwachter, Rowan Yuan, Christopher Holtkamp, Dave L. Renaud, Joao H.C. Costa, Kate Creutzinger***Enhancing animal welfare education through interactive comics***Steffi Wiedemann, Anja Waldmann, Anabela Parente, Jana Mariella Kalb, Mateo Covic, Denis Malinko, Isabelle Decher, Ido Iurgel***Do laying hens form stable social networks? – A case study***Louise Hedlund, Dominic Wright, Per Jensen*

Consistency of dairy cow milking temperament scores over time*Madalina Mincu-Iorga, Alexandru-Corneliu Olteanu, Mónica Ruiz-Ramos, Jennifer Van Os***Does increasing the food-related activity of indoor cats lower their attention-seeking behaviors?***Laura S.R. Lundegaard, Mathilde L. Møller-Pedersen, Ayoe Hoff, Søren S. Nielsen, Peter Sandøe***The delivery room for goats - opaque or open?***Kim Matthies, Patrick Schreiber, Lorenz Gyga, Edna Hillmann***Evaluating the effectiveness of wildlife zoo regulations towards enhancing the animal welfare in Tanzania: A case study of SERVAL WILDLIFE ZOO***Batro Ngilangwa***Pained brains: spatial working memory is impaired in female dogs with osteoarthritis***Mike Mendl, Melissa Smith, Joanna Murrell***Understanding calf responses to disbudding pain using play behaviours and individual differences in Pessimism.***Benjamin Lecorps, Amelia St John Wallis, Suzanne Held, Michael Mendl, Marina von Keyserlingk, Daniel Weary***Applying self-organising maps to explore behavioural feeding types in gestating sows***Iris Boumans, Jacinta Bus, Eddie Bokkers, Dennis te Beest, Jasper Engel, Ron Wehrens***The current state of research on peer social bonds in farm animals***Sébastien Goumon, Sarah Jowett, Sunil Khatiwada, Irene Camerlink***Camel-assisted services (CAS): Treatment, education, and support programmes***Carlos Iglesias Pastrana, Francisco Javier Navas González, Juan Vicente Delgado Bermejo, David Argüelles Capilla, María Esperanza Camacho Vallejo***Reaction of horses at pasture to traffic noise exposure***Johanna Henke-von der Malsburg, Uta König von Borstel***Interaction dynamics in dog-assisted therapy***Candela Jasmin Hüsken, Nienke Peters Scheffer, Robert Didden***Using a multi-stakeholder human behaviour change programme to address breeding for extreme conformation in companion animals***Ashleigh Brown***Voluntary wheel running induces nausea in laboratory rats: No sign of nausea habituation over 20 days***Sadahiko Nakajima***Livestock welfare during transport in New Zealand: Rethinking livestock crate design***Mairi Stewart, John Tacon***Beyond the rotation: Unveiling affective states in cows through grooming pattern***Lena Skånberg, Jordi Altimiras, Kaja Mulder, Daiana de Oliveira, Linda Keeling***Shaping the future of animal welfare science in New Zealand: challenges, gaps and opportunities***Mairi Stewart, Kate Littin, Mhairi Sutherland, Ngaio Beausoleil, Cheryl O'Connor, Rob Gregory***Behavioral and physiological responses of therapy dogs to animal-assisted therapy in an inpatient stroke rehabilitation program***Francois Martin***Prevalence and impact of lighting regimes on the circadian rhythms and behaviour of stabled horses in the UK***Linda Greening, Eilis Harkin, Panoraia Kyriazopoulou, Zoe Hepplethwaite, Francesca Aragona, John Browne, Andrew Hemmings, Jane Williams, Barbara Murphy***From cages to cage-free: a qualitative exploration of Chinese egg producers' views on the opportunities and challenges to adopting cage-free egg production systems in China***Qing Yang, Fritha Langford, Belinda Vigors, Ruqian Zhao, Cathy Dwyer***The effect of imprinting in laying hens on behavior after introduction to an aviary system***Saya Takayama, Yuki Tokunaga, Haruki Kimoto, Saki Imai, Toshiaki Inenaga, Shuichi Ito***AI approaches for detection and removal of environmental sounds in audio recordings to enhance automated annotation and extraction of cattle vocal parameters***Madalina Mincu-Iorga, Dinu Gavojdian, Ioana Nicolae, Anna Zamansky, Teddy Lazebnik***A non-invasive tool for Real-time Automated Multi-Species Monitoring of animal Activity in Research Trials (RAMSMART)***Harmen P. Doekes, Cees Voeselek, Rineke de Jong, Ines Adriaens, Norbert Stockhofe-Zurwieden*

Effects of time of calving and early-life experiences on the position of seasonally-calving dairy heifers in the milking order

Laura Field, Lauren Hemsworth, Ellen Jongman, David McGill, Megan Verdon

What does 'solving' the surplus dairy calf challenge look like? Australian public attitudes to future scenarios

Sarah Bolton, Nina von Keyserlingk, Lara Sirovica

Behavior analysis as a refinement in rhesus macaque medical research care

Autumn Sorrells, Kylie Thurman

The effect of litter parameters on stereotypic behaviour and normal activity – preliminary data from female European mink (*Mustela lutreola*)

Kairi Kiik, Kristel Nemvalts, Maria Diez-Leon

A systematic review of public perspectives of zoo animal behaviour and welfare

Nicki Phillips, Laëtitia Maréchal, Beth Ventura, Jonathan Cooper

Enhancing swimming activity in captive African penguins: evaluating the impact of sensor-activated bubble machine enrichment

Rielle Perttu, Madi Bacon, Lily Barrows, Sadie Burns, Samantha Griswold, Lauren Peterson, Katie Hall, Courtney Archer

Association between family dogs' inattention, hyperactivity and impulsivity and their gut microbiota composition

Attila Salamon, Attila Szabó, Tamás Felföldi, Soufiane Bel Rhali, Attila Andics, Ádám Miklósi, Enikő Kubinyi, Márta Gácsi

Relationship between behavioural and physiological responses and milk production of dairy cows reared in a small scale dairy herd

Ishrat Zerin Moni, Asif Mahmud, Rezoanul Haque, Amira Ahmed, Mohammad Mahbubur Rahman, Jashim Uddin

ManyPigs: Establishing a global community for pig behaviour and welfare researchers

Celine Tallet, Jen-Yun Chou, Mathilde Coutant, Sébastien Goumon, Charlotte Goursot, Megan Lucas, Michaela Másílková, Severine Parois, Maria Vilain Rørvang

How does cow-calf contact affect the biological functioning of calves under Norwegian conditions? A scoping review of research methodology

Julie Føske Johnsen

Impact of early creep heating on piglets' pen use, growth and survival in outdoor production

Jens Malmkvist, Lene Juul Pedersen

Effects of stocking density during simulated transport on behaviour and physiology of largemouth bass (*Micropterus salmoides*)

Yifei Yang, Edward Narayan, Sonia Rey Planellas, Clive Phillips, Lu Zheng, Bingying Xu, Lei Wang, Yuechong Liu, Yuxiao Sun, Gladstone Sagada, Hao-Yu Shih, Qingjun Shao, Kris Descovich

Behavioural and environmental welfare conditions are the most critical for shelter dogs: Consensus of Taiwanese experts

Yu-Hsing Chen, Ching-I Chen, Chen-Yan Lin, Kendy Tzu-yun Teng

The sustainability of broiler chicken production: balancing emissions and animal welfare

Ana Martos, Hillary A. Dalton, Amélie Legrand

The effect of chronic feed restriction on cognitive functioning in dairy calves

Jillian Hendricks, Thomas Leroy, Michael Mendl, Benjamin Lecorps

Integument damage from agonistic behaviour in dairy herds: influence of horned cow proportions and farm compliance with practical recommendations

Asja Ebinghaus, Julia Johns, Ute Knierim

Teat quality traits, nursing and suckling behaviour expression in Nigerian West African Dwarf goats

Moshood Popoola, Ademola Raji, Mariam Olaoye

How do dog behaviour knowledge sources affect ability to interpret dog emotional and motivational states?

Jana Muschinski, Lauren Samet, Naomi Harvey, Melissa Upjohn, Jane Murray, Sara Owczarczak-Garstecka

Metabolomic profile linking to behavioural changes associated with outdoor access in housed dairy cows

Jake Thompson, Alison Russell, Laura Randall, Robert Hyde, Dong-Hyun Kim, Martin Green

Conventional space density impairs night resting, feeder access, and pen hygiene in fattening pigs

Mathilde Coutant, Lene Juul Pedersen, Mona Lilian Vestbjerg Larsen

Pet mimics Human-Behaviours

Emmanuel Chukwuma

Alignment of multiple actors towards improving animal welfare through breeding: the HenTrack model*Michael Toscano, Franck Meijboom***The effect of creep forms on creep interaction and blood iron status of pre-weaned piglets***Abigail Tillton, Kylie Kallal, Jennifer Brown, Jen-Yun Chou***Longitudinal owner reported use of chemical interventions for undesirable behaviours in dogs***Mel Weedon, Jana Muschinski, Séverine Tasker, Rachel Casey, Jane Murray***Is water bathing in chickens a neglected comfort behaviour?***Margret Vonholdt-Wenker, Marc Bracke, E. Tobias Krause***Pig-ture this: Teaching scientific assessment of animal welfare using digital 3D pigs***Megan Lucas, Lauren Hemsworth***Unraveling social heritability in feed intake: Insights from beef cattle***Julia de Paula Soares Valente, Lucio Flavio Macedo Mota, Gustavo Roberto Dias Rodrigues, Joao Henrique Cardoso Costa, Maria Eugenia Zerlorri Mercadante***Behavioural lateralisation in the domestic pig***Grace Williams, Ramon Muns, Grace Carroll, Gareth Arnott, Deborah Wells***Breed-specific maternal behaviours in chickens: implications on poultry welfare***Oluwaseun Iyasere, Lorenz Gyga, Edna Hillmann***Continuous Automated Analysis of Facial Dynamics of Brachycephalic and Normocephalic Dogs in Different Contexts***Anna Zamansky, George Martvel, Petra Eretova, Lucie Pribylova, Helena Chaloupkova, Peter Pongracz***Effects of different farrowing systems on farrowing and piglet growth and survival***Vilja Hukkinen, Camilla Munsterhjelm, Anna Valros***Dog behavior and stress biomarkers offer insights into shelter outcomes and length of stay***Lauren Powell, Olivia Lenz, Chelsea Reinhard, Elena Anderson, Kathryn Graham, Laura Grant, Holly Yost, Brittany Watson***If you don't know what you're missing, are you missing out?": exploring UK pig industry perspectives of 'a good life' and strategies to fulfil it on farm***Holly Vickery, Isabel Lewis, Laura Palczynski, Minnie Cooke***Digging behaviour in production rabbits: is it a true behavioural need?***Malou van der Sluis, Jorine Rommers, Karel de Greef***Locomotor stereotypic behaviour in the domestic horse (*Equus caballus*) may be associated with a heightened response to social stimuli***Kate Lewis, Sebastian McBride, Matthew Parker, Leanne Proops***Comparing reaction scores, latencies, and heart rate as measures of fear in Icelandic horses***Rebecca Grut, Johanna Stenfelt, Maria Vilain Rørvang***Improving dairy cow welfare with flexible neck straps while maintaining hygiene***Stijn Brouwers, Michael Simmler, Pascal Savary***Welfare and Physiological Resilience of Gaddi Goats Across Altitudinal Zones and Reproductive Stages: Insights for Sustainable Transhumant Pastoralism***Ankaj Thakur, ML Kamboj, Jagvir Singh, Brij Vanita, Pravesh Kumar***Automated video analysis for monitoring of sow behavior: Identifying key maternal traits for improved piglet survival***Sehrish Malik, Lene Juul Pedersen, Kristine Hov Martinsen, Lisette van der Zande, Eli Grindflek***Therapy dog's hormonal and behavioural responses during a simulation of animal assisted interventions***Marta De Santis, Luca Martelli, Margherita Soncin, Diletta Fornasiero, Alberto Mair, Valentina Bertazzo, Simona Normando, Franco Mutinelli, Laura Contalbrigo***Grief in horses after the death of an companion equid***Claire Ricci-Bonot, Emily Wilson, Stefania Uccheddu, Daniel Mills***Resting during day- and night-time in slower growing broiler hybrids (*Gallus gallus domesticus*)***Stefan Gunnarsson, Anna Wallenbeck, Jenny Ynngvesson***Effect of a specific sensory additive on human fear test response and wellbeing in broilers production before catching***Juliette Foglio, Aline Flament, Elisa Arnaud, Jean-François Gabarrou***Assessing (dis)liking: subtle post-consummatory behaviour may reflect satisfaction with reached states in minipigs***Vivien Scheven, Lorenz Gyga*

Qualitative feed restriction has limited effects on home pen behaviour in Ross 308 broiler breeder cockerels

Guro Vasdal, Kathe Kittelsen, Ingrid de Jong, Fernanda, M. Tahamtani

The Sheep Appeasing Pheromone (SAP) can help ewes to cope with stressful events

Manon Chasles, Umut Burak Ağan, Lucie Pageat, Estelle Descout, Julien Leclercq, Míriam Marcet-Rius, Alessandro Cozz

Risk factors associated with keel bone damage and comb injuries in laying hens kept in mobile housing systems

Simon Horbach, Katrin Dorkewitz, Daniel Gieseke, Ute Knierim

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Horizons of animal welfare: insects in farming and research

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Billions of insects power ecological, biomedical, and other diverse areas of scientific research. Trillions of insects are farmed every year for food, animal feed, silk, dye, shellac, pollination services, and more—making insects the vast majority of farmed livestock. However, very little is known about the welfare of these animals. This is especially concerning given growing data that supports the plausibility of sentience in at least some insects. Out of an abundance of caution, it is necessary to devote greater empirical attention to the question of those factors that improve and worsen insects' quality of life. With this in mind, this talk accomplishes four goals. First, it introduces insects and the current state of the evidence on their sentience. Second, the talk provides an overview of the many uses of insects in lab and field research, the rapidly growing insects as food and feed industry, and more traditional insect farming operations. Third, the talk highlights some recent studies that demonstrate strategies for making progress in insect welfare science despite uncertainty about many welfare indicators. These studies include work on the productivity and welfare benefits of nutrition for adult black soldier flies; developing protocols for humane slaughter in black soldier flies and yellow mealworms; and the effects of handling-associated stress in black soldier fly prepupae on development, survival, and other measures of welfare. Fourth and finally, the talk draws attention to pressing research questions in insect welfare science, flagging the role that welfare scientists can play in accelerating our understanding of the needs of these diverse, understudied animals.

When pigs lend a hoof: a comparative study of helping across two research institutes

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By examining helping in pigs, we aim to shed light on the cognitive and emotional mechanisms underlying empathic responses in non-human animals. Helping is one of the clearest indicators of empathic abilities in animals, as it reveals their capacity to identify and respond appropriately to another's specific needs. Here, we present a study involving 159 pigs (*Sus scrofa*) conducted at two different institutes (FBN and VMU) across two countries. This study builds on an existing paradigm to study helping in pigs. The paradigm involves two compartments attached to the home pens of groups of ten pigs. The group members are able to open the door from the outside, though it cannot be opened from inside the compartment. During testing, each pig was isolated once from its group and placed into one of the two compartments. During 15-minute trials, remaining pigs in the pen could choose to open the trapped pig door, the door to the empty compartment, or neither door. Trapped pigs experienced one of two distinct stress levels: in one condition, they were taken directly from the home pen into the compartment (low stress), while in the other, they were isolated for 10 minutes before being placed into the compartment (high stress). We fitted a binomial generalized linear mixed model (GLMM) with the likelihood to open the door for the trapped pig first (yes or no) as the dependent variable, 'Treatment' (high vs. low stress) and 'Institute' (FBN vs. VMU) as fixed effects, and a random intercept for each trapped pig identity. The Treatment × Institute interaction was significant (GLMM, $p < 0.05$). Post-hoc Tukey-adjusted pairwise comparisons with emmeans revealed that under low-stress conditions, the probability of opening the trapped pig's door first did not differ between institutes (FBN = 62% vs. VMU = 70%, $p > 0.05$), whereas under high-stress conditions, VMU pigs opened the trapped door first more often than FBN pigs (82% vs 40%, $p < 0.01$). These findings suggest that stress level moderates the effect of institute on the likelihood of pigs engaging in targeted helping behaviors. Even more striking is the challenge of replicating these results across facilities where differences in breed or subtle contextual factors (e.g., lighting conditions, isolation place characteristics) may influence outcomes. We discuss strategies to mitigate these confounding factors and underscore the importance of standardized, multi-site research designs to advance our understanding of empathic behavior in non-human animals.

Coming of age: changes in laying hen pullets' fearfulness and aggression

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Laying hens face many changes at the time they reach sexual maturity, including transfer to adult housing and social mixing. Little is known about the affective states of laying hen pullets during puberty, especially if fear-reactivity and aggressive behaviours coincide with and are influenced by the elevation in sex steroid hormones. Here, 600 Lohmann LSL-lite pullets were raised in a split-plot design from 14 weeks-of-age (woa) to 26woa. Two rooms were photostimulated at 18woa (PS-18) and two at 20woa (PS-20) with two feeding regimens per PS treatment: ad-libitum (AL, 3 pens/rooms) and 10%-restricted feeding (RF, 3 pens/rooms), totalling N=24 pens. Pens were video recorded on weekends between 15 and 22woa, with aggressive behaviour observed daily in four 5-minute intervals. A combined Novel Arena (NA, 10min) and Novel Object test (NO, 5min) was conducted on two naïve birds per pen at 15, 19, 21, and 25woa. Indicators of fearfulness were latency to enter and agitation in the NA (1scan/15sec for 5min, 1scan/30sec for minutes 5-10), reaction to the NO (freeze or flee indicating fear), and NO approach latency. Data were analyzed in R using Generalized-/ Mixed Effect Models and survival-class analyses. Pullets were fastest to enter the NA at 19woa (8.9 ± 2.31 sec) and slowest at 25woa (82.4 ± 18.28 sec; $\chi^2 = 12.25$, df= 3, $p = 0.007$). Pullets' agitation increased between 15woa ($33.7 \pm 3.16\%$ of the scans when in NA) and 21woa ($68.1 \pm 5.40\%$) and decreased at 25woa in RF pullets only ($58.7 \pm 2.34\%$; $\chi^2 = 13.44$, df= 3, $p = 0.004$). Compared to birds at 15woa, birds were 67.7% less likely to react fearfully to the NO at 19woa (Odds Ratio [OR]= 0.32, 95%-Confidence Interval [CI]= [0.11, 0.93], $P = 0.036$) and 70.4% less likely at 25woa (OR= 0.30, CI= [0.10, 0.88], $P = 0.028$). Twenty-one-week-old pullets were 59% less likely to approach the NO than the 15-week-old birds (OR= 0.41, CI= [0.22, 0.73], $P = 0.003$). While aggression increased with age, it was more frequent in AL birds than in RF birds at 19 and 21woa ($\chi^2 = 17.22$, df= 6, $p = 0.009$) and in PS-18 birds compared to PS- 20 birds at 21woa ($\chi^2 = 16.22$, df= 6, $p = 0.013$). In summary, indicators of fearfulness increased with age, often peaking at 21woa. Aggression increased with age but more so in AL birds and those with an early PS. Our results support puberty-related shifts in affective state of increasing fearfulness and aggression, but further research is needed to link these changes to the onset-of-lay.

Combining QBA, behaviour tests, and physiological measures to assess positive affect in dairy cattle

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Validated measures of affective states mainly relate to arousal and negative valence. Regarding positive valence, qualitative behaviour assessments (QBA) are promising, and other measures are being explored. The objective of this study was to validate behavioural and physiological measures of positive affective states in adult dairy cattle. Using a cross-over replicated Latin square design controlling for ‘day’ and ‘animal’ effects, 13 dry cows and 5 heifers were each subjected to 3 treatments: positive (POS; large pen, deep straw bedding, brush access, fence-line companion heifer), neutral (NEU; midsized pen, minimal bedding, visual of companion heifer), and negative (NEG; small pen, no bedding, no visual contact with other animals, pail of inaccessible pellets). Animals were moved from their group-housed home pens to individual treatments pens, where treatments were applied in random order, with one treatment applied each day for 1hr ± 15min and 1 washout day between treatments. During each treatment period, we collected heart rate (HR), vocalizations, and continuous video data. Animals were then moved to a test pen, passing by a thermal camera before completing a novel object (NO) test (pool toy, hamper, airplane) and attention bias (AB) test (dog vs. pellets) with continuous RGB video recording. A single trained observer who was blind to treatments performed a QBA and assessed NO and AB reactivity scores in the test pen. The temperature data were analyzed using ANOVA. A canonical discriminant analysis (CDA) was performed on data collected in both pens, followed by MANOVA. Data were grouped by treatment, normalized, and scaled. Ear and nose-tip temperatures did not differ between treatments, however, eye-area temperature was highest in POS ($P=0.005$), while NEU and NEG did not differ. The two-dimensional CDA had an explained variance of 81.82% (DF1) and 18.18% (DF2). The largest positive contributions to DF1 include “indifferent”, “relaxed”, and “happy” behaviours and eye-area temperature, while the largest negative contributions were “distressed” behaviours and reactivity to the NO. DF2 had most positive contributions from “uneasy” behaviours and negative contributions from “relaxed”, “indifferent”, “active”, and “distressed” behaviours. Based on group means from DF1, which captured valence, POS scored higher than both NEU and NEG ($P=0.01$). This suggests that QBA, eye area temperature, and reactivity scores during NO tests may be sensitive indicators of positive affect.

The BIBAGO: A new behavioural test to assess reward sensitivity in non-human animals

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Accounting for individual differences in anxiety, depression or resilience is crucial to ensuring individualised well-being. Personality is reflected by differences in the tendency to approach rewards and avoid threats, and helps to understand what animals, including humans, want and like. At the neural level these tendencies are the result of differential involvement of the behavioural activation system (BAS) and the behavioural inhibition system (BIS). While humans can be classified along BIS/BAS scales through self-reports, such scales have never been validated in non-human animals. In this study we developed the BIBAGO, an innovative test to investigate individual reactions to rewards (BAS) and approach-avoidance conflicts (BIS), by simultaneously presenting a clear positive (treat ball) and a clear negative (waving a plastic bag for 3 seconds) stimuli in a novel arena (2.3 x 2.3 x 1 m), using the domestic pig (*Sus scrofa*) as a model. We assumed that the duration of interrupting the vocalisations (suggesting heightened attention in individual test settings in pigs) reflects BIS-related behaviours, whereas the occurrence and duration of touching the treat ball and eating the rewards would reflect BAS activation. We also submitted the subjects to four personality tests (Open Field, Novel Object, Human Approach and Novel Peer Tests). After testing 101 piglets, we showed that the BIBAGO is highly repeatable (dICC=0.355 +/-0.058, N=80 piglets) and reproducible (repeatability in an independent sample: dICC=0.433 +/-0.097, N=21 piglets). Using a graphical network approach combined with an extended exploratory factor analysis, we extracted two factors related to BIS and BAS (MSA=0.64, Bartlett's test $\chi^2=602.768$, 361 df=171, $p<0.001$), which are associated with classic personality dimensions. Specifically, exploration of a novel human (loading: 0.323), novel object (loading: 0.457) and novel arena (loading: 0.319) loaded on the BIS-related factor. This is in accordance with the idea that BIS is activated in novel and uncertain situations. Interestingly, we demonstrate that novelty elicits individual reactions that are independent of reward responsiveness (BAS). Thus, our study addresses individual differences in perceived reward, an aspect that has been neglected for too long, but which has important implications for promoting positive animal welfare.

Bored broilers? Assessing two novel measures for boredom in broiler chickens

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Boredom is the unpleasant state resulting from an unfulfilled desire for environmental novelty. Commercially raised broiler chickens may experience insufficient novelty; thus, boredom may contribute to poor welfare. Bored animals will interact with any stimulus providing novelty, even if aversive. Therefore, the interaction with aversive novel items can indicate boredom. Boredom is also associated with inactive-but-awake (IBA) behavior. The objective was to assess IBA behavior and interaction with novel stimuli in barren or complex housed broilers. This study followed ISAE ethical guidelines. Ross 708 birds ($n=144$) were housed in 24 pens (6 birds/pen; max density=1.9kg/m²). Barren pens contained standard resources, while complex pens additionally contained a dustbath, platform, mophead, mirror, and balls. For six days from d14-20, 12 1-min scans/pen were conducted at 10:00h and 15:30h to record behavior (inactive-but-awake, resting, active) and posture (standing, sitting) in all birds (no individual identification; 24 pens*6 birds*12 scans*2 timepoints*6 days=20,736 scans). Prevalence of behavior/posture combinations were calculated at pen-level by observation ($n=24$ pens*2 timepoints*6 days=288). Behavior was analyzed using a GLMM with beta-family distribution (fixed effect: treatment; random effects: date, time, room nested within pen). From d21, positive (haybale), neutral (two traffic cones), and aversive (airpuff) stimuli were presented for 12h each in a random order, with 48h washout. Latencies for the first bird/pen to approach within 5 and 1 bird-lengths of stimuli were recorded. Log-transformed latencies were assessed using a GLMM with gaussian-distribution (fixed effects: treatment and stimulus; random effects: presentation order, room nested within pen). Data presented as modeled means $\pm$ SEM. Standing IBA was more common in barren pens ($3.9\pm 0.3\%$ of behaviors observed) than complex pens ($2.5\pm 1.7\%$; $p=0.031$). Sitting active tended to be lower in barren ($15.3\pm 1.1\%$) than complex ($17.7\pm 1.2\%$; $p=0.090$) pens. Other behaviors did not differ ($p>0.13$). Latencies to five bird-lengths from the positive (4.9 ± 0.03 min) and neutral (2.5 ± 0.03 min) stimuli were shorter than for the aversive stimulus (56.7 ± 0.03 min; $p<0.001$). This pattern persisted for latencies to one bird-length (positive: 53.6 ± 0.03 min; neutral: 4.7 ± 0.03 min; negative: 251.2 ± 0.03 min; $p<0.001$). No differences were found between treatments ($p>0.5$). The more frequent standing IBA in barren pens may suggest more boredom, but no difference was found in the birds' interaction with stimuli between treatments. We suspect that little boredom was induced due to early test ages and low stocking density, limiting treatment effect. The latency differences between stimuli suggest that these items could be appropriate for assessing broilers' motivation to interact with novel stimuli.

The pain echo chamber effect: how cages and barren environments may amplify pain perception in animals

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Research has shown that the perception of pain is highly plastic, and that complex environments can partially or completely suppress the experience of pain, whereas barren environments do not offer opportunities for pain-suppression and also amplify the experience of pain. Despite this knowledge, current practices and research approaches in animal welfare science assume that similar injuries produce similar experiences of pain, even if they are produced in different environments. This assumption compromises both welfare assessments as well as translational pain research, with critical implications for our fundamental understanding about how animals experience the world. We examine ten factors that are relevant to common animal housing that have well-documented effects on pain processing: behavioral engagement, movement, social interaction, environmental control, fear, sleep, thermal conditions, stress, nutrition, and previous pain experience. For each factor, we review evidence demonstrating its mechanism(s) of action and subsequent effects on pain sensitivity. We then apply the principles of pain plasticity and environmental pain modulation to standard housing practices in commercial livestock industries, with a focus on layer hen housing systems. The results indicate that the systems offering the most environmental complexity, i.e. pasture-based systems with low stocking densities and rich environmental features, offer the greatest opportunities for pain suppression due to an enhanced behavioural repertoire, opportunities for uninhibited movement, complex social dynamics which are not encumbered by high stocking densities, and an increased ability to have control over their environment. We combine results from the Welfare Footprint Framework to estimate the hours in pain in each type of housing system and how the results may in fact be interpreted very differently when we incorporate evidence regarding the subjective experience of pain due to modulating environmental factors. Understanding the relevance of pain plasticity in this context offers a new perspective and proposes a transformational paradigm shift regarding standard housing environments in the farming industries worldwide. This review also reveals a striking scarcity of research directly investigating these effects in most species and housing systems. While the available evidence - particularly regarding behavioral suppression of pain, social modulation, and environmental control - raises serious concerns about pain perception in standard housing conditions, systematic studies examining these mechanisms across species and housing systems are urgently needed. Given that billions of animals are housed in conditions that may compromise natural pain-coping mechanisms, this represents a critical gap in animal welfare science.

The social brain under selection: tameness and its behavioural consequences in Red Junglefowl

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For the last 5 years, we have investigated the impact of selection for tameness on social interactions and cerebellar traits in the ancestor of the domesticated chicken, the Red junglefowl (*Gallus gallus*), enlightening the mechanisms underlying domestication-related behavioural and morphological changes. The research focuses on the hypothesis that reduced fear of humans, a key aspect of the domestication syndrome, drives significant alterations in both inter- and intra-specific behaviours. A series of experiments were conducted involving Red Junglefowl lines selectively bred for high (HF) and low (LF) fear of humans from generation 10, 12, and 14, and experiments comparing unselected Red Junglefowl (RJF) with White Leghorn (WL). Behavioural observations were made in semi-natural settings and in arenas. We also conducted brain tissue analysis. The studies included behavioural testing in risk-taking scenarios, social buffer preferences, and assessments of cerebellar morphology and function through various cerebellum-linked behavioural tests. The findings reveal that LF birds exhibited increased social conflicts, similar to behaviours observed in domesticated breeds, while HF performed more non-aggressive social interactions (effect of selection line: $Z = 4.313$, $P < 0.001$). WL displayed reduced fearfulness and stress, and the presence of a social partner had a weaker buffering effect on fear compared to RJF (likelihood ratio test: $\chi^2 = 15.28$, $df = 3$, $P < 0.001$). LF birds engaged more in social exploration and food calls ($P < 0.001$), while HF birds showed heightened interest in unfamiliar conspecifics ($P < 0.001$). Cerebellar analyses indicated that while LF ($N = 15$) birds had reduced relative brain mass ($P < 0.001$), HF birds ($N = 16$) demonstrated increased neuronal density in the cerebellum ($P < 0.01$). Behavioural assessment suggested that coordination and balance were not significantly different between the two lines, but HF birds exhibited faster obstacle navigation ($P < 0.001$), suggesting an enhanced social motivation compared to a more general exploratory behaviour observed in LF ($P < 0.001$). This research provides insights into the effects of tameness selection on social behaviour and brain morphology at the early stages of domestication. The results highlight the complex relationship between tameness, behaviour, and brain structure, suggesting that selection for tameness can drive significant behavioural changes resembling the domestication effects seen in modern chickens. These findings have implications for understanding the evolutionary processes involved in animal domestication. We demonstrate that selection related to fearful behaviour not only impacts social structure but also social coping mechanisms, which has implications for animal welfare.

Genetic determination of maternal behaviour in Swiss Landrace sows

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In sows, maternal behaviour is a commercially important trait which affects sow and piglet welfare and the quality and safety of human-animal interactions. The aim of this study was to evaluate maternal behaviour and to estimate its quantitative genetic parameters in Swiss Landrace (SLR). The lactating sows, with an average lactation period of 29-30 days and different parities (one to eleven) at four nucleus farms of the Swiss breeding company SUIAG underwent a series of tests and observations during two seasons (24 weeks). The behaviour towards a human when handling one of their piglets was scored on a scale from 1 to 5 in 569 sows. The reaction to the playback of squealing piglets from a different litter was evaluated on a scale from 1 to 5 for 521 sows. Vocalisations to the piglets before lying down (presence/absence) and time to lying down were recorded for 451 individuals. All tests/observations lasted between 1 and 5 minutes. Number of samples per measure varied between one and six. Variance components were estimated based on Bayesian univariate generalised linear mixed models, including as random effects the animal genetic effects and the permanent environmental sow effects. The additive genetic relationships were either computed from the pedigree (1418 individuals across six generations), the genomic data (from 376 genotyped sows using FBF SNP-Chip 60K), or the combination of both. All traits were found to be repeatable when modelling the relationship between individuals using pedigree information, with means of the posterior distributions ranging from 0.23 to 0.66. When genomic data alone were considered, only the repeatability of response to a human and probability of vocalising to piglets before lying down had means higher than 0.20 (response to a human: 95% CI = [0.47, 0.71], vocalising to piglets: 95% CI = [0.03, 0.69]), while the means of the other traits were lower than 0.17. When using pedigree data only, response to a human was found to be heritable (h^2 : mean = 0.44, 95% CI = [0.22, 0.69]). The 95% Credibility Intervals of the heritabilities of all other traits did not exclude values less than 0.001. Results suggest that the measured maternal traits show temporally stable variation (repeatability) between sows, and that their response to a human is a consistently genetically determined trait. This suggests selection for calmer behaviour of sows towards humans in breeding programmes would be feasible, potentially improving stockpersons' safety and sow and piglet welfare.

Play stimulation modifies behaviour and brain development in chickens – effects of domestication

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Play is ubiquitous among vertebrates, but its functions remain unclear. Young, domesticated chickens perform more play behaviour than their ancestors, the Red Junglefowl. Hence, studying play through the lens of domestication can uncover some of its functions. We studied the effects of play during the first weeks of life on later behaviour and brain composition in Red Junglefowl (RJF) and domesticated White Leghorns (WL), (N=32 in each breed). Half the subjects of both breeds received a five weeks long treatment in which they were stimulated to play during three 30 min sessions per week, while the other half did not and acted as controls. Subsequently, when six to seven weeks of age, we assessed effects on social and exploratory behaviour. After completing the behavioural tests, the birds were weighed and culled at seven weeks of age, their brains were harvested, and both the whole brain and the cerebellum was weighed. During the play treatments, WL performed significantly more play than RJF ($P < 0.001$), consistent with our previous findings. Following the treatment period, RJF were more exploratory in a novel object test (Wald $\chi^2 = 6.7$, $P = 0.01$) and in a food search test (Wald $\chi^2 = 21.9$, $P < 0.001$). In the same tests, play stimulation was associated with more food searching, irrespective of breed (Wald $\chi^2 = 4.4$, $P = 0.03$) but not more general exploration. In a social versus foraging test, play stimulated birds spent more time associating with social companions than exploring for food, in particular the WL (treatment: Wald $\chi^2 = 4.9$, $P = 0.03$; treatment x breed: Wald $\chi^2 = 8.8$, $P = 0.003$). WL chicks that were play stimulated weighed less than controls (Wald $\chi^2 = 6.2$, $P = 0.01$), while there were no such effects in RJF. Whereas there were no significant differences in absolute brain weight between play stimulated and control chicks in any of the breeds, the weight of cerebellum relative to the whole brain was higher in play stimulated than control RJF (Wald $\chi^2 = 4.6$, $P = 0.03$). No such effect was seen in WL. The results suggest that one function of play behaviour can be to modify later exploratory and social behaviour in chickens. This effect seems to have been affected by domestication. Furthermore, brain plasticity appears to have been reduced during domestication, since in RJF, but not in WL, play had a stimulatory effect on the development of cerebellum.

Socially-mediated arousal in two behavioural phenotypes of domestic laying hens

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Socially-mediated arousal (SMA) - increased behavioural and physiological arousal/alertness when an animal witnesses conspecific stress/distress – is a component process of emotional contagion. The welfare of laying hens can be influenced by the extent to which SMA occurs, in flocks which are typically composed of many thousands of birds. However, few studies have investigated individual variation in SMA capacity. We hypothesised that a behavioural subset of hens, ‘pariah birds’, would show reduced SMA capacity compared to non-pariahs. We have previously shown that ‘pariahs’ avoid conspecifics but are persistently targeted with aggression, even when they are moved into new social groups. One possible theory to explain this pariah bird ‘behavioural phenotype’ is that these individuals have lower levels of social responsiveness, meaning that they don’t display appropriate social signals to prevent aggression. Since SMA requires social responsiveness, we hypothesised that pariahs would also show a lower capacity for SMA compared to non-pariahs. Pariah birds (n=16) were each housed for three weeks with 4 non-pariah birds, one of which was designated as a ‘matched, non-pariah comparison hen’ (n=16). The sample size was determined using power analysis from our previous work (Edgar et al. 2011) which showed 16 hens per group were required to detect a decrease in eye temperature at an effect size of 1.63 (80% power, $\alpha=0.05$). At the beginning of week three, the pariah and matched non-pariah hens were exposed to two conditions in counterbalanced order: (a) air puff to familiar conspecifics (AP), during which air puffs were applied to three familiar conspecifics at 30 s intervals, and (b) control with noise of air puff (C), during which air puffs were directed away from the apparatus at 30 s intervals. Capacity for SMA was assessed by measuring the behaviour and surface eye temperature of the pariahs and matched non-pariahs throughout 10-min pre-treatment and 10-min treatment periods.

A mixed between-within subjects ANOVA showed that both pariahs and matched non-pariahs showed a significant reduction in surface eye temperature (indicating stress-induced hyperthermia) upon witnessing conspecifics being air puffed ($p < 0.001$), which was not the case during the control condition ($p > 0.05$). There was no difference in eye temperature response between the pariahs and the matched non-pariahs ($p > 0.05$). The results indicate that adult hens of these two behavioural phenotypes show socially-mediated arousal when watching a group of mildly stressed/distressed, familiar conspecifics.

Identification of early behavioural traits to predict injurious pecking in laying hens

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Injurious pecking (IP) represents a major challenge for the egg industry, compromising both welfare and productivity. We aimed to determine whether specific behavioural traits in pullets could predict later pecking behaviour. We tested Lohmann Brown and Lohmann LSL hens (N = 90 per strain) housed in floor pens in groups of 10 in a battery of tests at two ages (5-10 and 18-23 weeks). Each battery included a detour test, a modified cognitive bias test, a multivariate test, a novel object (NO) test performed in the home-pen and a tonic immobility (TI) test. The detour test involved a U-shaped compartment with a grid front, facing a mirror and food. To access them, the bird had to perform a detour, meaning temporarily losing their sight. In the multivariate test, birds were placed in an arena containing two conspecifics in a central compartment and four panels restricting visual contact, forming three virtual zones: near conspecifics, farther away with or without visual contact. Altogether, these tests assessed cognitive performance, social motivation, foraging, fearfulness and proactivity. Between 31 and 38 weeks, IP was assessed via direct observations (6.5 hours per bird). For each strain, the 20 birds performing the most (P+) and least (P-) IP were selected for analysis. Tests results were analysed using Generalised or Linear Mixed-Effects models, or survival analysis for censored latencies. Results showed that, regardless of the strain, P+ were faster and more likely to perform the detour at 5 weeks (P+: 167 s vs P-: 204 s; $\chi^2 = 4.1$, $p = 0.04$). At 21 weeks, they were also slower and less likely to approach the negative stimulus in the cognitive bias test (P+: 111 s vs P-: 62.4 s; $\chi^2 = 4.4$, $p = 0.03$) and had a shorter duration of TI (P+: 124 s vs P-: 181 s; $\chi^2 = 3.7$, $p = 0.05$). In Lohmann Brown only, P+ spent less time foraging during the multivariate test at 20 weeks (P+: 47 s vs P-: 74 s; $t(72.8) = 2$, $p = 0.05$) and spent more time near conspecifics (P+: 222 s vs P-: 172 s; $t(72.8) = -2.3$, $p = 0.02$). No significant effects were found in the NO test. These results suggest that future peckers may be more socially motivated and proactive, but early-life predictors of IP appear strain- and context-dependent, implying a complex relationship between early-life behaviour and IP later in life.

Comparative study of fear responses and oral – related behaviour in two turkey breeds

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Understanding breed differences in fear responses and other behaviour is essential for improving turkey welfare and productivity. This study aimed to assess breed differences in fear responses and oral-related (feeding and drinking) behaviour in Nigerian local turkeys (NLT) and Hybrid Converter turkeys (HCT) at different ages with implications for genetic selection, behavioural adaptability, and welfare improvement in turkey breeding programmes. Fear responses were examined in 50 NLT and 50 HCT using tonic immobility (TI), emergence, open field (OF), and inversion tests from the 4th to 12th weeks of life. Oral-related behaviour was analyzed in 30 NLT and 30 HCT using scan sampling at the 11th, 15th, and 17th weeks. Mann-Whitney U test in SPSS was used to assess breed differences in fear response and oral-related behaviour. Significant breed effect was observed in the number of attempts (NA) to induce tonic immobility at the 4th and 8th weeks ($U=555.00$, $p=0.009$ and $U=246.50$, $p=0.001$ respectively) with NLT showing higher ($p<0.05$) NA at the 4th week and HCT at the 8th week. The duration of tonic immobility (DT) was consistently longer ($p<0.05$) in HCT at all the weeks. Breed effect was observed in the latency to emerge from the dark box in emergence test at the 6th, 10th, and 12th weeks ($U=541.00$, $p=0.009$; $U=164.00$, $p<0.001$ and $U=110$, $p<0.001$ respectively) with NLT exhibiting the shortest latency at all the weeks. Open field test results showed that NLT displayed more ($p<0.05$) exploratory behaviours and escape attempts at 6th, 8th, and 12th weeks, while HCT exhibited longer ($p<0.05$) resting and floor pecking behaviours. The inversion test revealed that HCT had a higher ($p<0.05$) number of flaps (NF) at the 6th week, while NLT had a higher ($p<0.05$) NF and flapping duration (DF) at the 12th week. Flapping intensity (FI) was greater ($p<0.05$) in HCT at the 8th week. Significant ($U=691.50$, $p=0.001$) breed effect was observed in feeding behaviour only at the 11th week, with HCT exhibiting higher ($p<0.05$) feeding behaviour. At the 15th week, both feeding and drinking behaviours were higher ($p<0.05$) in HCT. However, at the 17th week, NLT showed higher ($p<0.05$) feeding behaviour only. The study concluded that HCT exhibited greater fearfulness than NLT. Differences in oral-related behaviour indicated that HCT prioritizes feeding at earlier stages, whereas NLT increases feeding activity later in life. Incorporating NLT in breeding programmes through crossbreeding may enhance fear resilience, activity levels, and welfare in commercial turkeys.

The welfare significance of stereotypic behaviours in rhesus macaques (*Macacca mulatta*): Do certain forms reflect cumulative negative affect over the lifespan?

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Stereotypic behaviours reflect sub-optimal welfare. But what types of negative affective state are they are most sensitive to? Short-term emotions? Longer-term moods? Or – longer-term still – cumulative negative affective experience over the lifespan? Because stereotypic behaviours are heterogeneous, the answer will vary with form. As indicators of emotion, however, stereotypic behaviours often seem problematic; they can be suppressed by negative emotions (e.g. fear), for instance, and increased by positive ones (e.g. food anticipation). Instead, evidence from rhesus macaques, elephants, and deer mice exposed to repeated stressors suggests that, at least for some forms, stereotypic time-budgets reflect the number of past negative events. Likewise, in humans at risk of OCD or trichotillomania, past exposure to more ‘stressful life events’ is a risk factor for the onset and severity of repetitive behaviours. Here, we investigate the impact of negative experiences over the lifespan, on the performance of stereotypic behaviours in rhesus macaques. Behavioural data were collected via live-streaming from 247 indoor-housed subjects from California and Oregon National Primate Research Centres (156 females, 123 males, averaging 9.67 years old) over 4-5 consecutive days (>100 scans/subject). 148 macaques performed stereotypic behaviour: 43.7% hair-plucked, 18.6% paced, and 9.7% showed a complex of rocking, swinging, bouncing or twirling (validated as one category: Polanco et al. 2021) (all other forms of stereotypic behaviour occurring in <5% animals). Split-half tests confirmed their within-subject consistency (hair-plucking: Spearman $\rho = 0.39$, $p < 0.05$; pacing: $\rho = 0.75$, $p < 0.05$; ‘rocking and correlates’: $\rho = 0.51$, $p < 0.05$). For each macaque, negative experiences (i.e. ones known to be aversive, or harmful for macaque fitness in the wild) were cataloged from birth (via facility records) to the week of behavioural observations, and (blind to their behavioural data) combined into a 14-point ‘Lifetime Stress Score’ (LSS) akin to tools used in human research. To investigate how LSS affects the performance of each form of stereotypic behaviour, mixed logistic regressions are currently being run (STATA 18.0). These will include controls for sex, age (weakly correlated with LSS), and overall activity levels (older macaques being more inactive). Preliminary analyses suggest that with increasing LSS, self-hair-plucking increases in likelihood. If confirmed, the onset and severity of self-plucking could be a useful way to non-invasively assess the impact of cumulative negative affect in research macaques. We hope this suggests new hypotheses to test about the role of cumulative negative affect in other species’ stereotypic behaviours.

Insights into inactivity: effects of enrichment and coping style on pigs' inactivity patterns

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Farmed pigs are often kept in barren and monotonous environments, which can result in prolonged periods of inactivity. Research indicates that increased inactivity may reflect negative affective states, for example boredom. However, little is known about how to describe and analyse inactivity in animals. To address this gap, this study explored different aspects of inactive behaviour in pigs. After weaning at an age of four weeks, 128 pigs from 16 groups were housed in either barren-monotonous (B) or enriched-varying (E) environments. After three to four months, half of the pigs switched from E to B (EB) or from B to E (BE), while the other half switched pens, but remained in the same condition (EE, BB). A detailed Inactivity Ethogram, capturing pigs' body postures while being inactive, e.g., leg and ear position, was applied to 64 focal animals. Inactivity was assessed via scan sampling on video recordings from both periods before (PRE) and after the switch (POST). The effects of environment and pigs' coping styles (assessed in a backtest before weaning) on different facets of inactivity were analysed with Generalised Linear Mixed-Effects Models. Pigs housed in B pens were significantly more inactive than those in E pens PRE-switch ($\chi^2 = 8.74$, $p < 0.01$, B = 71%, E = 62%) and POST-switch ($\chi^2 = 13.24$, $p < 0.001$, B = 81%, E = 70%). A significant interaction between housing conditions PRE- and POST-switch was found ($\chi^2 = 5.06$, $p = 0.03$), with EB pigs being more inactive than EE pigs (z ratio = -3.77, $p < 0.01$). Descriptive analysis of 1,437 scans revealed that the most common posture combination was lying laterally, head down, ears sideways and all four legs stretched to the side (36.3% of observations). Behaviour was overall comparable, but subtle differences occurred between treatment groups and coping styles, especially lying position and ear posture, highlighting the importance of detailed behavioural analysis. BE pigs, for example, showed more sternal lying, an active form of inactivity requiring body tension and linked to environmental awareness, compared to the control group (EE). Moreover, pigs scored as reactive lay laterally more often, particularly with head down, presumably reflecting relaxation. Proactive pigs displayed asymmetrical ears more frequently than reactive pigs, indicating greater environmental engagement while being inactive. This study contributes to a better understanding of pigs' body language while being inactive, paving the ground for future research on this often-overlooked aspect of behaviour.

Goats who stare at wolves – first steps in the development of an affect-driven attention bias test for small ruminants

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Reliable and non-invasive assessment of affective states is important in animal welfare research. A possible approach to assessing an animal's affective state is to link it to cognitive processes (such as cognitive biases). One such bias is the affect-driven attention bias, which occurs in various species, including humans, and refers to the tendency of individuals in negative affective states to focus more on threatening stimuli compared to neutral or positive stimuli. As one of the first steps in developing and validating an affect-driven attention bias test for goats, we aimed to identify visual stimuli that goats perceive as potentially threatening using a looking time paradigm. In a within-subject design, 30 adult (between one and four years old) female dwarf goats were exposed to photographs of 12 different animal species (6 natural predators of goats and 6 non-predatory species) from three different taxa (mammals, reptiles, birds) shown for 10 seconds each on either the left or right video screen of the experimental apparatus, while the opposite screen remained white. Stimuli were presented in a counterbalanced order and pseudorandomised. Each animal participated in four sessions (one session per day) of six trials each: two sessions in which the whole body of the stimulus animal was presented and two sessions in which only its face was shown, resulting in a total of 24 trials per subject. Subjects' looking duration was analysed using a linear mixed-effects model. Outcome variable of the model was the relative looking duration, calculated as the difference between the looking duration at the screen presenting a stimulus and the looking duration at the screen without a stimulus, divided by the duration of the head being visible during the 10 seconds of stimulus presentation. We found an interaction effect between the presented taxon and whether the presented stimulus individual was a predator or not ($p = 0.01$). Subjects paid more attention to predatory (model estimate = 0.26) compared to non-predatory (est. = 0.22) reptiles, while for mammals the opposite pattern occurred (predatory: est. = 0.14; non-predatory: est. = 0.19). No such deviation emerged between predatory and non-predatory birds (est. = 0.21 for both). Goats did not differ in their visual attention between full-body or face photographs ($p > 0.7$). These findings indicate that photographs of predatory reptiles (in our case snakes) might serve as negative stimuli in a subsequent attention bias test, although further validation regarding their negative valence is needed.

Three-step reduction of contact time between dairy cows and their calves does not result in low stress levels at the time of total separation

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There is growing interest in dairy farming to raise the calves with their dams in cow-calf contact systems, but welfare concerns exist about the high stress levels that animals experience at the time of weaning and separation. The study's aim was to investigate the behavioural reactions and milk yield of dairy cows to a gradual separation from their calves after 3 months of full-time contact. For this, the contact times between cow-calf pairs ($n=18$) were reduced in three steps: 1 week of half-day contact (~08:30-15:30h), 1 week of morning contact (~08:30-12:00h) and 1 week of fence-line contact before total separation of pairs. Nursing behaviour (scan sampling) and cows' vocalisations (continuous behaviour sampling) were observed in 5x30min intervals per day for 4 consecutive days after introduction of each separation step and in the week before separation (baseline). Milk yield was automatically recorded during the twice daily milking. A LMM was run for milk yield and nursing behaviour. Cows' vocalisations were classed as either a weak (≤ 10) or strong response (> 10 vocalisations/30min observation) and are presented descriptively. We found no increase in evening milk yield in the week with morning contact ($\text{LSM} \pm \text{SE}$: 2.93 ± 0.53 kg) compared to the half-day contact week (2.37 ± 0.53 kg, $p=0.98$), despite the shorter time-allowance for calves to suckle. Equally, no change in the percentage of scans with nursing behaviour from the week with half-day ($16.36 \pm 2.55\%$) to morning contact ($15.37 \pm 2.20\%$ of scans/30min, $p=0.91$) was evident in the observations conducted during reunion of pairs after morning milking, despite the longer separation time. In addition, cows reacted with a high amount of strong vocal responses once the contact was reduced to fence-line contact without the possibility of nursing (48.7% of all strong vocal responses observed in this week), which was more frequent than in the week with half-day contact (18.9%) or after total separation from the calf (25.2%). Taken together, these findings indicate that the reduction in contact time from half-day to morning contact did not achieve the intended reduction in nursing time and led in consequence to a rather abrupt loss of the nursing opportunity in the week with fence-line contact, which was accompanied by a considerable vocal response, indicative of stress. Future refinement of the gradual separation method must thus achieve a true reduction of nursing times and should carefully consider established nursing patterns and the possibility that calves might drink higher milk amounts in shorter time.

Playing music to animals: an interdisciplinary approach to improving our understanding of animals' responses to music

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Humans have profoundly changed the global soundscape. Studying how non-human animals respond to music can contribute to a better understanding of the effects of sound on animals. Animals are frequently exposed to human music, whether intentionally, for example in laboratory settings, or unintentionally, for example when animals live in close proximity to humans. Although several papers examine animals' responses to music, these typically do so from a purely behavioural perspective, sometimes missing relevant details about salient features of the music being played. An interdisciplinary approach which places musical and scientific knowledge on equal footing can improve our understanding of how animals respond to music and music-like sounds in new and exciting ways. To gain a representative insight into the current state of research on the effects of music on animals, we conducted a systematic review of original, peer-reviewed articles that tested animal responses to music published in Web of Science over the last 3 years (2021-2024). We chose a range of animal terms to ensure a broad survey of different taxa (birds, fish, mammals, reptiles, amphibians) while also targeting species known to be the focus of research on this topic (e.g. laboratory rodents, farm animals, zoo-housed non-human primates, companion animals). We included articles where the authors described their stimuli as "music" or "music-like", and where animals were exposed to music and their behavioural, physiological, affective, or neural responses were measured. In the 76 articles included in our review, crucial factors (intrinsic music properties, listener properties, playback context, and producer properties and contexts; ILPP) were not adequately considered or reported, which hinders scientific reproducibility within this area of study. These problems are caused by improper referencing of music sources, misunderstanding of music, and unexamined assumptions about individual variation and preferences between individuals of the same or different species. To increase comparability, generalisability, and reproducibility, we created a list of recommended information that should be reported in scientific studies.

Regular but temporary access to an enriched room modifies activity and social behavior of gestating SOWS

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In conventional pig farms, barren and monotonous environments can induce boredom and negatively impact animal welfare. Providing temporary yet regular access to an enriched space may offer a practical strategy to improve welfare. To test this hypothesis, six groups of nine gestating sows housed in barren pens were studied across three replicates. Enriched sows ($n = 27$ sows) accessed a multisensory enriched room three times per week for 2 hours (between 11AM and 4PM) from day 28 to day 106 of gestation (35 visits over 11 weeks). The room contained odorized objects, straw bedding and a peat box, with music or nature sounds playing continuously in the background. Control sows ($n = 27$ sows) remained in their home pens. Behaviours and postures were recorded in treatment weeks 2 and 11 using 6-minute scan sampling, while social interactions were continuously sampled in week 11. Observations were conducted on two days per week, with three 2-hour sessions per day (morning, midday, afternoon). Salivary cortisol was measured in weeks 2 and 10. Effects of treatment, week, daytime and parity were analyzed using linear mixed-effect models in R. On visit days, enriched sows ran faster to the enriched room than back to the home pen ($p < 0.001$), with running speed being higher in week 2 compared to weeks 5, 8 and 11 ($p < 0.001$). On non-visit days, home pen behaviours, postures, and social interactions were influenced by treatment x daytime interactions. In the morning, enriched sows spent more time lying ventrally ($p = 0.009$) and inactive ($p = 0.002$) but less time exploring pen fixtures ($p < 0.001$) and sham chewing ($p = 0.001$) than controls. They also engaged in fewer social interactions ($p = 0.006$), including reduced nose-to-nose contacts ($p = 0.004$), exploration of congeners ($p = 0.007$), and oral manipulation of congeners ($p = 0.005$). In the afternoon, enriched sows spent less time lying ventrally ($p < 0.001$) and inactive ($p = 0.002$), while spending more time standing ($p = 0.01$) and exploring the environment ($p = 0.01$) than controls, but social interactions were unaffected by treatment. Overall, enriched sows tended to be less aggressive than controls ($p = 0.06$). Salivary cortisol levels increased with gestation week ($p < 0.001$) but were unaffected by treatment. These findings suggest that temporary but regular access to an enriched environment influences activity patterns, reduces social interactions and potentially mitigates boredom in gestating sows.

Play responsiveness in an arena test is affected by feed restriction in calves

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Play behaviour is increasingly being used as a welfare indicator. For instance, dairy calves on standard milk allowances, thought to be experiencing hunger, often play less than those on higher allowances, potentially due to lower nutrition, negative affect, or both. Various aspects of play can be measured, but it is unclear which are the most sensitive indicators of hunger and welfare. We explored the relationship between feed restriction and both individual and social aspects of play by assessing calf behaviour in a play arena either when calves were on their own (individual test) or with a companion (pair test). Overall, 22 calves (4 Holstein female, and 18 beef cross [6 male and 12 female]) housed in pairs (home pens: 1.5m x 1.6m) on a commercial dairy farm were assigned at 9.7 ± 2.1 days old to two experimental groups: 6 L milk/day (standard) versus a maximum of 12 L milk/day (enhanced). Each pair included one calf from each group. At 16.7 ± 2.1 days old, the calves were habituated to the play arena (4.93m x 6.3m), and their play behaviours were assessed firstly in pairs and then individually on the following 2 consecutive days. Analyses of the effect of feed group on play behaviours were conducted for all calves using linear mixed models with pair as a random effect. Feed restriction did not affect locomotor play in either test in terms of running duration (all p values > 0.05), run bout frequency (all p values > 0.05), and kick/buck frequency (all p values > 0.05). However, feed restriction reduced play responsiveness in the paired test (mean difference = -19.86% , SE = 6.32; $R^2 = .27$, $F(1, 20) = 9.88$, $p = .005$), meaning the standard-fed calves were less likely to respond to their partner's locomotor play bouts by starting to play themselves. Standard-fed calves did not play less than enhanced-fed calves; however, standard-fed calves were less responsive to other calves playing. Here, the expected effects of feed restriction on locomotor play may have been masked by the calves' high motivation to play when given access to the arena, as their home pens severely limited opportunities for play behaviours. A calf's responsiveness to play contagion may represent a more sensitive welfare indicator that warrants further research, especially in contexts when the arena test is more practicable than home pen play measures.

Can we use the Broaden-and-Build-Theory to assess cow happiness? Behavioural diversity and social relationships

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In humans, the broaden-and-build-theory explains how positive states lead to a broadening of perspective (e.g. greater action repertoire) and subsequent building of personal resources (e.g. social relationships), which leads to a higher propensity to experience positive states. This upward spiral leads to a state of happiness or flourishing. This theory could be applied to animals to assess the outcomes of happiness to get a sense of how good their life is. This study aimed to test whether this human theory could be applied to a case of captive mammals: dairy cows (N=48), by exposing these cows to either improving (more space, additional brush) or worsening (reduced space, mixing, switching pen) conditions over a period of 6 weeks. From the 'Broaden' angle, we selected behavioural diversity, while for the 'Build' angle, we selected social relationships. The cows were observed the week prior to, and last week of, the treatment phase, using video observations during the two most active hours of the day, with scan sampling at 1-min interval. The broadest possible ethogram was developed and applied. First, a general behaviour analysis was conducted. Then, for behavioural diversity (Broaden), three variables were extracted: behavioural richness, evenness and Shannon's diversity index. For social relationships (Build), social network analysis was performed for lying behaviour, positive and negative social behaviours, and positive and negative social behaviours combined. Finally, the influence of three personality traits: sociability, fearfulness and activity level on behavioural diversity and social network was explored (based on challenge tests and principal component analysis). Poisson and binomial models were used to analyse the collected data. Cows exposed to improving conditions, and hence putatively more frequent positive states, increased their eating behaviour, while cows in worsening conditions decreased their eating behaviours ($P=0.016$) (reflected by general behaviour analysis) and increased their positive ($P=0.036$) and negative social behaviours ($P=0.039$) (reflected by general behaviour analysis and social network analysis). No effect of treatment was identified on behavioural diversity ($P=0.870$). Cows in worsening conditions became more and more limited in their eating and lying behaviours due to overcrowding likely ensuring more standing around waiting for access to resources. This likely promoted behaviours such as sniffing and licking the environment and increased the likelihood of contact with other cows. Most personality traits did not influence the behavioural diversity and social network analysis. Future research should ensure that the frequency of emotion is not manipulated by limiting the expression of behaviour.

Applying Qualitative Behaviour Assessment to investigate what a change in environmental conditions means for pigs

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The housing conditions of pigs on commercial farms are often barren and monotonous, which can negatively impact pig welfare. While environmental enrichment is known to improve pig welfare, the effects of changes in the environment, as on farms, are less well understood. Applying Qualitative Behaviour Assessment (QBA), this study investigated the short-term consequences of switching the environments of the pigs from enriched/variable (E) to barren-monotonous (B) or vice versa. QBA relies on human observers integrating subtle details of body language to infer animals' affective states through descriptors like 'relaxed' or 'bored'. The study included sixteen groups of pigs: eight groups experienced a switch of environment from E to B (EB) or B to E (BE). The other eight groups switched pens, but stayed with the same housing conditions (EE, BB). We filmed pigs' behaviour for 24 hours before (PRE) and 24 hours after (POST) the switch. Fourteen observers who did not know about the switch rated pigs' behavioural expressions from 64 video clips (two per pen; 32 PRE, 32 POST, each 1 minute long), using Free Choice Profiling. General Procrustes Analysis revealed two main dimensions accounting for 65.4 % of the variation between groups. Dimension 1 (D1) was described as ranging from 'active/engaged/explorative' to 'tired/bored', while Dimension 2 (D2) varied from 'bored/restless/aggressive' to 'relaxed/content/calm'. Linear Mixed-Effects Models showed that pigs' current housing conditions influenced QBA scores both PRE- and POST-switch (PRE-switch: D1: $F_{1,13} = 29.62$, $p < 0.001$; D2: $F_{1,13} = 13.13$, $p = 0.003$; POST-switch: D1: $F_{1,11} = 13.70$, $p = 0.004$; D2: $F_{1,11} = 9.00$, $p = 0.01$), with pigs in E pens being assessed as experiencing more positive affective states than those in B pens. However, there was no significant interaction between PRE- and POST-switch conditions on pigs' behavioural expression POST-switch (D1: $F_{1,11} = 0.03$, $p = 0.86$; D2: $F_{1,11} = 0.57$, $p = 0.47$). This contrasts with previous research showing that PRE-switch housing conditions influence behavioural and physiological responses POST-switch. One possible explanation is that the pigs' current housing conditions overshadowed any carry-over effects from the PRE-switch housing condition. Additionally, assessing pigs' behavioural expressions one day after the switch may not have been enough time to detect a statistically confirmed effect. Future research should assess the long-term effects of the switch to provide further insight into how changes in housing conditions affect pig welfare over time, ideally combining QBA with other indicators to corroborate the findings.

Relationships between behavioural and brain variables putatively reflecting positive and negative affective states of weanling piglets

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The amino acid tryptophan is a mediator of the link between stress, sickness and affective states. Stressors or infections can shift the balance between the serotonin and kynurenine pathways of tryptophan catabolism towards the latter, thus reducing tryptophan availability for serotonin synthesis, which has been associated with lowered mood in pigs. The aim of this study was to explore relationships between tryptophan, serotonin, their metabolites, as well as other monoamine neurotransmitters in the hippocampus, with behaviours that are assumed to be associated with positive and negative affect. Video recordings and brain samples were available from 46 female pair-housed piglets exposed to different sanitary and dietary treatments (2x2 setup) and weaned at 4 weeks. On day 16 postweaning, frequencies of damaging behaviours (including ear and tail biting), aggression, object play, individual locomotor play, social locomotor play and play fighting were recorded with continuous observations from 7:00-19:00h. On day 18, brains were collected for assessment of tryptophan, kynurenine, kynurenic acid, serotonin and 5-hydroxyindoleacetic acid, as well as adrenaline, noradrenaline, dopamine and homovanillic acid concentrations. Behavioural and brain variables were square root and log transformed, respectively. Pearson correlations were done on residuals of the variables obtained from a general linear model with sanitary status and diet as factors to correct for experimental treatments. Aggression and object play were not significantly correlated with brain variables. Irrespective of experimental treatments, hippocampal adrenalin concentrations, which may reflect stress, correlated positively with frequency of damaging behaviours ($r = 0.31$, $P < 0.05$), and negatively with play fighting ($r = -0.47$, $P < 0.01$) and social locomotor play ($r = -0.39$, $P < 0.05$). Hippocampal serotonin ($r = 0.41$, $P < 0.01$) was positively correlated with play fighting. Concentrations of kynurenic acid, a metabolite of the kynurenine pathway with neuroprotective properties, were positively correlated with individual ($r = 0.41$, $P < 0.01$) and social locomotor play ($r = 0.35$, $P < 0.05$). Also, its ratio to tryptophan was positively correlated with different forms of play behaviour and negatively with damaging behaviour ($r = -0.36$, $P < 0.05$). None of the behaviours were significantly correlated with noradrenaline, dopamine, homovanillic acid or kynurenine concentrations. In conclusion, this explorative study indicates that the expression of positive and negative behaviours of weanling piglets relates to brain biochemical pathways that involve tryptophan, serotonin and their metabolites, as well as adrenalin. It not only provides further insight into damaging behaviour but also is a step towards validating play behaviour as an indicator of positive affective states in pigs and possibly other animals.

Use of a feed motivation test as a potential indicator of hunger in pregnant beef cows with varying body condition scores.

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In certain regions, loss of body condition over winter is a key part of the management strategy for spring-calving suckler beef cows. While many believe that condition loss does not negatively affect cows, as they have evolved to endure feed shortages in colder months, winter maintenance still represents one of the highest energy demands in beef production, especially for thinner cows. Although thin cows have an increased risk of dystocia, farmers often manage over-conditioned cows to lose condition due to concerns about calving difficulties and to reduce feed costs. Poor nutritional management can result in substantial condition loss in a short time. The assumption that winter condition loss is natural highlights a gap in research regarding the potential impact on cow welfare. The objective of this study was to develop a novel motivational conflict test and to assess whether the body condition score (BCS) through pregnancy correlated with signs of hunger behaviour. Feeding motivation was tested on 11 occasions between 2022-2025. In-calf suckler beef cows in Scotland (n=523) and Ireland (n=173) were tested up to 3 times during mid-late pregnancy (n=2180). BCS was assessed during routine handling in a cattle crush, and upon release from restraint, cows were offered the opportunity to delay returning to their social group to consume a high-value feed reward. Immediately upon feeding, a handler would return the cow to the herd. Cows were expected to be motivated to reinstate social contact, so the option to stop to eat concentrates presented a motivational conflict. Cows were scored using flight speed, duration investigating the feed trough, latency to consume or move on from the feed, and attempts to return to the feed after being disrupted. The effect of absolute BCS and change in BCS during pregnancy was tested using linear mixed models. Initial data analysis of the first time point revealed that cows that experienced greater condition loss took less time between leaving the crush and reinstating contact with their social group ($p < 0.045$) compared to those that maintained or gained BCS. The model had a low Pearson's correlation coefficient ($r = 0.127$), suggesting the biological effect may be very small. Absolute BCS in late pregnancy and change in BCS from mid-late pregnancy had no effect on other measures of test performance. It is concluded that a falling body condition score has only a marginal effect on behaviour in a feeding motivation test. Analysis of the remaining tests is ongoing.

Behavioral responses of dairy cows to temporary separation and reunion

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The objective of this study was to explore the behavior of Holstein dairy cows (n=2 primiparous; n=5 multi-parous) in response to temporary separation and reunion with their Holstein calves, which may reveal possible behavioral indicators of positive affective state. Cow-calf pairs were managed individually in pens for the first approximately 48 h of age (range 36 to 60 h) prior to testing. Testing was divided into 3, 90-min phases (preseparation, separation, and reunion) between 1330 and 1830 h. Video was recorded for the first 60 min of each phase and analyzed continuously by trained observers. Seven behaviors expressed by the cow were observed: number of 'calf checks' (cow re-orient to touch the calf) and durations of touching the calf, allogrooming, drinking water, exploring (floor and walls), rubbing surfaces, and self-grooming. Behaviors (excluding calf-directed behaviors during separation phase) were compared between the three phases by analyzing with a Kruskal-Wallis test. Touching the calf increased between pre-separation (7.0 ± 16.1 s) and reunion (48.7 ± 21.5 s) ($P < 0.01$). Allogrooming the calf also increased between pre-separation (10.6 ± 22.2 s) and reunion (200.8 ± 230.9 s) ($P = 0.011$). Number of 'calf checks' increased between the pre-separation (1.0 ± 0.5 'calf checks') and reunion (3.0 ± 1.6 'calf checks') phases ($P < 0.01$). There was no difference in drinking duration between the three phases ($P = 0.19$). Exploring duration was greater during separation (365.2 ± 212.0 s) than reunion (115.2 ± 90.6 s; $P = 0.018$) and pre-separation (53.5 ± 80.6 s; $P < 0.01$). Rubbing duration was higher during separation (66.1 ± 94.6 s) than reunion (2.8 ± 5.7 s; $P = 0.034$). Rubbing duration tended to be higher during separation (66.1 ± 94.6 s) than pre-separation (6.5 ± 8.4 s; $P = 0.054$). Self-grooming duration did not differ between separation (123.6 ± 113.4 s) and reunion (41.5 ± 48.7 s; $P = 0.18$) but was higher during separation (123.6 ± 113.4 s) than pre-separation (14.5 ± 20.2 s; $P = 0.031$). Overall, maternal behaviors like allogrooming, 'calf checks', and touching increased upon reunion, probably reflecting maternal motivation to reunite with the calf after separation. Exploring, rubbing and self-grooming also increased during separation, which we speculate may reflect frustration related to seeking the calf. In light of this limited sample size, further exploration of these behaviors under different contexts could reveal their utility as behavioral indicators of affective state.

A spatial judgement bias task to assess affective states in horses

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Odours, whether inherently pleasant or positively associated through appetitive olfactory conditioning, have the potential to influence affective states and improve animal welfare. In this study, we designed a spatial judgement bias task to examine the effects of a conditioned odour (lavender) on horses' affective states. Over five weeks, 24 Icelandic horses were given access to either odourised or non-odourised totem brushes in their pastures to establish an association between lavender and a positive affective state following voluntary tactile stimulation. In parallel, the horses were trained and tested in a spatial discrimination task. Five buckets were placed evenly along the half-solid partition of a horse stall (~3 x 4 meters), creating a scale from positive to negative (balanced for side). The horses were trained to touch a target (rubber ball on a stick, presented by an experimenter in the adjacent stall) above the positive bucket for a food reward in the bucket below, whereas touching the target when presented above the negative bucket resulted in a 30-second timeout. After 16 training sessions, all but two horses met the learning criterion of 80% correct responses across both positions. In the following test sessions, 20 target presentations were made across all five positions (positive, near-positive, middle, near-negative, negative) in a standardised order. Horses were tested twice and exposed to either lavender odour or an odourless control, via customised halter nosebands, depending on the treatment group (odourised brush and tested with lavender: n = 8, odourised brush and tested with odourless control: n = 6, odourless brush and tested with lavender: n = 8). Responses (touch: yes/no) were recorded from video footage. The percentage of positive responses (touch: yes) was generally high across all five positions (41-95%). A stepwise-reduced binomial GLMM was fitted, including fixed effects of target position, odour treatment, test session, and an interaction between odour treatment and test session. Horse ID was modelled as a random effect with a random slope for test session. No effect of odour treatment was found, but post-hoc analysis showed that positive responses steadily decreased from near-positive to negative target positions (pairwise comparisons of adjacent positions: all P-values < 0.04), consistent with the theoretical framework. Although we did not observe an effect of the putatively affective manipulation, horses' success in adapting their responses during training suggests this method holds potential. We discuss challenges during testing and training, offering suggestions for refinements in future studies.

Effects of a synthetic analogue of bovine appeasing pheromone on dairy calf welfare from birth through to weaning

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The welfare of dairy calves is influenced by management practices during the weaning period. Current artificial rearing practices are known to have a negative effect on the wellbeing of the calves. This study examined the effects of a synthetic analogue of the bovine appeasing pheromone (BAP) on growth, physiological stress indicators, and behaviour in Holstein-Friesian calves from birth through weaning. It was hypothesised that calves receiving BAP would have better welfare indicators compared to calves receiving a placebo. In this blind randomized controlled trial 72 dairy female calves were randomly assigned to either a BAP or a placebo group, with treatment application every two weeks. Triaxial accelerometers were used to record activity levels from each calf from birth until the end of the experiment. Data on weight gain was collected every week throughout the study. Physiological stress was assessed using weekly heart rate variability (HRV) measures and biweekly hair and saliva cortisol levels. Raw data was analysed using a linear mixed effects model. Average daily gain (ADG) increased by 0.15 kg in BAP weaned calves compared to the placebo group (BAP 0.90 ± 0.34 kg, Placebo 0.76 ± 0.22 kg, $p=0.04$). Salivary cortisol tended to be lower during weaning (BAP 0.11 ± 0.10 µg/dL, Placebo 0.12 ± 0.10 µg/dL, $p=0.08$) suggesting reduced acute stress responses. HRV, including SDNN (before weaning: BAP 25.69 ± 10.18 ms, Placebo 22.04 ± 7.57 ms, $p=0.05$; 1st week after weaning: BAP 23.48 ± 9.71 ms, Placebo 18.45 ± 7.74 ms, $p=0.02$; 2nd week after weaning: BAP 21.36 ± 9.31 ms, Placebo 15.96 ± 7.60 ms, $p<0.01$) and RMSSD (before weaning: BAP 9.50 ± 3.32 ms, Placebo 8.01 ± 2.74 ms, $p=0.05$; 1st week after weaning: BAP 8.56 ± 3.16 ms, Placebo 7.09 ± 2.24 ms, $p=0.07$; 2nd week after weaning BAP 7.74 ± 2.88 ms, Placebo 6.40 ± 2.20 ms, $p=0.09$) were higher in the BAP group during and after weaning, compared to the placebo group, indicating better autonomic balance. Behavioural data revealed increased lying time and reduced restlessness in BAP-treated calves. Before weaning, calves in the placebo treatment spent 6.3% more time lying down compared with weaned calves ($p<0.01$), and 4.45% ($p=0.05$) more time than partially weaned calves, differences were not seen in the BAP group, highlighting enhanced comfort during stressful management events such as weaning. The findings suggest that BAP administration can mitigate stress-related behavioural and physiological changes, potentially improving calf welfare and performance in commercial dairy systems.

Using conditioned place preference testing to assess how laboratory rats perceive tickling

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Evidence suggests that heterospecific play (tickling) stimulates positive affect in laboratory rats, thereby acting as enrichment promoting positive welfare. Tickling, by alternating between tickling the nape (dorsal contact) and the belly ("pinning", by flipping the rat on its back), mimics some aspects of social play. However, not all rats may view tickling as a positive experience, especially if they perceive frequent pinning as domineering rather than playful. We used a conditioned place preference (CPP) paradigm to assess whether rats would develop a preference for the compartment where they were tickled and whether their preference, if any, varied according to the number of pins experienced during tickling. We tested 48 juvenile Wistar rats (24 males, 24 females) in a balanced experimental design across sexes and treatments (1 vs 4 pins/session). The CPP apparatus compartments were differentiated by visual and tactile cues. One compartment was paired with tickling, the other with the experimenter's motionless hand (control). Rats underwent four 40-s tickling conditioning sessions and four 40-s control sessions, with their 50-kHz ultrasonic vocalizations (USVs) being recorded as an indicator of positive affect. In the CPP test, they had access to both chambers in the absence of the experimenter, and their time spent in each compartment was measured. We predicted that: i) 50-kHz USV production would increase over the tickling sessions; ii) rats would develop a preference for the tickling-paired compartment; and iii) these effects would be stronger if subjected to 1 vs 4 pins/session. Overall, rats did not display a CPP for the tickling-paired compartment (one-sample t-test, $p=0.184$). However, 50-kHz USV production increased across tickling sessions as predicted (mean $\pm$ SE, 59.45 ± 38.12 USVs/min; one-sample t-test, $p<0.001$), and also across control sessions (29.9 ± 37.16 USVs/min, $p<0.001$). Moreover, 50-kHz USV production correlated positively with time spent in the tickling-paired compartment when tested (Spearman's rank correlation, $\rho=0.313$, $p=0.035$). Additionally, within a subpopulation of 20 rats showing relatively high CPP, those receiving 1 pin/tickling session displayed a stronger preference for the tickling-paired compartment than those receiving 4 pins (Two-way ANOVA, Tukey HSD, $p=0.040$). Our findings imply that tickling stimulated positive affect while demonstrating individual variation in its reinforcing properties. This conclusion is further supported by individual variation in responses depending on pinning frequency. It appears that the contrast between compartments in the CPP was low because rats enjoyed exploring both compartments and/or the experimenter's passive hand stimulated anticipation of tickling, perhaps explaining the lack of an overall CPP effect.

Reading between the ears: exploring ear postures as an indicator of affective state in dairy cows and calves during temporary separation and reunion

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Ear postures in dairy cows may be an indicator of affective state, but validation in positive and negative situations is necessary. We explored whether ear postures change under putatively positive and negative affective conditions, using a temporary cow-calf separation and reunion model. Holstein dairy cow-calf pairs ($n=8$) were housed in individual pens after birth for approximately 48h (range: 36-60h), before experiencing temporary separation. This included three, 90 min phases: pre-separation, separation, and reunion. During separation, calves were moved to a separate pen, with auditory but no visual contact. Ears were manually scored from frames extracted from recorded video at every other minute for the first 60 min of each phase, for both cow and calf (approx. 30 scores/cow and calf/phase). Both ears were scored for one of four positions: Forward (in line with or in front of frontal plane); Up (behind frontal plane, above line of neck); Backward (behind frontal plane, held in line with neck); Hanging (falls loosely downwards, perpendicular to head). Ears were scored as asymmetrical if the left and right ears were held in different positions, or were scored as unknown if the position was unclear. Frequency of each ear position was calculated as a percentage of observations where at least one ear was visible; this variable was analyzed using linear regression models for both cows and calves (fixed effects: phase; parity). Phase did not affect observed forward position (overall; cow: $29.7 \pm 17.0\%$; calf: $28.2 \pm 21.4\%$), up position (overall; cow: $13.8 \pm 10.7\%$; calf: $7.42 \pm 9.67\%$), nor backward position (overall; cow: $15.1 \pm 8.76\%$; calf: $15.6 \pm 9.50\%$) in either cows or calves. Hanging position in cows was greater (or tended to be greater) during pre-separation ($17.5 \pm 4.25\%$) than separation ($3.23 \pm 4.25\%$; $P=0.03$) and reunion ($5.81 \pm 4.25\%$; $P=0.06$) phases, but reunion and separation phases did not differ. Phase did not affect hanging position for calves (overall: $21.3 \pm 23.5\%$). Phase did not affect observed asymmetrical position for cows (overall: $33.0 \pm 11.6\%$); however, for calves, asymmetrical position was greater during separation ($37.6 \pm 5.38\%$) than reunion ($20.2 \pm 4.94\%$; $P=0.03$) but not between other phases (pre-separation: $27.4 \pm 4.94\%$). More frequent hanging ears during pre-separation, but not reunion, may suggest this position is not reflective of valence, but rather a low arousal affective state. Asymmetrical ear positions are rarely investigated, but their increase during separation may be related to negative affective states, which warrants further research. We caution this is a low sample size. Validation of ear posture as an indicator of affective state will be necessary alongside other measures.

Unravelling the functions of allogrooming in domestic cats using video-observations

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Allogrooming is a behaviour performed by many animal species that is thought to promote hygiene and/or maintain social bonds. Allogrooming by domestic cats is commonly described as a sign of social group bonding, although empirical evidence is lacking. We performed a video-based observational study to gain a deeper understanding of the function(s) of allogrooming in cats. A citizen science approach was used to collect videos of 53 cat dyads during allogrooming. Behavioural observations were performed independently by two observers, with strong inter-observer agreement based on our ethogram (Cohen's Kappa ≥ 0.78). Further statistical analysis included creation of a linear mixed model comparing duration and frequency of behaviours across cats grouped according to (1) performance of allogrooming (Gr: groomer, Ge: groomee), (2) relatedness and/or early socialisation (yes/no), and (3) synchronisation of body posture within the pair (S: synchronous, A: asynchronous, D: dynamic). Groomers sniffed the other cat more often ($p=0.019$, Gr: $0.63/\text{min} \pm 1.20$, Ge: $0.15/\text{min} \pm 0.40$) and performed more ($p=0.017$, Gr: $0.45/\text{min} \pm 0.72$, Ge: $0.14/\text{min} \pm 0.32$) and longer ($p=0.026$, Gr: $8.1\% \pm 17.9$, Ge: $1.1\% \pm 2.4$) autogrooming, while groomees showed more interactive body postures as seen during playful or aggressive encounters ($p=0.028$, Gr: $0.34/\text{min} \pm 0.91$, Ge: $0.60/\text{min} \pm 1.23$). Despite social group formation typically being attributed to related and early socialised cats, 24/53 unrelated/unsocialised cat dyads in the study groomed each other. No further behavioural differences were found based on relatedness. Lastly, cats synchronising their body posture during allogrooming, sought physical contact more often ($p=0.022$, S: $0.52/\text{min} \pm 0.77$, A: $0.11/\text{min} \pm 0.33$, D: $1.13/\text{min} \pm 2.50$) and for longer ($p=0.0005$, S: $49.0\% \pm 44.5$, A: $6.6\% \pm 19.5\%$, D: $7.4\% \pm 15.8$), avoided each other less ($p=0.023$, S: $0.24/\text{min} \pm 0.45$, A: $0.79/\text{min} \pm 1.17$, D: $0.95/\text{min} \pm 1.32$) and performed less shaking and scratching ($p=0.045$, S: $0.22/\text{min} \pm 0.41$, A: $0.66/\text{min} \pm 0.95$, D: $1.24/\text{min} \pm 1.80$). Our results illustrate the complexity of feline social dynamics and how behaviours such as allogrooming likely serve multiple social functions.

Affective states of dogs in animal-assisted services: a principal component analysis approach

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Animal-Assisted Services (AAS) have grown in popularity since the 1990s. Despite the growing use of dogs in these services, little research has focused on their welfare and how they experience these interactions. This study aims to identify underlying behavioural components that reflect dogs' affective states during AAS sessions using Principal Component Analysis (PCA). A total of 71 dogs participated in this study, with 837 sessions scored across four AAS categories: Animal-Assisted Activities (AAA), Animal-Assisted Coaching (AAC), Animal-Assisted Education (AAE), and Animal-Assisted Therapy (AAT). The majority of sessions were conducted in AAT, followed by AAA and AAC, while AAE had the fewest recorded sessions. After structured classroom training on using an ethogram, trained AAS professionals observed and recorded 19 dog behaviours post-session. Each service type was analysed separately with PCA to identify clusters of behaviours representing distinct affective states. The Kaiser-Meyer-Olkin (KMO) test assessed sample adequacy, and an orthogonal rotation was applied to enhance interpretability. Only PCA components with eigenvalues >1 were considered. For AAA sessions, PCA identified four distinct affective states: detached, thoughtful, uncertain, and playful, explaining 45.1% of the variance ($KMO = 0.656$). The detached state was characterised by behaviours such as sniffing the ground and lying down, while thoughtful dogs showed slow tail wagging and engagement with clients. In AAC, five PCA components emerged, including playful, comfortable, tense, anxious, and uncertain, accounting for 61.2% of the variance ($KMO = 0.729$). For AAE sessions, four affective states were identified: engaged, uncertain, anxious, and aroused, explaining 52.4% of the variance ($KMO = 0.587$). Dogs in the engaged state exhibited play behaviour and limited direct interaction with the client, while anxious dogs displayed a low posture, rapid tail wagging, delayed movements, and avoidance behaviours. For AAT sessions, PCA revealed four components: enthusiastic, anxious, relieved, and playful, explaining 49.7% of the variance ($KMO = 0.723$). Enthusiastic dogs exhibited high, rapid tail wagging and close interaction with the client, whereas anxious dogs engaged in avoidance behaviours, lip licking, and delayed responses. This study provides novel insights into the affective states of dogs in AAS sessions by objectively clustering behavioural expressions. The findings reveal a wide range of affective states displayed during sessions. While many dogs show signs of engagement and playfulness, others exhibit stress or detachment, raising concerns about individual suitability for AAS. Identifying behavioural markers can guide AAS dog selection and monitoring, ensuring ethical, effective services.

Exploring behavioural demand for foraging choices in piglets: a pilot study

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Making choices is a fundamental way animals can control their environment. Choosing how and when to interact with their environment allows animals to engage in activities that are rewarding for their own sake and may promote positive welfare. If piglets have a high motivation to access choice, it would indicate that choice is important from the piglets' perspective and may be used to improve welfare. The objective of this pilot study was to determine the strength of the motivation in piglets to access foraging options using a behaviour demand approach. We hypothesised that piglets would be more motivated to work for choice of different feed and ways to forage, compared to access to single items. To test this, 60 suckling piglets from 6 litters (21 days of age) could choose to push a weighted door to gain access to an additional pen. For 30 piglets, the additional pen contained five different food items (e.g., yoghurt, hay, fruit and cereal) fed in five different ways (e.g., bowl, Kong toy, Lickimat, hidden in peat) with different combinations every day (choice treatment), and for the other 30 piglets only a creep feeder, identical to the one in the home pen was present (no-choice treatment). There were 6 different costs (i.e., weight of the door): 10%, 16%, 25%, 40%, 50% and 60% of body weight. The animals could work for 2 minutes access to the additional pen for 20 times each cost. Data was analysed in R with a mixed model fitting treatment and cost as fixed effects and piglet nested within sow as a random effect. There was a significant interaction between the treatment and the cost of access to the additional pen ($F_{(5,182)} = 5.8, P > 0.001$). At the minimum cost (10%) the choice group had 11.15 ± 0.9 and the no-choice group 1.5 ± 0.4 entries. At the maximum cost (60%) entries were 3.0 ± 0.9 for the choice group and 0 ± 0 for the no-choice group. Hence, motivation dropped in both groups with increasing price, but the choice group had a consistently higher number of entries compared to the no-choice treatment. Giving piglets the opportunity to choose proved to be an important motivational and rewarding factor for those animals. This suggests that offering more choices to perform an already highly motivated behaviour, like foraging, may be a good way to promote positive welfare, although more research using a larger sample set would be needed to confirm this.

The effect of choice on horse behaviour, heart rate and heart rate variability during human-horse touch interactions

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Human-horse touch interaction is a feature common to almost all equine-assisted services (EAS), although less is known about how horses perceive tactile stimulation during interaction with humans. The current study assessed the effect of three types of touching (patting, stroking, scratching) on three anatomical body locations (neck/shoulder, body, hindquarter) of therapy horses (N=10) on horse behaviour, heart rate (HR) and heart rate variability (HRV) under forced and free-choice touch treatments. Each horse interacted with no more than two participants per day. The human participants (25 experienced and 24 inexperienced with horses) interacted individually with four horses under both treatment conditions within a familiar round pen. During the forced touch treatment, the horse was tethered for the test duration (4.5min) and the participant touched each body location with each type of touch, switching every 30s as instructed by the researcher. During the free-choice touch treatment, the horse was loose in the pen and the participant, standing in the centre, touched the horse only if the horse came within arm's reach. A GLIMMIX with repeated measures examined the effect of treatment, touch type, location and human experience on horse behaviours, HR and HRV. Odds ratios were calculated for head height and ear orientation. Oral behaviours, restlessness and tail swishing occurred more frequently, while head shaking behaviour occurred less frequently during forced compared to free-choice touch treatments (all $p < .0206$). Tail swishing was less frequent when touching the hindquarters in comparison to touching the neck/shoulder and body ($p < .0001$). The odds of high (OR=0.10, 95% CI (0.05, 0.20)) and even (OR=0.04, 95% CI (0.03, 0.06)) head positions were higher during forced touch treatments and lower during free-choice touch treatments. Conversely, the odds of a low head position were higher during free-choice treatments (OR=9.75, 95% CI (7.84, 12.12)). Horses were more likely to keep their ears oriented toward the participant during forced touch compared to free-choice touch treatments (OR=0.19, 95% (0.15, 0.23)). Horse HR was higher during freechoice touch compared to forced touch treatments ($p = .0007$). Horse HRV was lower during interaction with experienced than with inexperienced participants ($p = .0293$). Descriptive analysis showed that when given a choice, horses spent more than half their time out of human reach during free-choice treatments. These findings highlighted that therapy horses did not perceive forced touch treatment positively, emphasizing the importance of offering horses choice and agency during EAS to maintain human safety and ensure a good life for horses.

Chickens at work: exploring avian agency and resistance in agricultural systems

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The study of human-animal relationships in agricultural settings has often focused solely on human perspectives, neglecting the lived experiences of farmed animals themselves. However, recent scholarship in animal studies and critical agrarian research has begun to challenge this limited viewpoint by emphasizing the agency of farmed animals. This paper contributes to this expanding field by investigating how the under-researched species of chickens express agency within the context of commercial farming. We use a multi-sited qualitative approach, combining in-depth interviews with farmers and on-farm observations across various agricultural settings, such as intensive and organic farms. The interviews aim to uncover how farmers perceive and manage chickens' behaviours, while the participative observations focus on the chickens' own activities, movements, and interactions within their environment. A part of the observational work involves the use of Qualitative Behaviour Assessment (QBA), a method that captures the expressive qualities of animal behaviour in a structured yet holistic way. By integrating QBA with animal-centred participative observation and human-centred interviews, this method is particularly effective for studying human-animal relationships, as it allows us to analyse how interactions between chickens and humans occur in diverse contexts, rather than being limited to a single farm, system or method. By examining multiple sites, we aim to capture the variations in how chickens engage with different farming infrastructures, technological innovations, husbandry practices, and human expectations. This approach also provides a comparative perspective that helps us explore how factors such as farm size, management style, and technological interventions influence the agency of chickens. Within these field sites, we focus on how chickens "perform" their role in agricultural systems, how they navigate their environments, respond to human-imposed routines, and adapt to or resist being viewed as mere units of production. Furthermore, our study examines how farmers perceive and interpret chicken behaviours, highlighting the intersubjective dynamics present in human-animal relationships. This ongoing study will present the theoretical framework and methodological approach used to investigate avian agency. We will attempt to give voice to chickens' interests whilst avoiding anthropocentric assumptions. This research contributes to broader discussions on ethics, animal welfare, and sustainable farming practices by shifting the analytical focus toward the agency of farmed chickens. Recognizing chickens as active participants in agriculture offers alternatives for reconsidering traditional farming practices, emphasizing the relational and dynamic nature of human-animal interactions.

Harmonizing Animal-Based Measures: Criteria for a comparable animal welfare assessment

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The European Food Safety Authority (EFSA) stresses that animal-based measures (ABMs) should be based on scientifically validated indicators, with standardized data collection methods to ensure comparability and policy relevance. The European Union Reference Centres for Animal Welfare (EURCAW) similarly highlight the importance of developing ABMs that are not only scientifically sound but also applicable across different welfare assessment frameworks. Arguably, the greatest challenge is the lack of harmonization in welfare assessment protocols among EU countries. Within the European Partnership for Animal Health and Welfare, one of the priority areas is surveillance, monitoring, and risk assessment for animal health and welfare, from which the Set of Action number 9 (SOA9) project emerges—bringing together 10 countries and 20 EU institutions. The initiative aims to establish a collaborative knowledge platform that serves as a hub for collecting, analysing, sharing, and using integrated scientific and technical data on animal welfare—benefiting all key actors, including decisionmakers, scientists, veterinarians, food business operators, farmers, and NGOs. Therefore, the main goal of the present work is to identify and compare protocols and tools used to assess animal welfare in livestock species, in order to provide key criteria needed for the harmonization of AB. This will support a more consistent and comparable animal welfare assessment across different stages, including on-farm, during transport, and at the slaughterhouse—allowing for better monitoring of animal welfare data.

Preliminary assessment of the physical welfare of tethered and free-ranging Lagune cattle in the Oueme Valley region of southeast Benin, West Africa

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Lagune cattle is a dwarf shorthorn taurine breed. The tethering Lagune cattle system is a local, extensive production system where cattle are kept under coconut or oil palm plantations, or are kept at stake around houses in the village for grazing. Such a system is used, particularly in the Oueme Valley region, characterised by wetlands, as it offers advantages (e.g., access to a natural grazing environment, reduced management costs). However, it creates unsuitable conditions that can negatively affect the physical welfare and health of the cattle, and this remains largely unexplored. The aim of this study is to investigate the physical welfare of tethered and free-ranging Lagune cattle in the Oueme Valley region of southeast Benin. The Oueme Valley region, located in southeast of Benin, is the cradle of Lagune cattle breed with the largest number of Lagune herds in Benin. A questionnaire-based survey was conducted on a randomly selected sample of 250 Lagune farmers to understand the Lagune cattle production systems. Then, 60 Lagune farmers who owned at least five animals and agreed to participate in the animal welfare assessment study were chosen for a six-month herd monitoring. The physical welfare assessment was based on the Five Domains Model of animal welfare. The results show that 96.8% of farmers combined agricultural and non-agricultural activities, leaving little time for proper animal care. Most Lagune cattle farming is secondary, with small herds (average size of 4.4 ± 4.5) dominating. Three production systems were identified: tethering (81%), free-ranging monitored (1.7%), and unmonitored free-ranging (17.3%). Tethered cattle faced several welfare issues: limited access to water, exposure to the sun without shelter (90%), and no opportunity to select preferred forage. Injuries (lameness, neck pain) and underfeeding (50% during dry season, 100% during floods) were common. Cattle on bamboo piles during floods had no access to water, could not lie down, and were underfed. In comparison, free-ranging cattle showed injuries from cuts and pesticide poisoning, but their welfare issues were less severe than those of tethered cattle. This study highlights the critical need for further research on Lagune cattle welfare, particularly regarding tethering practices and their challenges. It is essential to raise awareness among farmers about welfare concepts and promote better management practices. By improving our understanding of animal welfare challenges and integrating these considerations into livestock management, future studies can enhance both animal health and farm productivity.

Gut microbiota alteration in response to social behaviours and skin lesions in growing pigs after regrouping

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Frequent regrouping during different growth stages exposes pigs to unacquainted environments and individuals, increasing possibilities of aggression and associated welfare concerns, such as skin lesions. One of the strategies to address these welfare concerns is to promote affiliative behaviours, which are commonly exhibited in stable social groups and contribute to a calmer state and reduced lesion severity in pigs. Furthermore, the bidirectional relationship between the gut-brain axis and behaviour suggests that these social interactions may also influence gut microbiota composition. This study aims to explore alterations in gut microbiota associated with social behaviours and skin lesions in pigs after regrouping. A total of 319 growing pigs were transported for 2 h and then randomly regrouped at a research farm. Aggressive and positive social behaviours were video-recorded for 24 h after regrouping, and skin lesions were assessed on the same day. Based on lesion severity, pigs from 3 pens were divided into two groups: low skin lesions (LL, n = 9) and high skin lesions (HL, n = 9). Fecal samples were collected from three pigs per pen, for a total of nine pigs per group, on days 1 and 2 after regrouping. The microbiota composition was analysed via 16S rRNA gene sequencing, and the spearman rank correlation test was used to analyse correlations. At the phylum level, linear discriminant analysis effect size (LEfSe) revealed a greater abundance of Bacteroidota and Campylobacterota in LL group than HL group ($P < 0.01$ for both), while Firmicutes was more abundant in HL group than LL group ($P < 0.01$). At the genus level, Oscillibacter, Monoglobus, Parabacteroides, Succinivibrio, Campylobacter and Phascolarctobacterium were remarkably more abundant in the LL group ($P < 0.05$ for all), while the HL group showed higher proportions of Faecalibacterium, Dialister, Ruminococcus, Fusicatenibacter, Butyrivibrio, Oribacterium, Lachnospira ($P < 0.05$ for all). Positive social behaviour showed negative correlations with relative abundance of Bacteroidota ($r = -0.83$, $P < 0.05$), Campylobacterota ($r = -0.99$, $P < 0.01$), Oscillibacter ($r = -0.94$, $P < 0.01$), Campylobacter ($r = -0.99$, $P < 0.01$), and Phascolarctobacterium ($r = -0.83$, $P < 0.05$). These findings suggest that lesion severity influences the composition and richness of gut microbiota in growing pigs. The adverse correlation between social behaviours and microbiota related to pathogenesis highlights the role of positive social interactions in gut health. Therefore, establishing environments that promote positive social behaviours after regrouping may have the potential to improve gut health and overall welfare in growing pigs.

Dog ethogram (Part I): review of existing ethograms

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The lack of a widely accepted and comprehensive ethogram for the dog (*Canis familiaris*) hinders the study of its behavior. Ethograms facilitate the study of species behavior by providing a list of predefined behaviors and establishing the level of analysis. They also define the units of ethology as a science, mitigating subjectivity through consistent standards. A comprehensive and standardized ethogram provides common terminology, promoting progress, collaboration, and comparison across studies of this species. This study aimed to compile as much information on the ethograms created for *Canis* species; to identify patterns and gaps in the different ethograms; and to provide a foundation for creating a standardized and comprehensive ethogram. To achieve these objectives, two types of ethograms were analyzed: comprehensive ethograms created for the species of the *Canis* genus, and partial ethograms developed for dogs. The comprehensive ethograms selected were all those published in English. Four comprehensive ethograms were identified. Partial ethograms selected described more than 10 behaviors and were published in English in the following journals: Applied Animal Behavior Science, Journal of Veterinary Behavior, and Animal Behavior. Using these criteria, 71 articles out of the 426 identified were selected. The ethograms were assessed based on the following criteria: the level of detail in behavior descriptions, objectivity (avoiding functional interpretation), and ease of use, considering if the behaviors were classified and if illustrations or images were included. Different trends were revealed between different ethograms. Comprehensive ethograms include a high number of behaviors but with little detailed description, and often add many functional interpretations. Behaviors are typically classified and, in some cases, are accompanied by illustrations or images. In contrast, partial ethograms normally include fewer behaviors, but these are generally described in more detail and avoid functional interpretations. They do not normally classify behaviors or include any visual support. Based on these results, this study suggests combining the most positive aspects of each type of ethogram to create one that can be widely used. The fundamental principles that this ethogram should consider are the following: gathering the highest possible number of dog behaviors, describing them in as much detail as possible to avoid misinterpretations; classifying the behaviors and accompanying them with illustrations to facilitate their use; and avoiding functional classifications and definitions to enhance the objectivity of the ethogram.

Bridging the gap: aligning zoo signage with visitor interests to promote conservation action

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One of the main aims with conservation education according to the World Association of Zoos and Aquariums (WAZA) is to motivate people to change their behaviour to a more pro-environmental behaviour. To succeed in educating their visitors, zoos put a lot of effort in designing signs with information. In a previous study of signs in Swedish zoos we found that the main information presented on signs were facts about the species (78%) and the threats (68%). Less common was information about specific threats to species (44%) and what you can do to help in conservation (17%). The aim with this study was to investigate what type of information the visitors were most interested in when they read the signs. A survey was created and distributed online via zoos' social media and in 142 Facebook groups including groups about travelling in Sweden and leisure activities for children and families. In total 626 persons completed the survey, of which 82% were women, 69% were 26-55 years old and 68% had a university degree. Half of the respondents visited zoos at least once a year. A majority of the responders preferred to listen to presentations of zoo staff or read signage to learn more during their zoo visit. Learning about how they could contribute to conservation was important for 64% of the responders, learning about animals was important for 61% and about half of the respondents marked both of these as important. 50% of those visiting a zoo at least once a year considered learning how they could contribute as important, 32% of those who rarely or never visit zoos also considered this important. Only 5% of responders considered learning how to contribute not important, and none of those visit zoos often. When ranking what topics, they thought were most interesting to learn more about, the three with highest rank were; 1) How animals live in nature, 2) How zoos contribute to conservation and, 3) How the animals are cared for at the zoo. With 64% of visitors expressing interest in conservation actions but only 17% of signs providing such information, a clear mismatch exists between what the visitors want to learn during their zoo visit and the information provided through signage in Swedish zoos. One way to increase pro-environmental behaviour in zoo visitors could therefore be to add information about what you, as a visitor, can do to help in conservation.

Genetics and early life effects on ear biting and the genetic correlations with growth, survival and fertility in pigs

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Ear biting is a damaging behaviour in pigs that impairs their welfare. There are multiple risk factors influencing its occurrence, and it has been suggested that these may include genetics. If so, genetic selection may help to reduce ear biting. Behavioural traits are difficult to measure on a scale needed for genetic studies. However, with the help of social genetic models, it is possible to study the genetics of behaviour without behavioural measurements. This is possible if the consequences of the behaviour are measurable on the recipient (i.e., damage in case of harmful behaviour), and the pen composition is known. Here we used a dataset of pigs with ear damage scores ($n=21,715$) to estimate the genetic parameters of both the victim and, indirectly, the performer effect on ear damage. We also investigated the effect of the early life environment common to litter mates on receiving or afflicting ear damage, i.e. we tested whether litter mates have a similar propensity of receiving or afflicting ear damage. Finally, we estimated the genetic correlation between being a victim and being a performer of ear biting with other traits relevant to pig breeders (growth, fertility, and survival). Our study shows that there is genetic variation in the tendency of both receiving and inflicting ear damage in pigs. We also show that the litter environment in which piglets grow up shapes their tendency to express and become a victim of ear biting. This early life environment effect could falsely be mistaken for genetic variation if not accounted for in the statistical genetic model. We found no significant genetic correlations with the fertility or survival traits examined (number of piglets born alive and weaning to finishing survival). There was, however, a moderate favorable genetic correlation ($r=-0.35$) between the pigs' effect on their pen mates' growth and ear damage, meaning that pigs that bite their pen mates less also increase their pen mates' growth. Thus, genetic selection for reduced ear biting will also positively affect production. In conclusion, there is heritable variation in the social interaction between pigs with regard to ear damage opening up the possibility to select against ear biting additional to other measures to reduce this damaging behaviour.

Domestication and early stress resilience: Insights from White Leghorns and Red Junglefowl

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Stress tolerance is considered a key factor in domestication. Studies show that domesticates exhibit greater stress resilience than their wild ancestors. Despite stress responses observed in White Leghorn (WL) laying hen chicks hatched in commercial hatcheries, these responses are less pronounced than anticipated given the severity of the hatching procedure. This raises the question of whether their resilience is innate due to their precocial nature or a result of selective breeding. This study aims to assess the differences between WL and the ancestral Red Junglefowl (RJF) to a procedure that mimics treatment in a commercial hatchery. WL eggs were collected from a commercial hatchery, but both WL and RJF chicks were incubated and hatched in small-scale incubators in the lab. A total of 44 WL (22 per treatment) and 40 RJF (20 per treatment) were assigned to a pseudo-commercial hatchery treatment or a control. The pseudo-commercial treatment involved sliding chicks through a cardboard tube, placing them on a turning table for 5 minutes, weighing, wing-tagging, and vaccinating them while exposed to continuous industrial fan noise (90 dB), and a two-hour car transportation. Control chicks were weighed, leg-ringed, and vaccinated without noise. Over three weeks, chicks underwent behavioral tests, including a novel arena (NA), social isolation (SI), and restraint tests to measure corticosterone (CORT) reactivity. NA, SI values were analyzed using a GLM with treatment and breed as factors. CORT values were analyzed similarly but separately for each sex. Breed affected emergence time in NA, with RJF emerging faster compared to WL ($W^2 = 37.211$, $df = 1$, $p < 0.001$), suggesting that RJF are more explorative in this novel environment. Additionally, during SI, breed also affected vocalizations, with RJF emitting more peeps than WL ($W^2 = 262.605$, $df = 1$, $p < 0.001$), indicating an increased tendency to re-establish social contact with conspecifics. Lastly, there was a treatment and breed interaction effect on female CORT reactivity in the restraint test ($W^2 = 3.888$, $df = 1$, $p = 0.049$), with experimental RJF showing higher values than the other treatment groups, suggesting a selection for early stress resilience in females. In conclusion, our study highlights significant differences between breeds, suggesting a domestication effect. Additionally, we found evidence that female RJF subjected to the pseudo-commercial treatment exhibited higher stress levels compared to other treatment groups, indicating that domestication may have specifically altered stress resilience in females in response to this commercial procedure.

Suitability assessment of a non-invasive cortisol measurement method for season-dependent stress levels in horses

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Stress affects horse's organism simultaneously reducing their welfare. As a consequence of chronic stress, reproductive disorders, gastric problems and weight loss have been observed in this species. Despite the fact that horses have a wide range of zones of thermal indifference compared to other animal species, they are characterized by high individual variability, especially in the case of foals, elderly horses or those affected by various health problems limiting their thermoregulatory abilities. Traditional techniques for determining cortisol levels in the blood provide results of short-term organism reactions to stressors. In order to determine the long-term impact of stress, a method for measuring cortisol concentration in hair was developed. This method is noninvasive and easy to use and complies with the 3Rs (Replacement, Reduction and Refinement) which excludes animal suffering and eliminates stress during sampling for testing. In addition, determining the level of cortisol from hair allows for the estimation of stress exposure over longer periods of time and forming retrospective fingerprints of cortisol concentrations. The aim of the study was to assess the usefulness of a non-invasive method for measuring cortisol. Cortisol concentrations determined in tail hairs of horses kept in a free-range system were compared depending on the season. Hairs taken from the tails of 10 horses kept in outdoor runs 24 hours a day throughout the year were fragmented into sections corresponding to 4 seasons - spring, summer, autumn and winter. The hair was collected during the daily care of the animals, using nail clippers. Cortisol was extracted by incubating biological material in methanol. Hormone concentration in the tested samples was measured using the Cortisol Express ELISA Kit (Cayman Chemical) and was read using a RT-6900 Rayto microplate reader. The obtained results were subjected to statistical analysis to detect significant differences between the cortisol concentration in 1 mg of hair corresponding to a given season. The results of the study indicated that cortisol levels differed depending on the season. Preliminary results showed higher cortisol levels in the summer compared to the winter ($p>0.05$). Determining cortisol concentration from tail hairs is a reliable method for the horse welfare level assessment.

It's not black and white: Perspectives of Western Canadian beef farmers on dairy-beef production

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Non-replacement dairy calves (i.e., male calves and females not needed for milking herd replacement) can face multiple welfare challenges due to their lower economic value in the dairy and beef industries. Incorporating beef genetics into dairy herd breeding programs has become common on dairy farms to produce 'beef-ondairy' calves that are better suited for beef production than pure dairy breed animals. This practice results in increased revenue from non-replacement dairy calves for dairy farmers, but little is known about the impact of dairy-beef production on beef farmers. This study aimed to investigate the attitudes of Canadian beef farmers toward dairy-beef production, with a focus on how beef-on-dairy breeding strategies by dairy may affect the beef industry. We conducted semi-structured interviews with 20 beef farmers in Western Canada, exploring their awareness, attitudes, and recommendations for the management of beef-on-dairy calves. Participants (11 male, 9 female) were recruited using snowball sampling and interviewed following a semi-structured interview guide. The audio-recorded interviews (averaging 44 ± 15 min in duration) were transcribed verbatim and analyzed using inductive thematic analysis, resulting in three main themes: 1) the dairy and beef relationship, 2) attitudes to beef-on-dairy animals, and 3) a shared future. In the first theme, participants discussed the relationship between the dairy and beef industries, highlighting differences in Canadian market structures (dairy as supply-managed vs. beef as an open market), farming practices (beef farming as more extensive vs. dairy as more intensive) and public perceptions of the two systems. In the second theme, participants showed mixed attitudes toward dairy-beef production and discussed their views about beef-on-dairy calves compared to purebred dairy calves, the management practices used to raise them, and the potential impacts of dairy-beef production on the beef industry. In the third theme, participants reflected on the future of dairy-beef production, discussing who should be involved in shaping the future of this practice. Participants showed mixed feelings towards the use of beef genetics in dairy herds, with some perceiving this as an opportunity for the beef industry to meet consumer demand and others expressing concern about the oversaturation of the beef market and possible threats to traditional ways of rearing beef. Our study enhances the understanding of the relationship between the dairy and beef industries in Western Canada and suggests the need for communication and collaboration among producers and others in the dairy-beef production supply chain.

Behavioral, welfare, production pattern of unique black meat poultry breed kadaknath in different housing systems

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The study was carried out to understand the behavioural, welfare and production pattern in Kadaknath breed (indigenous black meat chicken) reared in three different housing systems (cage system, semi-intensive/loose housing and free-range system). The birds were divided in to 3 groups of 100 birds each. T1 birds were reared in cages for whole time, T2 birds were kept open in loose housing system but were let open in field during few hours in day time, T3 birds were kept in open free-range condition throughout the day and were kept in close only in night. A number of behavioral parameters like pecking, foraging, cannibalism, wing flapping, dust bathing, nesting and welfare parameter like sunlight exposure, feather condition, footpad dermatitis, mortality rate were analyzed. Production pattern like egg production, average daily weight gain, feed consumption, feed conversion ratio was recorded. There was significant difference in behavioural and welfare expression among different housing systems. It was observed that birds in free range housing system exhibit better natural behaviours like foraging (38%), dust bathing (20%) as compared to Kadaknath birds kept in semi-intensive and cage system of rearing. Feather pecking and cannibalism incidents were also lowest in case of free-range system and was highest in cage system followed by semi-intensive system housing system. It was also observed that feather condition and sunlight were better in case of free-range system where as the mortality rate (5%) and footpad dermatitis (4%) were higher in free range system and lowest in semi-intensive system. On the contrary the production parameters were slightly lower in case of free-range system (80-87 eggs/bird), in case of semi-intensive (90-105 eggs/bird) and in case of cage system (110-120 eggs/bird). The feed conversion ratio was most efficient in case of cage system (FCR:2.1). The overall health score was best in case of free range system. This behavioural study indicates the importance of housing system for improved welfare of Kadaknath breed. The result exhibited better welfare in case of free-range system but it led to decreased production and increased mortality rate due to predation. These findings indicate development of a production system which optimize both welfare and production system to preserve and develop a sustainable housing system for this unique and only black meat indigenous breed of India. It was also observed that women farmers are best suited for backyard poultry farming and be a good source of income generation (300%) for the poor women.

Exploring the behavioral effects of fennel essential oil-enhanced environmental enrichment in rabbits

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With the Brazilian rabbit farming still predominantly relying on the use of conventional cages, limiting the expression of natural behavior and leading to stress, environmental enrichment is used to reduce undesirable behaviors while promoting well-being. This preliminary study aimed to evaluate a new environmental enrichment composed of fennel essential oil with sensory functions on the behavior of growing rabbits. The new enrichment was a block of 100 g composed with bentonite, molasses, wheat bran, limestone and fennel essential oil, mechanically pressed and dried for 48h at 50°C. Twenty New Zealand White male and female rabbits at 36±3 days of age were allotted to individual cages in a randomized block design with four treatments and five animals per treatment: T1) basal feed + hay (hay considered as the enrichment); T2) basal feed + hay + enrichment block with no fennel; T3) basal feed + hay + enrichment block with fennel; and T4) basal feed + enrichment block with fennel. Behavior was assessed in all animals using focal sampling, where the behaviors of eating, interacting with enrichment or with the cage, drinking, self-grooming, lying, sitting, being alert, exploring and stereotyping (bitting, licking, digging the cage and sham chewing) were observed for two minutes before daily management routine started. We also performed the open field (OF) and novel object (NO) in a test arena (2x2 m) for two minutes, and the human approach (HA) test in the cages for 30 seconds. Statistical analysis was performed using the R software. Significant differences were only found for the OF test, with rabbits of T4 exploring more quadrants when compared to T2 ($P=0.026$). Numerically, T4 also explored the arena for longer (144/180 s), and T2 remained stationary (70/180 s). Observing the focal sampling, numerically, T4 spent more time interacting with the enrichment (108/120 s) compared to the other treatments (T1 – 34/120 s; T2 – 28/120 s and T3 – 74/120 s). We observed that rabbits in T4 appeared calm during the OF test and interacted more frequently with the block than those in T2, although the limited number of animals used limits the accuracy of definitive conclusions. Further studies with larger sample sizes are necessary to better evaluate the potential effects of fennel enrichment on rabbit behavior.

Bibliometric insights into the research on behavior and welfare of domestic turkeys

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Understanding the current landscape of scientific literature on farm animal behavior and welfare is a critical first step toward identifying gaps, fostering interdisciplinary questions, and translating research into meaningful improvements in farming practices. Driven by a strong interest in the behavior and welfare of domestic turkeys (*Meleagris gallopavo*), this study represents the first step in a broader research initiative aimed at understanding how scientific knowledge can best be communicated and implemented to improve welfare outcomes in turkey farming. To first grasp what has been explored and reported on the subject, we conducted a bibliometric analysis of the existing scientific literature with the goal of mapping research themes and trends, identifying knowledge clusters and key contributors, and uncovering underexplored subjects. Bibliometrics is a database analysis methodology that focuses on scientific mapping and performance assessment within a defined subject and time span. Our search, conducted on Web of Science and Scopus, targeted a broad range of relevant titles using the following keywords and Boolean operators: turkey OR “meleagris gallopavo” AND welfare OR behavior*. After applying the necessary filters, 139 articles and reviews were exported and processed using RStudio’s Bibliometrix tool. Publications ranged from 1955 to 2024, with peak scientific output occurring in 2024. Our findings indicate that Germany and Canada are the leading contributors to research on this topic, whereas the USA holds the highest citation count. Most publications originated from single-country studies, and international collaborations were limited to North America and Europe. The most relevant sources were Poultry Science, British Poultry Science, and Applied Animal Behaviour Science. Over the past four years, the most prominent trending topic has been injurious pecking. Thematic mapping revealed word clusters such as: behavior, feather pecking, and performance; welfare, leg abnormalities, and litter quality; time-budgets, environmental enrichment, and floor space; and egg production, broodiness, and luteinizing hormone, which point to well-established areas of focus in scientific literature. This bibliometric analysis highlights a growing interest in the behavior and welfare of domestic turkeys, with recent increases in scientific output and a concentration of research in specific geographic regions and thematic areas. While topics such as reproductive behavior, feather pecking and the impact of housing conditions on welfare are frequently addressed, the limited international collaboration and lack of research diversity underscore the need for more integrative and globally representative studies on behavior and welfare of domestic turkeys.

Feather pecking and feather damage of mature laying hens supplemented with prebiotic galacto-oligosaccharides during times of social stress

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Severe feather pecking (FP) is a prevalent behaviour in laying hens, where a hen repeatedly pecks or pulls on another's feathers, leading to feather damage. The microbiota-gut-brain axis is associated with FP development, and some probiotics can prevent an increase in stress-induced severe FP. Prebiotics, like galacto-oligosaccharides (GOS), are more stable than live bacteria and can boost beneficial bacterial populations in the gut. This study aimed to investigate if GOS mitigate stress-induced severe FP as a curative treatment. White Leghorn laying hens (N = 191) from a line divergently selected for high (HFP) or low (LFP) FP activity were housed in 12 floor pens (7±1 HFP; 8±1 LFP/pen). From 29 to 32 weeks of age (woa), six pens received Nutrabiotic® GOS (74% GOS; Dairy Crest Ltd., Davidstow, Cornwall, United Kingdom) via drinking water while the remaining pens received plain water. Simultaneously, half of each group underwent social mixing with unfamiliar hens to cause chronic, unpredictable stress (2x2 factorial design). All pens were video-recorded (120 minutes/pen), and blinded observers recorded all occurrences of FP. A blinded observer assessed feather damage and assigned scores of 0-2, with higher scores indicating more damage. Feather damage scores were recorded at 28 woa for a baseline measurement and after treatment at 32 woa. Using a generalized linear mixed model (SAS V9.4) the effects of period, supplementation, and stress on the rate of FP were assessed with pen as a random effect. A multinomial model with odds ratios (OR) was used to investigate changes in feather cover between treatment periods, water, and stress treatments, where an OR > 1 indicates higher odds of increased feather damage. The rate of severe FP did not differ between hens that received plain water and those that received GOS ($P=0.363$). Additionally, there was no difference between hens who underwent the social stress treatment and those who remained undisturbed ($P=0.914$). Overall, FP behaviour was increased at the end of the experiment ($P=0.010$), and hens were likelier to have worse feather damage compared to the baseline (OR=28, 95% confidence interval 11.7-66.9). The social stress treatment did not increase severe FP in this flock, which may have masked potential beneficial effects of GOS supplementation. The increase in FP and feather damage as birds age is consistent with previous studies. On-going microbiota analysis investigates whether any changes occurred in the microbiota during supplementation or stress.

Analyzing the behavioral responses of broiler chicks to different commercial feeder types

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Feeder design and management can impact feeding and feeding-related behaviors of birds. This study investigated the impact of commercially available feeder types on feeding related behaviors of broiler chicks. On the day of hatch, male broiler chicks (n=720) were randomly placed into 24 pens (30 birds/pen). Treatments were C2 Plus feeder (C2) with 14-spoke grill design, C2 with supplemental cylindrical-conical shaped turbo-grow feeder (C2TG), C2 with supplemental rectangular shaped feed-tray (C2FT), and Konavi feeder with low pan height and scalloped edge (KON). Behaviors were continuously recorded on days 1, 4, 7, and 14. Behaviors were eating whilst outside the feeder, eating from the edge of the feeder, eating whilst inside the feeder, entering and exiting the feeder, attempting to enter the feeder, moving inside the feeder, exploring within the feeder, displacing other birds from the feeder and repetitive pecking at the feeder. Behavioral diversity was calculated using the Shannon Diversity Index. Behavior durations were analyzed by ANOVA for effect of feeder treatment. Birds spent the longest time eating overall with C2FT (936.78s). Eating inside the feeder was highest with C2FT and C2 (394.54s; 254.73s), whilst eating outside the feeder was highest for C2TG and KON (827.13s; 690.54s). Birds eating from the edge of feeder were higher for C2 (5.68s) and C2TG (4.05s), then C2FT (3.81s), and lowest for KON (1.39s). Birds entering and exiting the feeder were higher in C2 (2.85s), then C2FT (2.60s), followed by C2TG (0.42s), and lowest in KON (0.33s). Attempts to enter the feeder were highest in KON (0.99s) and lowest in C2FT (0.46s). Birds were most active in C2FT (10.34s). Explorative behaviors were highest in C2FT ($P < 0.01$). Displacement of other chicks from feeder occurred the least with C2 (0.02s). Repetitive feeder pecking occurred most with KON (6.84s). On days 1 and 4, KON had the lowest diversity and C2FT the highest ($P = 0.0176$, $H' = 1.76$ and 2.77 , respectively). These results indicate that feeders where chicks can enter successfully (C2FT and C2), had a longer duration of eating inside, more active and explorative behaviors within the feeder, less displacement of chicks from the feeder, and highest diversity. Whereas the feeders where chicks could not readily enter (C2TG and KON), chicks spent longer time eating from outside, had more failed attempts to enter the feeder, and showed repetitive feeder pecking. Overall, these findings highlight the importance of feeder design and management in ensuring the behavioral expression of broiler chicks.

Slow-growing versus fast-growing broiler behavior in a silvopasture environment

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Silvopasture is an outdoor access environment integrated with orchards or forests. There is limited information as to how broiler chickens behave in silvopasture, particularly considering breeds differing in growth rate. We aimed to evaluate the effect of broiler breed on the performance of natural behaviors in a silvopasture environment. A total of 250 Ross 708 (fast-growing) and 250 SASSO (slow-growing) male chicks were brooded in shelters, then provided access to silvopasture paddocks at 24d (n=5 pens/strain, 50 birds/pen). Live observations were conducted at 26-27d and 33-34d for 2h in the morning (AM) and afternoon (PM) with 10-min scan sampling intervals. The proportion of birds inside the shelter, walking/standing, eating, and drinking were determined. One-zero sampling was used for the proportion of observations where ≥ 1 bird was foraging or sparring. Data were analyzed with generalized linear mixed effects models including breed, age, time of day, and their interactions (fixed effects) and pen (random effect). More slow-growing broilers were observed walking/standing ($p < 0.0001$; Slow: 31.4 ± 2.2 , Fast: $11.5 \pm 1.3\%$, mean $\pm$ SE) and sparring than the fast-growing birds ($p = 0.0002$; Slow: 22.7 ± 3.7 , Fast: $5.7 \pm 1.4\%$). More fast-growing broilers were eating ($p = 0.0003$; Slow: 3.1 ± 0.3 , Fast: $5.8 \pm 0.5\%$) compared to slow-growing broilers. Eating ($p = 0.03$; AM: 4.7 ± 0.3 , PM: $3.9 \pm 0.3\%$) and sparring were more common in the morning than in the afternoon ($p < 0.0001$; AM: 21.4 ± 2.8 , PM: $6.9 \pm 1.4\%$). As they aged, more birds stayed inside the shelter in the afternoon ($p = 0.0009$; 26-27d: 29.1 ± 3.1 and 30.3 ± 3.0 , 33-34d: 25.2 ± 2.8 and $50.6 \pm 4.6\%$ in the AM and PM, respectively), fewer birds were walking/standing ($p = 0.0003$; 26-27d: 40.8 ± 2.5 and 18.2 ± 1.7 , 33-34d: 14.5 ± 1.5 and $12.1 \pm 1.8\%$ in the AM and PM, respectively), and fewer occurrences of sparring were observed ($p < 0.0001$; 26-27d: 28.4 ± 3.5 , 33-34d: $4.3 \pm 1.0\%$). More birds were eating at the older age ($p = 0.016$; 26-27d: 3.8 ± 0.3 , 33-34d: $4.7 \pm 0.4\%$). Foraging was common and identified in 98.1% of scans, so statistical differences could not be determined. For the 1.9% of scans without foraging, all except one scan were fast-growing birds across both ages. The slow-growing broilers were more active while the fast-growing birds spent more time consuming feed and water. More birds stayed inside their shelter in the afternoon as they aged. Birds may have preferred the shelter as a resting place in the afternoon heat, and/or silvopasture conditions may have been less optimal for the birds as they aged (e.g., less novelty, less vegetation). The majority of the birds were out on the range in all observations though (versus being inside the shelter) and foraging was common, indicating that silvopasture was highly used by broilers throughout rearing and regardless of genetic strain.

Evaluating the prevalence of injurious pecking and foraging behaviors in two genetic strains of turkeys with or without environmental enrichment

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Injurious pecking is one of the leading noninfectious health concerns within commercial turkey production, prompting welfare and economic concerns. Ample research has been conducted on this behavioral issue in laying hens, linking it to redirected foraging behavior and aggression depending on the body region being pecked. However, injurious pecking in turkeys is understudied. Our objective was to assess how genetic strain and environmental enrichment affected the performance of injurious pecking and foraging behaviors. A total of 528 turkey toms from two commercial genetic strains (A and B) were randomly assigned to pens on day of hatch (22 birds/pen, 12 pens/strain). A hanging hemp rope enrichment was added to half the pens starting at 5 weeks of age (WOA; n=6 pens/strain/enrichment treatment). Video recordings were taken at 4 WOA for a baseline and 18 WOA. The number of pecks directed at the body/wing/tail (B/W/T) and head/neck (H/N) and bouts of foraging behavior were coded for 20 min during the morning and afternoon at both ages using BORIS. Data were analyzed as pecks or bouts/pen/20 min with generalized linear mixed effect models in R software. There were no significant interactions between genetic strain, enrichment, age, and time of day for any of the behaviors ($p>0.05$). Strain A turkeys pecked at H/N more frequently than B turkeys ($p<0.001$; A: 55.8 ± 7.18 , B: 23.2 ± 3.19 pecks/pen/20 min; mean $\pm$ SE). Both strains displayed similar levels of B/W/T pecks and foraging bouts ($p>0.05$). Environmental enrichment did not affect the frequency of any of the behaviors ($p>0.05$). At 4 WOA, poults displayed more B/W/T pecking ($p=0.014$; 4 WOA: 243.8 ± 26.1 , 18 WOA: 172.9 ± 18.8 pecks/pen/20 min), more H/N pecking ($p<0.0001$; 4 WOA: 64.3 ± 7.5 , 18 WOA: 20.2 ± 2.5 pecks/pen/20 min), and more foraging bouts than toms at 18 WOA ($p<0.0001$; 4 WOA: 74.9 ± 3.5 , 18 WOA: 13.9 ± 1.1 bouts/pen/20 min). In the afternoon, turkeys exhibited more B/W/T pecking ($p=0.00010$; Morning: 155.8 ± 16.7 , Afternoon: 270.6 ± 29.2 pecks/pen/20 min) and more foraging than in the morning ($p=0.045$; Morning: 30.7 ± 1.8 , Afternoon: 34.1 ± 2.0 bouts/pen/20 min). H/N pecking was similar across the day ($p>0.05$). Hanging hemp rope enrichment was not effective in mitigating pecking behavior, so other intervention strategies should be explored. Younger poults are more active than market-aged toms regardless of enrichment, and strains differed in H/N pecking that is typically associated with aggression. B/W/T pecking may be associated with foraging as both increased in the afternoon. Future intervention strategies specific to age, genetic strain, and behavioral motivation may be more effective.

A preliminary exploration of spatial relationships in an indoor dairy dam-rearing system

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Cow-calf contact (CCC) systems offer complex social environments for dairy calves. For example, spending time in close proximity to the dam or other adult cows may allow the calf opportunities for nutrition, social learning and forming social bonds – all of which can benefit calf welfare. This research aimed to explore possible factors associated with time spent in close dam-calf proximity. Dam-calf pairs (n=10) were housed in an indoor pen (space allowance per dam, calf: 11.9, 7.4 m²) with cow-driven CCC and automatic milking. Dams thus had primary control over the amount of contact with calves, which was possible in a separate shared area of the pen. The shared area consisted of two rows of freestalls separated by a walkway, while calves also had access to a separate calf creep. Positioning data was collected for all dams and calves using a real-time location system during five consecutive days, corresponding to average calf ages ranging from 32–72 days old. Missing location data was interpolated using the Modified Akima method, and Euclidean distances were calculated per second for all dam-calf pair combinations. Bouts of close proximity (CP; ≤ 2.5 m) were identified for all dam-calf pairs and observation days; bouts occurring < 1 min apart were aggregated. The total daily time spent in CP (min/d; Box-cox transformed) and number of CP bouts (bouts/d) were analysed for dam-calf pairs as response variables using linear mixed effects models. Fixed effects included calf age (days), sex, and breed (dairy vs beef cross), and dam parity (primi- vs multiparous), with observation day nested within calf ID specified as a random intercept. Dam-calf pairs were frequently observed in CP (average (SD): 25 (9.2) bouts/d) but for short periods of time (11 (4.7) min/bout), totalling approximately 238 (92.1) min/d. Preliminary analyses found potential effects of calf sex (LSMean $\pm$ SE; bulls: 21 ± 5.5 vs heifers: 19 ± 5.4 bouts/d; $P=0.07$) and breed (dairy: 29 ± 4.0 vs beef: 10 ± 6.4 bouts/d; $P=0.08$) on the daily number of CP bouts. Breed additionally influenced the total time spent by dam-calf pairs in CP (dairy: 271 ± 3.3 vs beef: 78 ± 5.5 min/d; $P=0.04$), although sex did not ($P=0.19$). Neither calf age nor dam parity were associated with either behavioural measure ($P>0.10$). While the small sample size warrants caution in interpreting these results, it appears that calf-level factors may play a role in shaping spatial relationships within cow-driven CCC systems.

Assessing animal welfare standards in slaughter facilities in Ghana: a checklist-based evaluation

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Animal welfare in slaughter facilities plays a crucial role in ensuring ethical treatment of animals and maintaining meat quality. In Ghana, there is limited data on the welfare standards of slaughter facilities, creating gaps in understanding compliance with international welfare guidelines. This study aimed to assess animal welfare practices across five slaughter facilities in Ghana using a structured Animal Welfare Checklist, identifying key deficiencies and recommending improvements. The checklist assessed the following key domains of animal welfare: lairage facilities, handling practices, stunning and slaughter methods, and the monitoring of animal welfare. Each domain was subdivided into specific items and the five slaughter facilities were evaluated based on 14 welfare parameters involving Space and Shelter, Water Availability, Protection from Weather, Monitoring of Environmental Conditions at Lairage, Humane Handling Methods, Staff Training, Unloading and Movement, Handling During Movement, Stunning Equipment Effectiveness, Equipment Maintenance, Backup Systems, Monitoring Effectiveness of Stunning, Welfare Monitoring System, and Corrective Actions. The checklist utilized a deficiency scoring system on a scale of 0 to 9. A score of 0 indicated no deficiency, representing full compliance with welfare standards, while a score of 9 indicated a complete deficiency, signaling significant non-compliance. The scoring was based on direct observations of practices at the facility, without any interviews or interactions with the facility staff. Facilities with scores ranging from 0 to 40 were classified as “excellent”, reflecting minimal deficiencies and strong adherence to animal welfare standards. Facilities with scores between 41 and 80 were classified as “good, indicating moderate compliance but with notable areas for improvement. Facilities that scored between 81 and 135 were classified as “poor”, signifying significant deficiencies and the need for major improvements in their animal welfare practices. Qualitative comments were recorded for each observation providing context and specific conditions. Four of the five facilities scored 116, 110, 92, and 83, grading poor, indicating significant deficiencies in key areas such as water availability and shelter. Poultry Processing Plant was graded excellent with a score of 23, demonstrating compliance with most welfare standards. Common deficiencies across facilities included a lack of clean water, absence of stunning equipment, and poor handling practices due to inadequate staff training. The findings highlight widespread deficiencies in animal welfare practices across most slaughter facilities in Ghana. Immediate interventions, including infrastructural improvements, regulatory enforcement, and mandatory staff training, are essential to improve welfare standards, enhance meat quality, and support the industry’s competitiveness.

Do farm animals like music? A systematic review for farm animal welfare

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Sensory enrichment – the addition of objects or events into the animal’s environment that stimulates its sense of sight, taste, touch, smell, and hearing – enhances the well-being and reduces signs of stress and abnormal behaviour in captive animals. Acoustic enrichment (or how to use sound as sensory enrichment), however, remains poorly understood. Despite this knowledge gap, music is one of the most widely used forms of acoustic enrichment. Animals are regularly exposed to music in farms to zoos, laboratories, domestic homes, and rescue shelters based on assumptions that they like listening to music. Yet it is unclear how much empirical evidence exists to support this assumption. We performed a systematic review to falsify the assumption that birds, mammals, and fish like listening to music. We define “liking” music at the level of behaviour and brain, and searched for original peer-reviewed research articles that played music and measured animals’ responses in ProQuest Psychology, PubMed, Scopus, and Web of Science. The search terms used were related to 1) music (e.g. “music”, “musical”), 2) behavioural preference (e.g. “approach*”, “prefer*”), 3) indicators of activity in neural reward systems (e.g. “dopamin*”, “reward system”, “nucleus accumbens”). In the 47 studies that met our criteria, we examined if “liking” was affected by music characteristics (i.e. style) and/or animal characteristics (i.e. species, age, sex). Only six out of 47 articles focused on farm animals (two on cattle, two on poultry, and two on fish), despite a recent review indicating that over 40% of studies on the effects of music on animals—not limited to investigations of music “liking”—published in the past three years involved farm species (32 out of 76 studies; Kriengwatana et al. 2025). Cattle voluntarily approached automatic milking stations where music was played more than if music was not played. Day-old chicks were more likely to approach consonant music (which Western cultures generally find pleasant), however, adult layer hens did not prefer to peck keys that produced reinforcement and music playback over keys that produced reinforcement but no sound playback. Evidence that fish (carp and trout) liked music was weak, as levels of the neurotransmitter dopamine, involved in reward processing, were not significantly elevated after music exposure. Thus, we do not have clear evidence that music affects farm animals because they find music rewarding or pleasurable. Whether farm animals like music depends on factors such as context, age and/or auditory experience.

Using oral firocoxib to improve the welfare of sows after farrowing

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In the United States, millions of sows farrow each year without pain management, even though parturition is known to be painful. Unmanaged pain negatively impacts the sow's welfare and can lead to economic and production losses. A previous study found transmammary delivery of firocoxib (FIRO) to piglets provided some pain relief during castration and tail docking. FIRO is a non-steroidal anti-inflammatory drug in the COX-2 inhibitor class, currently labeled for use in dogs and horses. Since the sows received firocoxib orally for the transmammary delivery to the piglets, we hypothesized that it might also alleviate post-farrowing pain. Forty-five sows (Yorkshire x Landrace) that were 2 days post-farrowing were enrolled in this study and randomly allocated to one of three treatment groups (n=15 sows/treatment): oral placebo, mid-level dose of oral FIRO (3.0 mg/kg), or high-level dose of oral FIRO (5.0 mg/kg). FIRO doses were calculated for each sow and administered using a drench gun (0h time point). The outcome variables assessed were behavior, facial grimacing, infrared thermography (IRT) of the vulva and cranium, pressure mat gait analysis, plasma cortisol concentrations, plasma drug concentration, and body weight. Plasma cortisol concentrations and IRT were taken at baseline, 4, 8, 12, 24, 36, and 48h post-treatment. The IRT images were analyzed to find the average tissue temperature of each region. Sow body weight was collected at baseline and at the time of piglet weaning (21 days post-farrowing) for average daily gain (ADG) calculation. Cortisol levels were significantly higher in all treatment groups at baseline when compared to the other time points ($p \leq 0.05$). Placebo sows had significantly lower vulva temperatures when compared to 3.0mg/kg ($p=0.02$) and 5.0 mg/kg ($p=0.04$) FIRO groups. No significant differences in ADG were found between treatment groups; however, placebo sows, on average, lost weight (-0.09lb/day) while sows administered 5.0 mg/kg FIRO gained weight (0.4lb/day). In the future, a larger sample could be used to determine if FIRO protects against post-farrowing weight loss. Facial grimacing, behavior, gait speed and pressure distribution, and FIRO blood concentration analysis are ongoing. While preliminary results suggest that FIRO did not decrease physiological signs of stress and pain, upcoming result analysis could change these findings.

Living conditions of broiler chickens in Suriname: is there attention for animal welfare?

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Periodic high mortality rates, high animal feed costs, and hot weather impact poultry production in Suriname. Putting this economic focus aside, this paper aims to assess the living circumstances of chickens in Suriname, especially those on broiler farms. Suriname is a small country in South America, with a population of merely 600,000 inhabitants. Despite the size of 183,000 sq. km, 70% of the population resides in urban and rural coastal areas on less than 1% of the geographical area. According to household budget and expenditures surveys, about 95% of the population is non-vegetarian and chicken meat is in high demand and comparably more consumed than other meat. Statistical data of the Ministry of Agriculture shows that the hatching egg production increased from 2017 (7,600 tons) to 2022 (10,000 tons) by 76%. Of the hatching eggs in 2022, the hatch rate in day-old chicks was 75%, and approximately 85% of these reached slaughter weight (6,370 tons in 2022) of 2.0kg/liveweight. The growing demand for chicken meat and the concentration of all economic activities in the highly dense urban/rural-living area create numerous unfavorable farming conditions and pose risks for the welfare of broiler chickens and other animals. Therefore, as part of a larger project, this study starts by investigating the current practices used at the farm level in broiler production with a focus on animal welfare, using the WOA- guidelines. Next, a mixed method will be applied to carry out this study and compare the current situation with the agricultural census data 2008-2009. For broiler welfare, aspects like stocking density, genetic strain, type of ventilation/cooling, and feed quality can have a strong impact. Broiler welfare can be assessed by measuring body condition (including foot pad lesions and hock burn), bird cleanliness, gait score, litter quality and behavioural activity. It will be valuable to collect information on these aspects on broiler farms in Suriname. Hence, this study will reveal the living conditions of broiler chickens in Suriname, the attention for animal welfare and opportunities to improve broiler production practices.

Association between farrowing duration, gut microbiota composition, and postural changes in primiparous sows

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The duration of farrowing in sows has increased due to large litter sizes, leading to increased physiological stress and a higher risk of neonatal mortality. Physiological stress during farrowing may also influence the gut microbiome and sow behaviour. This study aimed to investigate the effects of prolonged farrowing on postural changes and gut microbiota composition in sows. Twenty-two sows (Landrace × Large white) were categorized into two groups based on farrowing duration: long farrowing duration (LFD, $n = 11$,) and short farrowing duration (SFD, $n = 11$) groups. The average duration of farrowing and litter size were 333.7 ± 97.0 min and 15.0 ± 1.8 , respectively, in the LFD group, and 144.7 ± 50.1 min and 13.1 ± 3.3 in the SFD group (mean $\pm$ SD). All sows were video recorded for 24 h after the onset of parturition. Faecal samples were collected on day 1 after farrowing. The gut microbiome was analyzed using full-length 16S rRNA sequencing with the PacBio Revio system and the spearman rank correlation test was used to analyse correlations. The LFD group exhibited a higher relative abundance of *Campylobacterota*, *Spirochaetota*, *Treponema*, whereas *Lactobacillus amylovorus* was more abundant in the SFD group. In terms of behaviour, sows in the LFD group showed fewer postural changes ($P < 0.05$) and shorter durations of sternal lying and sitting postures ($P < 0.05$ for both) compared to the SFD group. Conversely, the LFD group showed longer duration of lateral lying than the SFD group ($P < 0.05$). Correlation analysis showed that *Campylobacterota* tended to be positively correlated with duration of lateral lying ($r = 0.39$, $P = 0.07$) and negatively correlated with the frequency of postural changes ($r = -0.47$, $P = 0.03$), frequency of sternal lying ($r = -0.60$, $P = 0.01$), and standing duration ($r = -0.48$, $P = 0.02$). In contrast, *Lactobacillus amylovorus* was positively correlated with postural changes ($r = 0.48$, $P = 0.02$), frequency of sternal lying ($r = 0.51$, $P = 0.01$), and frequency of sitting ($r = 0.50$, $P = 0.02$). These findings suggest that farrowing duration may be associated with gut microbiota composition and sow postural behaviours. Furthermore, the correlations indicate that specific microbial taxa could influence sow behaviour during farrowing. Understanding these relationships may contribute to improved sow welfare and farrowing management strategies.

The effects of oxidizing air purification technology on swine barn air quality, piglet performance, and piglet behavior during the farrowing phase

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Commercial swine barn air quality can negatively affect pig health, welfare, and productivity. The objective of this preliminary study was to investigate the effect of CereneAir™ oxidation purifying technology on swine barn air quality, piglet performance, and piglet behavior during the farrowing phase. Ninety-seven piglets from 9 litters were divided into two treatments and housed in a farrowing room equipped with two CereneAir™ purifying units (CA, n = 43) or a farrowing room without CereneAir™ purifying units (CON, n = 54). Additionally, to evaluate whether CA treatment could serve as a potential method for reducing the use of antibiotics at birth, half of the piglets received oxytetracycline at processing while the other half did not. Air samples were collected from both treatment rooms during the farrowing phase to measure ammonia, water vapor, and hydrogen sulfide concentrations on experimental d 0, 7, 14, 21, and 28, with d 0 being the day sows were moved into the farrowing rooms. Average daily gain (ADG) was determined using piglet body weight (BW) taken at 0, 6, 12, and 18 (± 3) d of age. At 1, 6, 12, and 18 d of age, nursing behavior was recorded continuously and posture (lying, sitting, and standing) behaviors were recorded for 60-min at 1000 and 1700 h using a 2.5 min instantaneous scan sampling strategy. Data were analyzed using PROC MIXED in SAS. There were no differences in environmental measures between CA and CON rooms ($P > 0.10$). Piglets in the CON treatment not receiving oxytetracycline exhibited a higher ADG (0 to 18 d of age) compared to CA piglets (regardless of CA piglet oxytetracycline status; $P < 0.05$). However, there were no treatment differences in piglet BW at any age ($P > 0.10$). Piglet behavior is currently being analyzed and will be presented during the meeting. Based on the piglet performance data, we predict greater nursing frequency and duration will be observed in the CON treatment, as indicated by greater ADG in CON piglets not receiving oxytetracycline. Accordingly, we predict CON piglets will exhibit increased lying and reduced standing behaviors compared to piglets in the CA treatment. In conclusion, oxidation purifying technology did not affect the air quality parameters measured or negatively impact piglet performance. Further work is under way to determine the effect of the technology on piglet health, behavior, and microbiota within the treatment rooms and upper respiratory tracts of piglets.

Evaluating mental health support strategies of UK organisations for rural and research-based animal caregivers

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The One Welfare concept outlines a reciprocal relationship between human and animal well-being; although there has been more focus on how animal welfare impacts human well-being than the reverse. There is growing recognition that these concepts are intertwined, with improvements in one reinforcing the other. Animal caregivers in livestock farming and research settings face distinct challenges which may increase the likelihood of mental health concerns, including compassion fatigue. Workplace stress can negatively impact animal caregivers' well-being, reduce job performance, subsequently compromising animal welfare. In the UK, organisations exist to support the mental health of these caregivers, but there is a limited understanding of their operations and support strategies. This study aimed to gain insight into how organisations provide mental health support to animal caregivers in the livestock farming and animal research sectors, with a focus on identifying gaps and potential barriers and facilitators of support. Nine online semi-structured interviews were conducted with members of UK organisations specialising in supporting the mental well-being of animal caregivers in research (n=3) and farm settings (n=6). Topics covered included: methods of accessing support, workplace stressors and their impact, training and resources, and challenges and opportunities in providing effective support. Interviews were audio recorded, transcribed and analysed thematically. Participants within supporting organisations suggested feelings of embarrassment and fear of judgment were barriers to caregivers accessing support. In research settings, lack of insight into the demands of caregivers' roles by external mental health providers was a further barrier. Stressors such as isolation, loneliness, high workloads, animal health concerns, and interpersonal dynamics were identified by participants as contributing to caregivers' mental strain. Compounding farming challenges included adverse weather conditions, financial constraints, and statutory changes. Culling animals emerged as a major stressor in both settings, although more commonly in research settings. Training and knowledge exchange were more established in farm settings yet an increased need for support and knowledge exchange was identified in research settings given the limited capacity for reflection and emotional expression within roles. Participants identified challenges in providing support to animal caregivers, including limited-service reach, delayed engagement from users, workplace restrictions on seeking external help, and resource constraints. Overall, findings highlight the need for more targeted and co-ordinated mental health support training tailored to the contextual needs of animal caregivers. Findings have informed an ongoing quantitative exploration of the potential impact of compassion fatigue on those who care for animals in research and farm settings.

Stockpeople's attitudes and calf welfare on dairy farms with cow-calf contact or early separation

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Cow-calf contact (CCC) rearing in contrast to early separation (ES) becomes increasingly important in dairy farming. Stockpeople's attitudes are important predictors for their behaviour and subsequently animal behaviour and welfare. We hypothesized that on farms with CCC, stockpeople would show more positive attitudes and calf welfare would be higher. Further, we expected attitudes to be correlated with calf welfare across systems. Calf welfare was measured using the Welfare Quality® Protocol for dairy calves on 25 CCC and 25 ES farms in Austria. Stockpeople (n=115) filled in a questionnaire on beliefs about cows and on attitudes towards handling them with 7-point Likert scales (1=lowest to 7=highest agreement). Principal component analysis revealed 14 attitude factors. Stockpeople on CCC farms showed higher consideration for 'needs of cows' (Mann-Whitney U Test, $p < 0.001$, CCC: median (range): 6.4 (4.8-7), ES: 5.8 (3.6-7)) and enjoyed positive interactions with cows more ($p = 0.05$, CCC: 6 (4-7), ES: 6 (2.7-7)). CCC farms less often had calves with lesions ($p = 0.049$), and CCC calves scored higher in Qualitative Behaviour Assessment (QBA, $p < 0.001$), showed less non-nutritive oral behaviours ($p = 0.038$) and had more access to pasture ($p < 0.001$). No association of rearing system with avoidance distance (AD), agonistic, cohesive, play behaviour and the other 13 clinical parameters was found ($p > 0.05$). Over all farms (n=50), calves played more on farms where calf caretakers rated regular positive contact with cattle of all age classes more important ($r_s = 0.36$, $p = 0.01$), enjoyed working with the cattle more ($r_s = 0.28$, $p = 0.05$) and agreed more on cows' cognitive abilities ($r_s = 0.28$, $p = 0.05$). Higher agreement of calf caretakers on 'needs of cows' tended to correlate with a higher frequency of cohesive behaviour ($r_s = 0.25$, $p = 0.08$), lower mortality ($r_s = -0.24$, $p = 0.1$) and provision of longer access to pasture ($r_s = 0.25$, $p = 0.08$) while shorter access to pasture was given on farms where caretakers agreed more on negative behaviour during moving cows ($r_s = 0.35$, $p = 0.01$), but also on the need to touch cows before attaching milking clusters ('warn', $r_s = 0.29$, $p = 0.04$). AD was lower if farm managers had more positive beliefs about cows ($r_s = -0.32$, $p = 0.02$) and less animals could be touched if they scored higher on 'warn' ($r_s = -0.28$, $p = 0.05$). In sum, more positive attitudes of stockpeople and CCC rearing, being also interlinked, may contribute to better welfare of calves. Thus, our hypotheses were confirmed, although effects were rather weak. The project COWLEARNING is funded by the Austrian Science Fund (CM 400-B).

Assessing the emotions of dairy cows: Relationships between infrared temperature of key external body surfaces, lateralised behaviour, and milk production

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In dairy cattle, negative emotions from encounters with potential threats can significantly affect their welfare, behaviour, and productivity. While laterality indices are used to assess emotional states, measuring them can be time-consuming and stressful for the cows. Infrared thermography offers a non-invasive method to measure emotional changes. We hypothesized that infrared temperature (IRT) of key body surfaces would relate positively to right-lateralised cows and negatively to their milk productivity. The first experiment evaluated thermographic, behavioural, and lactation parameters of left-lateralised (less anxious; $n = 15$) and right-lateralised (anxious; $n = 16$) lactating dairy cows for one month. The laterality of cows was tested by observing their behaviour as they passed an unfamiliar person while exiting the milking parlour over 9 days. Video analysis determined the mean ratios of cows passing on the left (L) and right (R) sides, using the formula $L + 1/R + 1$ to avoid 0 as a divisor. A ratio >1 indicated left lateralization, while <1 indicated right. Cows passing to the right view the person with their left eye, activating the right brain hemisphere associated with fight or flight responses, and are linked to higher stress scores. Maximum IRT of cows' heads and forelimb coronary bands was recorded daily for six days during milking in a covered herringbone parlour. Subsequently, cows underwent forced lateralisation tests for 10 days. Milk production records were also analysed for the same six days of IRT. We found that right-lateralised (R) cows exhibited higher IRT at the eyes and coronary bands of the forelimbs compared to left-lateralised (L) cows (left eye, right eye and both eyes of L Cows = 36.1, R Cows = 36.5, SED = 0.16 °C, $P = 0.01$). In a second experiment, 171 lactating cows were examined individually over three consecutive one-month periods. In the first month, R cows showed higher IRT in their eyes than L cows. The lack of an association between IRT and laterality during the second and third periods suggests that the cows habituated to the testing conditions. The adjusted R^2 of the regressions across months was greater for IRT (eyes 86%; limbs 78%) than rectal temperature (63%). Over the course of three months, IRT was highly repeatable, particularly for both eyes, but rectal temperature was not. This study indicates that eye IRT can reflect emotional responses linked to lateralisation in cows.

Welfare assessment of dairy herds in Sweden including positive welfare indicators

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Farm assessment protocols have mainly focused on the absence of negative aspects of welfare and are lacking indicators to identify animals with good welfare. Several promising indicators of positive welfare have been identified in dairy cattle, such as greater herd synchronisation, more exploration, more positive behaviours (brushing, (allo)grooming, play) and different body postures (e.g. ears postures, openness of eyes and tail movements). In this study, we investigated whether these positive indicators could be used to assess welfare on commercial farms and, in particular, to differentiate between good and excellent welfare farms, a distinction lacking in existing protocols. Thirty-one dairy farms were selected by a Swedish dairy association (Växa) to represent three categories according to the farm's presumed level of welfare (V-best, V-middle, V-poor) based on recent health and fertility data from each farm. The exact combination of variables from the database used by Växa for the selection had been shown to be a good predictor of welfare on farm according to the Welfare Quality assessment protocol. Trained pairs of assessors, blind to the categorisation, visited the farms in spring 2022 and collected indicators of positive welfare. Statistical analysis consisted of type-III Anova tests of means per farm for each indicator, followed by Tukey pairwise comparisons if applicable. Results showed that cows from V-best farms performed more positive behaviours (e.g. brushing, (allo)grooming) (estimated mean $\pm$ SE: 2.7 $\pm$ 0.6 occurrences) than cows from V-middle farms (1.2 $\pm$ 0.3 occurrences) ($F=4.0$, $p=0.03$). Cows from V-middle farms had lower herd synchronisation (48 $\pm$ 1%) than cows from V-poor farms (53 $\pm$ 1%) ($F=4.2$, $p=0.02$). Animals from V-middle farms also approached the object in an exploration test more than cows from V-poor farms ($F=5.0$, $p=0.01$). However, no differences in body postures (ears, eyes, tail) were identified across farm categories. In terms of practicalities, the indicators were easy to include in a day visit and inter-observer reliability ranged from fair to excellent. The results did not show a clear and consistent distinction between farms, especially between the presumed best welfare farms and the other two categories. This could reflect (1) a lack of discrimination in the positive protocol or (2) that health and fertility outcomes of farms are insufficient to predict levels of positive welfare. While these two alternatives are being investigated, we believe that the variation between farms and the feasibility of using these indicators are a promising first step towards the inclusion of positive indicators in new or already existing welfare assessment protocols.

Sentience in non-human animals: what can we learn from judgement bias tests?

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The distribution question of sentience asks which living organisms, aside from humans, have the capacity to have conscious experiences, and in particular, to feel *pleasures* and *pains*. This is an ethically important problem, and one that is central to contemporary animal welfare science. Public concern for the welfare of animals is predicated on the presumption of animal sentience, at least in some species, but to date, no reliable method for establishing its presence has been demonstrated. Here, we review the question of whether cognitive bias tests could demonstrate the presence of *conscious* valenced affective states in animals. Building on empirical findings that people reporting positive emotional states are more likely to make optimistic decisions in ambiguous situations, translational judgement bias tests have been developed to assess animal affect by employing discrimination-learning tasks to demonstrate optimistic-like and pessimistic-like responses to affectively ambiguous stimuli. While mostly used with mammals, these tests have also been employed to assay positive and negative states in non-mammalian species. Some commentators have speculated that this may indicate the presence of conscious affect in all of these animals. However, we question this, suggesting instead that, while optimistic-like and pessimistic-like biases in decision making have adaptive functions for many animals, these could be effected both consciously or unconsciously. Here, we consider the ways in which conscious and non-conscious decision making might be experimentally differentiated. First, our ‘bottom-up’ approach is to take examples of data obtained from a range of species (including mammals, birds, fish and invertebrates) to pinpoint consistent differences in the ways in which decisions are made within the judgement bias task. Although this approach cannot, by itself, differentiate conscious and non-conscious decision-making, it can provide a catalogue of decision-processes that differ between species, thereby providing a structured basis for further investigation. Our second, ‘top-down’ approach is to use humans as our model species (i.e. of an animal that can use conscious processing to guide behaviour) to scrutinise the potential role of conscious processing in non-human animals. Psychologists have proposed key aspects of human decision-making, such as the use of ‘affect heuristics’, that are thought to necessitate the use of conscious affect. And computational studies of decision-making have identified decision parameters that are closely correlated, in human participants, with self-reported moment-by-moment affective states. We use these to develop a framework for identifying similar parameters within computational studies of decision-making in animal judgement bias tasks.

Exploring the role of dietary energy in the expression of play behaviour in pigs

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Surplus Resource Theory proposes that play behaviour evolved in juveniles that had access to necessary resources. Previous studies showed a positive correlation between post-natal growth and play behaviour, suggesting there could be a relationship between provision of nutritional resources and play behaviour. We propose that sufficient dietary energy is likely to be a requirement for play and therefore hypothesise that pigs on an energy-deficient diet will show reduced play. 128 mixed sex Large White x Landrace x Danish Duroc piglets were randomly allocated to one of two diets: a control diet, that represented the commercial norm, or a low energy diet, achieved by diluting the control diet with 15% indigestible fibre (Arbocel). Pen groups (8 pigs) were given access to a play arena, 4 times over 10 days, with a 2-day rest period between sessions. Before entering the arena, on 2 of the 4 occasions, both treatment groups were offered a sucrose supplement. The pigs' behaviour was recorded from video images using an ethogram for a total of 15 minutes/pen/visit to the arena. Each pig was continuously sampled, with behavioural frequency recorded. Piglets were weighed at weaning and before entering the play arena and feed consumption was recorded on a pen level. Behaviours, lesions and production metrics were analysed using glmer, and lmer models. The low energy diet did not affect feed intake, but reduced daily gain ($p=0.005$) and increased feed conversion ratio ($p<0.001$). Males engaged in more play fighting ($p<0.001$), whilst females engaged more in solo and social object play ($P=0.023$, $P=0.009$) and solo and social locomotor play ($P=0.001$, $P=0.049$). Treatment x pen average sugar intake affected play fighting ($P=0.034$), aggression ($P=0.005$), social object play ($P=0.009$), social locomotor play ($P=0.005$) and total play ($P=0.035$). Social object and social locomotor play were also affected by treatment x individual sugar intake ($P=0.023$, $P=0.003$). Overall, play behaviours were higher in basal diet pigs that consumed no or low amounts of sugar compared to Arbocel diet counterparts. The effect of play session and treatment x play session was inconsistent across behaviours but with a general trend of play behaviours reducing over time. Our results suggest that reduced energy intake is associated with reduced play behaviour which can be reversed with administration of sucrose supplementation. However, further work is required to understand inconsistencies in both treatment and sugar effect on play behaviour and the effect of energy on other positive behaviours.

Effects of gestational olfactory enrichment on adaptation to weaning in pigs

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In conventional farms, the use of odours to enrich the environment, which is often poor and monotonous, may offer a simple and cost-effective strategy to enhance welfare of pigs. Furthermore, pigs are capable of prenatal olfactory learning, which is context-dependent and can have long-lasting behavioural effects upon odour recall. We aimed to evaluate whether the recall of an odour perceived in a positive context during prenatal life would promote better adaptation to weaning in piglets. Fifty-four gestating sows and their piglets were used in three replicates. In each replicate, enriched sows ($n=9$) had access to an enriched room 3 times/week for 2h throughout gestation. The room was odourised with anise and contained a peat box, straw bedding, and odourised objects, with music or nature sounds playing continuously in the background. Each visit was paired with the voluntary ingestion of aniseed sugar cubes (525 mg of anethol/intake). Control sows ($n=9$) were continuously kept in their barren pen. At weaning (D28), piglets from each prenatal treatment were allocated to an anise-odourised or control non-odourised room, resulting in 4 prenatal x post-weaning treatments ($n=12$ pens of 4 piglets/treatment). Piglet behaviour was recorded using 5-min scan sampling for 6h/day on D28 and D29. On D25 and D29, blood cortisol and blood cell counts were measured. Feed refusals and piglets were weighted on D29, D35 and D42. Effects of prenatal treatment, post-weaning treatment, day and their interactions were analyzed using linear mixed-effect models in R. Prenatal treatment did not affect post-weaning weight gain, but compared to piglets from control sows, piglets from enriched sows ate more in the first 24h post-weaning (D29, $p<0.05$). On D28 and D29, they also spent more time at the feeder ($p=0.004$), less time exploring the enrichment materials ($p=0.006$) and tended to spend more time resting ($p=0.06$). In the odourised post-weaning room, piglets prenatally exposed to the odour spent less time displaying undesirable social behaviours than non-exposed piglets (prenatal x post-weaning treatment, $p=0.04$). Compared to male piglets from control sows, male piglets from enriched sows had lower blood cortisol concentrations (prenatal treatment x sex, $p=0.007$), and tended to have a lower neutrophil/lymphocyte ratio (prenatal treatment x sex, $p=0.05$) on D25 and D29. While the effects of odour recall in the post-weaning environment were limited, providing gestating sows with regular access to an enriched environment positively affected the stress-related behavioural and physiological responses of their piglets at weaning.

Dried black soldier fly larvae (*Hermetia illucens*) as environmental enrichment for laying hens – a full-scale commercial study

Faye Tahamtani¹, Kathe Kittelsen¹, Guro Vasdal¹

1. Animalia

There is a growing interest in the use of insect larvae to promote sustainability and welfare of farmed animals such as pigs and poultry. Previous studies have piloted the provision of insect larvae to small experimental groups of broiler chickens and laying hens, but this has not yet been tested in full commercial scale. This study reports on the first full-scale provision of dried black soldier fly (*H. illucens*) larvae (BSFL) to laying hens housed in commercial farms. The aim of the study was to assess the effects of the provision of dried BSFL as environmental enrichment on behavioural indicators of welfare in adult laying hens. To this end, 8 commercial flocks of laying hens (flock size: 7,500 hens) were assigned to one of two groups: the flocks in the Larvae group received 1g/hen/day dried BSFL every 3 days between 30 and 55 weeks of age (woa). The larvae were sprinkled on the litter area by the farmer, which was expected to reduce fearfulness in the flock. The flocks in the Control group, did not receive any larvae. Both Larvae and Control flocks received other enrichment according to the Norwegian standard such as pecking stones, oyster shells, and toys. The flocks were visited at 30, 55 and 70 woa and observed for fearfulness and feather pecking behaviour. Larvae provision reduced fear of a novel object at 55 woa compared to the Control group (Mean hens approaching the novel object $\pm$ SE: Larvae = 62.51 ± 7.8 ; Control = 3.94 ± 7.8 ; $P = 0.0009$). In addition, Larvae hens showed less fear after 25 weeks of larvae provision compared to before ($P = 0.007$). Control hens performed more gentle feather pecking compared to Larvae hens at 55 ($P = 0.003$) and 70 woa ($P = 0.002$), but not at 30 woa ($P = 0.99$). Furthermore, gentle feather pecking increased in the Control flocks with age ($P < 0.02$), whereas no age differences were observed in the Larvae flocks ($P > 0.05$). More severe feather pecking was performed by Control hens than Larvae hens at 70 woa ($P = 0.01$). In addition, severe pecking increased with age in the Control flocks ($P = 0.01$) but not in the Larvae flocks ($P = 1.0$). These results indicate a high potential for dried insect larvae such as BSF to reduce fear and feather pecking in commercially housed adult laying hens.

Exploring the impact of early experiences on canine and feline behavior

Maria Andersson ¹, Elin Hirsch ¹

1. Swedish University of Agricultural Sciences

Welcome to our interactive workshop, where we delve into the fascinating subject of early experiences and their effects on the behaviour of puppies and kittens. The primary goal of this workshop is to facilitate a thoughtful discussion and reflection on how the initial weeks and months of a puppy or kitten's life shape their temperament, social skills, and overall future interactions with humans. Socialization plays a crucial role in shaping adult social behaviour and, consequently will have an effect on the cat-human and dog-human relationship. A well-structured socialization process that supports the optimal development of kittens and puppies might provide long-term benefits for both animals and their future owners. During the socialization period, exposure to positive and representative experiences is essential, as it may significantly influence future behaviour. Stress, fear, and undesirable behaviours are becoming increasingly common in pets, in many parts of the world, partly due to increased awareness. Many of the behaviours that lead to animals being rehomed, surrendered to shelters, or euthanized often stem from limited socialisation and negative early life experiences. The first months of life have a lasting impact on behaviour, adaptability, emotional regulation, cognitive abilities, and social relationships. An animal's ability to cope with challenges such as stress and fear is shaped early in life and can contribute to the development of undesirable behaviours. However, these risks can be minimized through proper socialization, ensuring that kittens and puppies are gradually exposed to the stimuli they will encounter later in life. Learning outcomes and activities during workshop:

- Overview of the developmental stages, and discussion on the importance of early socialisation, in relation to what we know today.
- Reflection and discussion in smaller groups on real-life examples showing the impact of early experiences on behaviour.
- Guided discussion in relation to the participants own experiences.
- Discussion in smaller groups on best practice and a guided tool-kit.
- Group presentations and summary

Activism in animal welfare – yay or a no-go?

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Should activism play a role in the work of scientists involved in animal welfare research? Given the mandated characteristics of our research field and the overall slow and often limited progress in welfare legislation, integrating evidence-based activism into our scientific efforts may be beneficial for driving meaningful change. Similar to how climate scientists have increasingly taken on activist roles to highlight the urgent need for action against climate change, animal welfare scientists can also engage in activism to promote transparency about animal conditions and advocate for better welfare standards. Activism can raise public awareness and support for animal welfare issues, potentially leading to greater backing for scientific research and policy changes. Additionally, public interest generated through activism can lead to increased funding for animal welfare research. However, there are potential risks to consider. Activism can be perceived as compromising scientific objectivity, or as a diversion of time and resources away from primary research activities. It can pose professional risks, including potential conflicts with employers or funding bodies. Stakeholders' reluctance to cooperate with one's research (e.g. by allowing access to their premises) or to (co-)finance it, is another risk. The objective of the suggested workshop is to create an opportunity for animal welfare researchers to discuss the ethical and practical implications of activism in animal welfare science in a "safe" environment. A panel of researchers with differing opinions on the matter will briefly present their views, explained and supported by relevant cases from their own experiences. We will then divide participants into smaller working groups to discuss the possible avenues for promoting our research effectively and responsibly. Confirmed panel members: Christine Nicol, Frank Tuytens, Laura Boyle and Per Jensen.

Providing a good life to all animals: the importance of recognising, understanding and managing individual differences

Ellen Williams¹, Holly Vickery¹

1. Harper Adams University

Inter-individual differences (personalities) influence how individuals perceive, react to, and interact with their environment, conspecifics, and threats. Understanding animal personality makes it possible to predict individual responses to particular situations or stimuli; allowing opportunities to provide optimal environments for individual animals. If animal behaviour and welfare scientists are to ensure all animals live 'a good life' then attention must be paid to every individual within a group, something which has been historically lacking. There is an urgent need to ensure scientists fully appreciate the role of individuality in positive animal welfare and consider behavioural profiles of animals, to enable the incorporation of individual differences into evidence-based management – which varies across all managed animal disciplines. Personality impacts the success of housing and management, the valence of human-animal interactions and contributes to animals' affective states, therefore it should be more broadly considered and applied in animal management. Whilst in some species personality is widely assessed and included in management, there is significant disparity across species. The workshop organisers stem from farm and zoological backgrounds and will bring their expertise, and knowledge of current research, to this multi-disciplinary workshop. This workshop aims to promote critical reflection on the importance of recognising individual differences, consideration of the role this plays in providing positive welfare for all animals, and how this can be applied to improving animal management. A key goal will be for attendees to leave with knowledge of the way that personality impacts on animal experiences, and with the skills required to consider this in their own project or animal management. The workshop will consist of short introductory talks, round table discussions, and hands-on activities. Discussions and activities will focus on three key areas: (i) the role that individual personality plays in animal experiences; (ii) ways in which personality can be measured and the impacts of those measurements on behavioural profiles, and (iii) the challenges and opportunities for providing 'a good life' for multiple personality types within one group. Case studies from different disciplines will be integrated into the activities to allow for interdisciplinary learning and networking. Participants will be encouraged to reflect on, and share, their own experiences in different disciplines to enable critical reflection and peer-learning. These activities intend to further stimulate reflection upon how their own personality relates to their experiences of different conditions, in order to result in participants better understanding the role of personality in animal experiences.

A hands-on approach to bioacoustics in applied ethology

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The importance of animal sounds, especially vocalisations, in assessing the affective states and welfare of farm animals is gaining more attention. The Acoustic Enrichment Interest Group (AEIG) is a network to unite research on sounds for animal health and welfare. AEIG aims to promote and communicate research on sounds and animal health by creating opportunities for dialogue and networking among researchers, practitioners, and the public. This workshop by AEIG will introduce participants to the applications of bioacoustics in applied ethology, emphasising its role in animal behaviour studies and welfare. The workshop is designed to engage participants through a combination of theoretical discussions and hands-on activities. Firstly, participants will be provided with a foundational overview of bioacoustics, explaining its significance in understanding animal behaviour, from communication and mating calls to alarm signals. Participants will explore how bioacoustics is used in assessing animal welfare of farm animals. The second activity will focus on sound identification and interpretation. Participants will listen to pre-recorded animal sounds, including vocalisations from chickens and ruminants, and hypothesise the behavioural context of each sound. This exercise will encourage participants to think critically about the ecological and social roles of animal sounds. Following this, the workshop will delve into the use of audio analysis software, such as Raven, to examine sound wave properties like frequency, pitch, and duration. Participants will analyse recorded animal sounds to explore how these parameters correlate with specific behaviours and species-specific communication patterns.

Animal welfare progress: co-creating effective solutions to improve animals' lives

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Though animal welfare science is a productive field of study as measured by increasing numbers of publications and degrees conferred, some research findings are not feasible, others are not useful, and others may take decades to become common practice. What causes these mismatches between science and application? We find this question worthy of discussion in order to arrive at effective solutions that concretely improve animals' lives. To begin brainstorming, some reasons could include: practices that receive little attention despite impairing welfare (e.g., absence of stunning wild fish when captured, tail docking horses and dogs for breed standards), limited economic or knowledge-based resources (e.g., resources concentrated in the Global North despite needs in the Global South), or strong lobby groups who perceive change as a cost or hindrance rather than an animal welfare improvement. With such challenges, is animal welfare research a morally good but futile endeavour? Or does the animal welfare scientist 'raison d'être' also include helping the translation from scientific evidence to practice? To our knowledge, useful solutions have been rarely described or discussed in animal welfare science. The aims of this workshop are to a) discuss why animal welfare research findings might be poorly implemented, and b) identify potential solutions to more effectively improve animal welfare in practice worldwide. In the workshop, participants will engage in small-group brainstorming of the challenges, and whole-group discussion of potential solutions. Before the workshop, interested participants are encouraged to explore the literature for causes of poor implementation of animal welfare research findings, and potential solutions. The outcome of the workshop will be an enriching discussion that cultivates diverse ideas for how to effectively benefit the lives of animals.

Bridging AI and animals – Are we In?

Borbala Foris¹, Andrea Sommesse¹

1. University of Veterinary Medicine Vienna

Automated tools for routine animal behavior and welfare monitoring are increasingly relevant to fulfill societal demand for high animal welfare. Artificial Intelligence-based tools are becoming widespread in many domains and how animal behavior and welfare is represented in AI models may have downstream consequences for welfare assessment, policy, and may also influence the societal perception of diverse animal husbandry and keeping practices. However, it is unclear to what extent AI models are aligned with contemporary concepts of animal welfare, open-source annotated animal behavior datasets for development are lacking, and ethologists or welfare scientists are rarely involved in the development of AI tools. Under these circumstances, the quick pace of development and the increasing variety of AI tools on the market raises the question of how applied ethologists can meaningfully contribute to the AI revolution. The aims of this workshop are to 1) explore how commonly used AI models interpret animal behavior and welfare scenarios, 2) discuss positive examples, challenges, and concerns around AI use for animal monitoring, 3) outline potential engagement opportunities for ethologists interested in contributing to ethical AI development and regulation. After a short introductory overview of AI and associated terminology, participants will work in small groups and test a variety of AI models for the evaluation of different behaviors in the form of text descriptions and images representing multiple species. Based on reports from the small groups, the strengths and weaknesses of different AI models will be outlined. This will be followed by a discussion using case studies to compare generic AI solutions with purpose-built automated animal monitoring tools regarding their performance, validity, and applicability for routine monitoring. Finally, we will present an overview of current trends in AI development and regulation in different countries and end with a brainstorming session to identify key areas where contribution from applied ethologists is needed.

From debate to dialogue – improving collaboration between animal welfare and genetics

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There are immense opportunities to improve farm animal welfare using selective breeding strategies. However, progress is limited by collaborative challenges. To identify the different factors that influence the collaboration between the disciplines of animal breeding and animal welfare, a series of 6 workshops have been designed to facilitate a dialogue between stakeholders about animal welfare in animal breeding. Workshop 1 aims to produce separate definitions and visions for animal welfare in selective breeding from animal ethologists and welfare scientists and geneticists at Danish institutions. Workshop 2 will combine these parties for a discussion of the two positions, with the goal of producing a joint collaboration roadmap that respects the visions and constraints of each discipline. Workshops 3-6 will expand on this joint position through discussions with other industry stakeholders; an international industry (incl. breeding companies, NGOs) perspective (W3), social scientists and ethicists (W4), and students (W5). Finally, workshop 6 includes policy makers and influencers (i.e., EFFAB, EFSA, EURCAW). The overarching goal of this initiative is to improve communication between stakeholders about animal welfare in animal breeding, and open a dialogue about how to practically and feasibly conduct research in this space using methods agreeable to all parties. In this ISAE 2025 workshop, we will share our findings from workshops 1 and 2 (workshops completed prior to ISAE 2025). As behaviour is a key read-out of animal welfare, and there is increasing interest in phenotyping behaviour, it is highly relevant to discuss this topic with the international and interdisciplinary audience of ISAE. The content of the workshop would involve focus group style activities including group discussion and independent reflection. We would invite participants to reflect individually on their definition of animal welfare in animal breeding and discuss their ideas in small groups, and conduct large group activities (i.e., post-it note exercise, case study presentations). We would then share our findings from our previously conducted workshops with the participants and discuss as a group how these findings compare to what was discussed among the participants. Participants, especially early-career researchers, would gain valuable exposure to complexities of interdisciplinary research, network with colleagues, practice critical thinking in a safe and collaborative environment, and learn about a potential roadmap for collaborating with geneticists or animal breeding companies. Including this topic as an ISAE workshop would be immensely timely, as it would allow the perspective of ISAE participants to be included in subsequent workshop discussions (W3-6).

CSRD reporting on animal health and welfare in dairy cows

Rozan van Rossum¹, Judith Vollering¹

1. Lely International

As part of the European Green Deal, the Corporate Sustainability Reporting Directive will transform how companies report on sustainability matters. It aims to improve the availability and reliability of sustainability information whilst creating a culture of transparency around companies' impact on people, animals and the environment. Lely is a world leading manufacturer of automatization for dairy farms. Cow health and well-being is of vital importance to all dairy farms. Lely's vision for the "farm of the future" has a strong focus on improving animal health and welfare, as one of the five impact areas. This shows that the company is intrinsically motivated to quantify animal health and welfare. Lely choose to adopt the animal welfare model proposed by Professor Mellor to support it's mission. The intrinsic value of the animal is put at the foundation of the model by the Dutch Raad voor Dieraangelegenheden (RDA). We have experienced that the intrinsic value is perceived very differently throughout the world. It is highly culturally determined, hard to measure and hard to influence. The 4 higher domains (nutrition, physical environment, health and behavioral interactions) on the other hand, can be measured and influenced. They provide opportunities for farmers to improve animal welfare and performance of their herd. And create potential for innovation for Lely. Lely focusses it's efforts on these four domains. Despite the wide spread acknowledgement of the Mellor model, there is no consensus on the measurability of the domains. Given the assignment put in front of companies like Lely to report on animal welfare as part of CSRD standards, it is needed to take a practical approach to Mellor's theoretical model. For all domains, Lely aims to quantify the impact using Lely data sources. During a milking, Lely milking robots collect over 150 data points. Lely is considering which of these data points, from the milking robot itself, but also derived from smart neck bands and feeding appliances, are most representative of the domains. And we ask for your help! During the workshop, we will provide the available data points and measurements. We would like invite you to join us and use your knowledge and experience to translate a model into a practical tool for reporting on animal health and welfare for Lely farmers world wide. We invite you to discuss in small groups what to show on a dashboard using our data.

Where do you draw the line? A conversation about how we use animals in our research as applied ethologists and welfare scientists

Katy Proudfoot¹, Bianca Vandresen², Caroline Ritter¹, Beth Ventura³

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Researchers in the fields of applied animal behaviour and animal welfare encounter a unique contradiction: they conduct research aimed at improving the lives of animals while at times their research methods may cause harm to animals who are part of the study. In other disciplines such as veterinary medicine and nursing, internal conflicts arise when individuals face morally ambiguous decisions or actions that conflict with their values. These conflicts can affect their emotional well-being and the sense of meaning they derive from their work. This participatory workshop aims to foster discussion among ISAE attendees at all career stages about their experiences with using animals in their research. A secondary goal is to collect data for a research project aimed to describe these experiences. At the start of the workshop, attendees will be asked to fill out a short demographic questionnaire along with a consent form. To prompt attendees to reflect on their own experiences, they will be presented with hypothetical scenarios depicting individuals facing internal struggles related to animal use in their research. We will then form small groups to discuss: 1) the internal struggles workshop attendees may have encountered in their research with animals and how they have navigated these challenges; and 2) the perceived impacts of these internal conflicts on their own research and the field of applied ethology and animal welfare. Following the small group discussions, we will debrief and invite attendees to share strategies for managing difficult or morally ambiguous situations involving animals in research. The small group discussions will be audio-recorded for research purposes. Attendees who opt not to participate in the research will be invited to join a group that will not be recorded for data collection. These methods will be submitted for approval to the relevant institutional ethics committees and will adhere to ISAE Ethical Guidelines.

Observer reliability in animal behavior research: a workshop

Cassandra Tucker¹, Sarah Adcock², Jennifer Van Os³, Carly Moody¹, Blair Downey⁴

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Assessing observer reliability is a way of evaluating similarity of measures or techniques collected by ethologists and can apply to many aspects of the research process. We assess reliability as a way to confirm that our methodology can be understood and uniformly applied by all members of our team to reduce potential bias. We have built a website that outlines our approach (<https://www.animalbehaviorreliability.com/>). In this workshop, led by all five of the website authors, we will examine factors and considerations that affect the repeatability of the dependent variables commonly used in ethology. We will engage in activities that examine the characteristics of robust behavioral definitions and brainstorm about how logistical constraints (e.g., video vs. live recording, camera angles, if the behaviors of interest are rare) affect our approach to assessing observer reliability. Participants will have the opportunity to work in small groups. The groups will discuss sample outcomes from reliability testing, including various forms of visual assessment (e.g., plots from open access behavioral coding software, scatterplots, Bland-Altman) and the outcomes of statistical evaluation using a variety of common metrics (e.g., kappa, ICC, etc.). We will interactively explore examples of when problem solving is needed because good intra- or inter-observer reliability was not achieved with workshop participants. Examples from the workshop will draw upon data and experiments run by our team; they will be realistic and reflect the most common challenges in applied ethology. Our intent in this workshop is that participants will gain concrete, specific skills to apply in their own behavioral research.

The WOAHA animal welfare commitment and challenges in a diverse world

Leopoldo Stuardo ¹

1. World Organization for Animal Health (WOAH)

Since its founding in 1924, the World Organisation for Animal Health (WOAH) has been responsible for setting intergovernmental animal health standards. Upon the establishment of the World Trade Organisation (WTO) in 1995, the WOAHA animal health Standards were recognised in the WTO Sanitary and Phytosanitary Agreement. WOAHA broadened its mandate to include animal welfare standards in Terrestrial and Aquatic Animal Health Codes in 2002. This was at the request of its Member Countries, who recognised that enhancing animal welfare has a positive impact on animal health. The first WOAHA standards on animal welfare were published in 2005; to date, fourteen Chapters have been published in the Terrestrial Code and four in the Aquatic Code. WOAHA Members and partner organisations such as the International Society for Applied Ethology (ISAE), with whom WOAHA has a formal 'Exchange of Letters' signed, play a crucial role in the development of WOAHA animal welfare activities. Animal welfare has been recognised as a complex and multifaceted issue, which makes the implementation of the WOAHA animal welfare standards by Members challenging. The WOAHA Global Animal Welfare Strategy (GAWS) was adopted in 2017. This strategy was developed from lessons learned from actions taken at national and regional levels and aims to be a source of ongoing guidance for WOAHA's activities, with the objective of achieving: "A world where the welfare of animals is respected, promoted and advanced, in ways that complement the pursuit of animal health, human well-being, socio-economic development and environmental sustainability". The WOAHA GAWS is built on four pillars, focusing on the development of international standards which captures the different realities of the 183 Members through the standard-setting process in which experts from ISAE participate in the ad hoc Groups that develop the draft texts of new or revised standards; and also through the development of the Global Animal Welfare Forum under the pillar of communication with governments and partners. As part of the implementation challenges, a key aspect is the development of the capacity of veterinary services regarding animal welfare; this is covered in part by the WOAHA training portal; and finally supporting Member Countries in the implementation of these standards through the WOAHA Observatory project, which provides an overview of the uptake of international standards on animal health and welfare and veterinary public health by our Members.

Wild and unseen: Addressing the welfare crisis in global wildlife trade

Helen Lambert ¹, Angie Elwin ², Neil D'Cruze ²

1. Eurogroup for Animals, 2. World Animal Protection

The global wildlife trade continues to pose severe welfare concerns for countless animals, yet policy and public discourse often fail to fully acknowledge the extent of suffering involved. This review applies the Five Domains Model as a framework to systematically assess the suffering of wildlife in three case studies: bears farmed for their bile, dolphins kept in captivity for entertainment, and mink farmed for their fur. These examples are drawn from a structured review of peer-reviewed and grey literature, representing distinct forms of commercial exploitation in which captivity is not incidental but rather the intended outcome of trade processes. By examining each case within the Model's domains—Nutrition, Environment, Health, Behaviour, and Mental States—we highlight not only the direct impacts of captivity and trade but also the broader welfare implications that are often overlooked in conventional assessments. The findings reveal consistent patterns of suffering across cases: in bear bile farming, chronic confinement, malnutrition, and painful extraction methods contribute to extreme distress; captive dolphins endure environmental deprivation and social frustration, leading to abnormal behaviours and compromised mental well-being; and mink farmed for their pelts are often kept in barren environments that fail to meet their behavioural needs, culminating in high stress levels and poor physical health. These examples collectively demonstrate that the suffering of animals in trade is not simply a matter of inadequate care but is structurally embedded within these systems. Even where regulation exists, fundamental welfare needs remain unmet. To drive meaningful change, we must move beyond mere harm reduction as the ultimate goal and towards a fundamental shift in perception, recognising these animals as sentient beings whose welfare should not be compromised for economic gain. To safeguard the welfare of wild animals impacted by commercial trade, we recommend that the 3Rs approach is applied to reduce and ultimately replace the commercial consumptive use of wild animals. In the short term, critical refinements may be applied to modify practices and improve the welfare of animals in the interim. This poster will discuss practical strategies to advance this shift, including policy advocacy, public engagement, and promoting humane alternatives.

Behavioural changes relating to thermal stress and transport quality during the transport of finisher pigs

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The transport from farm to abattoir is a stressful experience for finisher pigs, which can be made worse in high summer temperatures. The aim of this study was to identify behavioural changes relating to heat load and transport quality in varying environmental temperatures during the transport of finisher pigs. We followed a total of seven transports from August to December of 161 finisher pigs from farms to abattoirs. Two data loggers were mouthed in the transport vehicles to continuously measure the temperature and humidity, to calculate the temperature-humidity index (THI) and presented as 5-minute intervals. Two cameras were installed to monitor pig behaviour. The video recordings were analysed using BORIS Observer Software. State behaviours: standing, sitting, laying, panting, and foaming of pigs were observed in 5-minute intervals to correspond with the THI values, while event behaviours: mounting, falling, slipping, aggressive, vomiting were continuously observed. The quality of every transport was evaluated by the stocking density, speed, duration, distance, and number of curves and bumps/holes on the road. The THI values in the transport vehicles ranged from 36-81 and were categorized into thermal loss (<66), thermoneutral (66-73), and heat load (>73). The three THI groups were compared with the state behaviours using non-parametric test. Event behaviours were compared with the THI values and the bumps and curves for each transport, using non-parametric correlation. There was no difference between the number of animals observed standing ($47 \pm 28\%$, $54 \pm 22\%$, $52 \pm 25\%$), sitting ($34 \pm 16\%$, $29 \pm 16\%$, $33 \pm 20\%$), and foaming ($23 \pm 21\%$, $27 \pm 25\%$, $27 \pm 31\%$) regarding thermal loss, thermoneutral and heat load, respectively ($p > 0.05$). A difference was found in panting behaviour between all three groups; thermal loss (0%), thermoneutral ($17 \pm 27\%$), and heat load ($38 \pm 39\%$), between observed individuals ($p < 0.05$). No correlation was found between the THI values and mounting ($r_s = 0.14$), falling ($r_s = -0.04$), slipping ($r_s = 0.00$), aggressive behaviour ($r_s = -0.20$), and vomiting ($r_s = -0.12$) ($p > 0.05$). However, positive correlation was observed between vomiting and curves, $r_s = 0.67$, and negative correlation between aggressive behaviour and bumps on the road, $r_s = -0.63$ ($p > 0.05$). The results of this study indicate that increased THI values in transport vehicles contribute to elevated panting, and this behavior may serve as an indicator of heat stress during transport. Likewise, we observed an association between transport quality and certain behaviours such as vomiting and aggressive behaviour in transported pigs. However, a larger number of transport cases are needed to conclusively determine the impact of heat load and transport quality on pig behavior.

Effects of transportation methods on the behavior, welfare, and meat quality of Japanese Black Cattle

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Despite numerous studies on animal transport, the effects of different transport methods on the behavior, welfare, and meat quality of Japanese Black cattle (JBC) remain unclear. This study compares two transport methods: (1) Same Farm (SF), where cattle are picked up directly from their production farm and transported straight to the slaughter facility, and (2) Multiple Farm (MF), where cattle are picked up from several farms with stops in between before reaching the slaughterhouse. The study aims to assess how additional stops and prolonged journeys under the MF method influence behavior and welfare indicators. A total of 42 JBC steers (784 ± 81.3 kg) were observed at the JA Hida Meat slaughter facility in Gifu Prefecture, Japan, with 21 animals assigned to each transport method. Behavioral observations were conducted using focal sampling for 8 hours after the cattle were tied in their assigned stalls, and posture data were recorded for 18 hours using four fixed cameras. Frequencies of behaviors were calculated as average values per group. Meat quality was assessed following the guidelines of the Japan Meat Grading Association, including carcass grade, dressing percentage, marbling score, and color score. Data were analyzed using a generalized linear model, with transport method and production farm as fixed effects. Results indicated that cattle in the MF group exhibited significantly higher drinking ($p = 0.005$; 252 MF vs. 51 SF) and eating frequencies ($p = 0.005$; 82 MF vs. 48 SF). Because animals in the MF group experienced longer transport durations, multiple stops, and exposure to unfamiliar animals. Rumination was numerically higher in the SF group (44 SF vs. 20 MF), although this difference was not statistically significant. Self-grooming was significantly more frequent in Farm B under the SF method ($p = 0.002$; 46 MF vs 12). In terms of posture, MF cattle spent more time standing (946 min MF vs. 902 min SF), while SF cattle spent more time lying down (184 min SF vs. 134 min MF), suggesting that SF transport may support better rest and recovery. Extended standing can negatively impact animal welfare by reducing sleep and compromising physiological stability. No significant differences were found between the two methods regarding meat quality parameters. Overall, these findings suggest that the SF method may offer welfare benefits by promoting calmer post-transport behavior. Further research is recommended to evaluate the physiological and economic implications of these transport practices.

Influence of two different feeding intensities on behaviour in organically kept Holstein cows

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The aim of the present study was to compare a high- (HI) and a low-input (LI) organic milk production system regarding cows' behaviour. We hypothesized that LI feeding would be more challenging for Holstein cows, a breed primarily developed under HI conditions. Therefore, we expected to observe less affiliative and more agonistic and abnormal behaviour in LI cows than in HI cows, indicating poorer welfare conditions in the LI system. The behaviour of cows (German Holstein) that were fed to achieve an annual milk yield of either 9000 kg (HI, $\bar{n} = 21$) or 7200 kg (LI, $\bar{n} = 18$) was video-recorded on an organic research farm in Hesse, Germany, on five Sundays (6 hours/day) in autumn 2023. HI and LI cows were housed separately in a freestall barn under otherwise identical housing and management conditions. Each group was subdivided into two groups according to their lactation status. Linear mixed-effects model analysis revealed a higher frequency (events/cow/observation day) of head rubbing (HI: 0.37 ± 0.04 , LI: 0.09 ± 0.04 ; $t_{13.85} = -5.19$, $P < 0.001$) and tongue rolling (HI: 0.14 ± 0.03 , LI: 0.05 ± 0.03 ; $t_{12.61} = -2.95$, $P = 0.01$) in HI cows than in LI cows. The latter exhibited an increased frequency of allogrooming (HI: 2.07 ± 0.68 , LI: 4.42 ± 0.68 ; $t_{15} = 2.85$, $P = 0.01$) and urine drinking (HI: 0.33 ± 0.67 , LI: 2.61 ± 0.67 ; $t_{13.19} = 83$, $P = 0.01$). Differences between the treatments were also evident in the duration of the above-mentioned behaviours per cow. In addition, HI cows had a shorter feeding duration (HI: 391 ± 11.5 min/cow/day, LI: 440 ± 12.5 min/cow/day; $t_{43.30} = 3.16$, $P < 0.01$). As urine drinking may indicate deficiencies in feeding management, our hypothesis of poorer welfare conditions in the LI system is supported. It remains an open question whether the higher frequency of allogrooming among LI cows reflects better welfare, due to higher levels of affiliative behaviour, or lower welfare, caused by an increased need for grooming due to soiled coats and/or the need to relieve social tension. However, tongue rolling is indicative of an unfulfilled feeding motivation, which is in line with the shorter feeding duration observed in HI cows. Consequently, we cannot fully accept our hypothesis regarding overall welfare, as both feeding systems seem to pose distinct welfare challenges, revealing suboptimal feeding regimes in both systems.

Physiological and behavioural indicators to evaluate pigs' positive emotions in an outdoor context

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The assessment of positive and negative emotions in livestock animals is crucial for improving their welfare. Despite this, there is a lack of valid indicators to evaluate animals' emotions, especially positive ones. Oxytocin is a hormone that could be used as a novel physiological indicator of positive emotional states. The objective of this study was to evaluate the use of oxytocin as an indicator of positive emotions in pigs, compared to other commonly used and non-invasive indicators of emotional state such as cortisol and behaviour. We evaluated 20 Large white x Landrace fattening male pigs, all subjected to a positive and negative context. To create the positive context, the animals were given outdoor access in groups during 30 min for 9 days, in an outdoor area with ground, grass, and mud. Saliva samples were taken, and behaviours were evaluated on three days: first outdoor access (day 0), positive context (day 7), and negative context (day 9, outdoor access not allowed). On each sampling day, behaviour was evaluated during 30 min pre-stimulus (in the home pen) and post-stimulus (in the outdoor area, or in the home pen for the negative context), conducting 15 scans (body posture, ear posture, tail posture, and tail movement) and 5 min of continuous observations (agonistic, affiliative, play, exploration, escape, excretion, and vocalization) for each pig. Saliva samples were taken after behavior was evaluated, both before (pre-stimulus) and after (post-stimulus) taking the animals to the outdoor area (or when not allowed, in the negative context). We used LMMs and GLMMs to assess the differences in oxytocin, cortisol, and behaviour between the different contexts. No significant differences between the first outdoor, positive, and negative contexts in salivary oxytocin (82.69(34.03sd); 70.21(19.56sd); 102.99(42.54sd) pg/mL) or cortisol (9.36(7.12sd); 5.79(2.47sd); 7.07(3.98sd) ng/mL) were found. Pigs performed significantly more play behaviour in the first outdoor than in the positive context, and more in the positive than the negative context ($p < 0.0001$). Pigs performed significantly more exploration ($p < 0.0001$), presented more body posture upright ($p < 0.0001$), ears forward ($p < 0.0001$), tail wagging ($p < 0.0001$), and tail up ($p = 0.008$) in the first outdoor and positive than in the negative context. These behavioural differences could be considered indicators of pigs' positive emotions, whereas neither oxytocin nor cortisol were valid to detect their emotional states in our contexts. Further studies should be performed to elucidate if these results could be attributed to the context not being positive or negative enough.

Validation of the calf grimace scale following COSMIN guidelines

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Pain assessment in animals is challenging due to the limited availability of reliable and valid scales. The calf grimace scale (CGS) was developed to assess pain and stress in Angus calves, but its validation is required. This study aimed to validate the CGS to assess pain following COSMIN guidelines. Sixty-nine male Angus calves, 6–8 weeks old, were allocated into surgically castrated (CAST, $n=34$) or sham castrated (SHAM, $n=35$) groups. Calves' faces were video recorded before, during, and after castration on pasture (baseline), in a holding pen (unrestrained), and in a tilt table (restrained). Front and side-view facial images were extracted from these videos and randomized to minimize observer bias. Pain-related behaviours, including activity, locomotion, and miscellaneous behaviours from the UNESP-Botucatu cattle pain scale, were recorded and used to evaluate CGS criterion validity. Six trained observers, blinded to treatments, scored 100 images from all moments twice, three-weeks apart, to evaluate intra- and inter-observer reliability using intraclass correlation coefficient (ICC). Principal component analysis revealed that CGS is two-dimensional from front view and three-dimensional from side view images. CGS demonstrated very good inter- (ICC=0.92) and intra-observer (ICC>0.87) reliability. However, its internal consistency was low (Cronbach alpha=0.44 and 0.39 for front and side views, respectively). Item-total correlation, evaluated using Spearman correlation coefficient (r_s), was acceptable (>0.30) for ear position, tension above the eye, and nostril dilation from the front view. The CGS construct validity was supported by higher total CGS scores (Median [IQR]) in CAST calves compared to SHAM calves during and after castration ($P<0.01$) from both front and side views, except for one side-view time point. The correlation between activity- locomotion score and CGS scores was moderate ($r_s=0.49, 0.42, P<0.01$, for front and side views, respectively), indicating moderate criterion validity of CGS. While some FAUs met (≥ 0.70) specificity or sensitivity criteria, none satisfied both. Receiver operating characteristic curve analysis was conducted using two datasets: data from CAST calves before and after castration and data from combined CAST and SHAM calves. Total specificity, sensitivity, accuracy, and analgesic threshold varied according to the data used, restrained condition (tilt table versus holding pen), and image view (front versus side). The side view of the CGS under unrestrained conditions exhibited the best performance using the two datasets, with accuracy >0.90, specificity >0.86, sensitivity >0.82, and a threshold score of $\geq 6/12$. In conclusion, the CGS demonstrated acceptable performance under unrestrained conditions but displayed varied performance under restrained conditions.

Play ontogeny in young chickens – individual variation and connection to affective state

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It is known that chickens display different play behaviours (e.g. frolicking, sparring, worm running), but so far, individual variation in play has not been investigated in this species. Also, play is highly associated with positive affective state. Hence, our aim was to (1) evaluate two different potential methods to study individual variation in playfulness, and (2) to investigate the link between playfulness and affective states. We previously found domestication effects in chicken play ontogeny. Therefore, in both experiments, we used an intercross between ancestral Red Junglefowl and domesticated White Leghorn chickens, where a large individual variation in any segregating phenotypic trait is expected. In experiment 1, a video portraying playing chicks was used to stimulate play. This allowed for standardized stimulation. The chicks were habituated to the arenas for four weeks. The group size was gradually decreased from eight to one. A video without play was introduced day 13, and the play video day 18. Day 28, each chick was video recorded individually for 15 min with the play video. For comparison, on day 29, the chicks were tested in pairs without video. At 33 days of age, a cognitive judgement bias (CJB) test was conducted on all birds, to assess their affective states. For males, there was a significant positive correlation between play with video and play in pairs (males: $r = 0.690$, $p = 0.004$; females: $r = 0.260$, $p = 0.313$). No correlation between individual mean play frequency and cognitive state was found for either sex (males: $r = -0.148$, $p = 0.599$; females: $r = -0.242$, $p = 0.350$). In experiment 2, all chicks ($n=45$) were tested twice in groups of three, three days in a row (day 28-30 and 35-37), with different conspecifics each time. The groups were always within cage, i.e. the chicks were always familiar with each other. Some consistency in individual play activity across days was found, mainly between day 28 and 29 (males: $r = 0.729$, $p < 0.001$; females: $r = 0.509$, $p = 0.013$) and between day 36 and 37 (males: $r = 0.485$, $p = 0.026$; females: $r = 0.484$, $p = 0.019$). Results from the CJB test in experiment 2 are pending analysis. In conclusion, the individual play frequency varied somewhat consistently, suggesting a genetic basis for play motivation. Video stimulation showed some potential as a way of stimulating play in young chickens.

Affective bias testing confirms sex differences in rats' preference for how they are tickled

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Rat tickling is a positive heterospecific interaction between humans and laboratory rats, which mimics rats' rough-and-tumble social play. It has been used to study positive affective states and to improve rats' welfare. Previous work suggests that pinning rats in a supine position to tickle them, may not be a positive experience for all rats. We recently tested rats' responses to tickling treatments varying in amount of pinning. Using 50-kHz ultrasonic vocalisations (USVs) as an indicator of rats' affective state we found females prefer to be tickled with less pinning and that males showed no preference. The purpose of this study was to use an Affective Bias Test (ABT) to confirm these findings. The ABT is a validated test that measures acute changes in the animals' affective states and involves animals learning two independent substrate-reward associations: 1) Following an affective state manipulation (treatment), 2) Under control conditions. Affective biases are then quantified in a choice test, measuring how many times (out of 30 trials) the animal chooses to dig in the control- or the treatment-paired substrate. The substrates used had been previously tested and matched by digging effort. 31 Wistar Han rats (16 males and 15 females – one female being lost due to illness) were used, between 5-12 weeks of age. All rats were individually exposed to two treatments on separate weeks: P1: Tickling with 1 pin/30s session; P4: Tickling with 4 pins/session. For control, the experimenter's hand was placed on one of the arena's walls. Animals received two interspersed treatment and two control sessions per week, ending each week with a choice test. Animals showed a positive choice bias to both P1 ($t=4.615$, $p<0.0001$) and P4 treatments ($t=3.269$, $p=0.0027$), compared to control. Due to differences in data distributions that could not be transformed, females and males were analysed separately. Males showed no preference between treatments ($W=251.5$, $p=0.645$), whereas females displayed a stronger bias for P1 compared to P4 ($t=3.73$, $p=0.002$). This study confirms previous findings based on USV production, confirming a sex-difference in preference for how tickling is applied with females showing a stronger choice bias for tickling with less pins and males showing no preference. These results support a refinement in rat tickling protocols to reduce the amount of pins/session; we recommend harmonising to 1 pin/session for both sexes. The results also demonstrate the importance of taking account of sex differences when designing interventions to improve animal welfare.

Navigating welfare challenges in China's livestock industry: from intensive farming to higher welfare practices

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1. Compassion in World Farming

China, the world's largest producer and consumer of meat, plays a dominant role in the global market. In 2024, official statistics report 70.256 million pigs, 32.359 million sheep, 50.99 million cattle, and 17.34 billion poultry slaughtered. Driven by domestic demand and international trade, the scale and intensification of animal production present significant challenges to farm animal welfare. This presentation examines key welfare challenges in China's intensive farming systems and explores promising solutions. A major challenge is the predominance of large-scale intensive farming, which typically prioritizes production efficiency over welfare. Close confinement, high stocking densities, barren environments, and using high-yielding breeds result in restricted movement, heightened disease risk, behavioral deprivation, and stress. The absence of a formal legislative framework to protect farm animal welfare further complicates the establishment of enforceable standards. Low consumer awareness and limited demand for higher-welfare products also reduce incentives for system improvements. Despite these challenges, key collaborations with government and industry have led to promising developments. Since 2014, the Good Farm Animal Welfare Awards, established by leading NGO Compassion in World Farming, have recognized progressive farmers in China. By 2024, over 120 Chinese producers' commitments are projected to benefit more than 432 million animals annually. Award highlights include cage-free systems for laying hens (24 Good Egg Production Awards, 493,129 hens/year), group housing and/or free farrowing for sows (78 Good Pig Production Awards, 177,682 sows/year), and lower stocking density and/or slower-growing breeds for broilers (29 Good Chicken Production Awards, 2,846,273 broilers/year). Academic institutions are also increasing efforts to disseminate scientific knowledge and best practice recommendations. This includes establishing the International Joint Research Center for Animal Welfare with the Institute of Animal Sciences and promoting welfare research through collaboration with Animal Research and One Health, a journal initiated by the Chinese Academy of Agricultural Sciences. Conferences and forums such as the World Conference on Farm Animal Welfare emphasize integrating sustainable, welfare-oriented livestock farming using the One Health approach. Improving farm animal welfare in China will require continued research, multi-stakeholder collaboration, and effective knowledge dissemination. Demonstrating successful higher-welfare models and promoting their adoption can facilitate a shift toward more sustainable, welfare-oriented systems. While obstacles remain—including stricter disease control and the lack of formal animal welfare laws—positive momentum is growing. Rising consumer awareness, post-COVID economic recovery, the growing influence of the One Health concept, and expanding global market opportunities offer further support for advancing animal welfare in China's intensive production systems.

Preference of laying hens for synbiotic-supplemented water under stressful conditions

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Synbiotics (SYN), used in both human and animal studies, are mixed into drinking water to improve health and well-being. As natural remedies like SYN become more popular, it is important to determine if animals can distinguish between supplemented and unsupplemented options, especially under stress conditions, where acceptance of natural remedies in drinking water might be more challenging. We aimed to determine if laying hens can differentiate between drinking water supplemented with an SYN and unsupplemented placebo (P) water or change their consumption under stress. This study involved 226 White Leghorns, 37 weeks old, divided into 12 enriched floor pens with 18-19 birds per group. Hens were given the choice between P and SYN in colour-coded water jugs (yellow or blue) with colours assigned alternately to treatments in half of the pens to avoid colour bias and to assess their relative preference. Hens were introduced to P and SYN water during a 2-week associative learning period, which was followed by a 1-week washout. Then, a 6-week preference testing period was conducted, consisting of pre-stress, social stress, and post-stress periods. Hens simultaneously had access to both liquid types during preference testing. Throughout the experiment, SYN water was created fresh daily by mixing a commercial SYN into water (dosage: 80 mg SYN/L water). Liquid consumption via manual weighing (group-level) and water jug visit durations via a radio-frequency identification (RFID) system (individual level) were recorded. During the stress period, birds were introduced to repeated, unpredictable social stress where they were moved to new pens and mixed with unfamiliar birds. A generalized linear mixed model assessed time spent at the SYN water jug and changes in SYN consumption across pre-stress, stress, and post-stress periods. During the pre-stress period, $56 \pm 2.4\%$ of the total liquid consumed was SYN water compared to $52 \pm 2.3\%$ ($p = 0.0010$) during stress and $53 \pm 2.3\%$ ($p = 0.0131$) post-stress. Overall, hens spent more time at SYN (9.9 minutes/6.5 hours/day) than P water jugs (8.7 minutes/6.5 hours/day) ($p = 0.0325$). The findings suggest that hens have a relative preference for SYN-supplemented water under stress, indicating their ability to differentiate between supplemented and unsupplemented water. This is particularly important under stressful conditions, as additives like SYN might be added to help manage stressful periods. Although this study tested only one commercial SYN product, it is the first to investigate this research question and open new avenues for future research.

Pig behaviour during transit – welfare hazards in assembly centres

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Each year, approximately 33 million pigs, mostly weighing around 30 kg, are transported across EU member state borders. During transit, pigs may pass through assembly centres or control posts, which serve as veterinary control posts and are legally required to provide access to feed, water, and rest after a maximum journey duration of 24 hours. The study provides the first description of pig behaviour after arrival at an assembly centre. Behaviour was recorded the first 4.5 hours after unloading in one of two assembly centres following 16 short (8-hour) and 16 long (24-hour) journeys. Maximum group sizes were 88 and 98 pigs, respectively (0.25 m² per pig). Unfamiliar pigs were mixed as part of normal practice. Water was accessible from either four drinking nipples (short journeys) or two troughs (long journeys). Lying behaviour was recorded using 15-minute interval instantaneous scan sampling, while presence near drinkers was recorded every 5 minutes. Aggressive interactions were continuously recorded in five 20-minute sessions, once per hour. Behaviour was analysed using mixed models to assess the effects of time since unloading and temperature. The average temperature in the assembly centres was 21 °C (min-max: 11-30) after short journeys and 18 °C (min-max: 8-28) after long journeys. More pigs were lying down, influenced either by the main effects of time since unloading, average temperature and temperature variability (measured by SD) every 15 minutes, or by the interaction between time and average temperature or temperature variability. After short journeys, the area near the drinkers was occupied by on average $\pm$ SD 51 % $\pm$ 17 of its max capacity (min-max: 0-100%), increasing with time since unloading and higher temperature variability, except the first hour ($P < 0.01$). After long journeys, the area near the drinkers was occupied by on average 42% $\pm$ 14 of its max capacity (min-max: 0-100%). The proportion of pigs near the drinkers peaked 3 h after unloading ($P < 0.05$) and was unaffected by temperature ($P > 0.1$). Aggressive interactions occurred throughout the stay, peaking 2 hours after unloading. The behavioural findings will be discussed in terms of the potential welfare hazards of the system like access to adequate feed, water, space and microclimatic conditions as well as disruption of social structure.

Identification and characterization of mismothering types in beef cattle and their associated risk factors

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Mismothering, when cows fail to strongly bond with their calves, resulting in abandonment, neglect, or aggression, has significant animal welfare and economic implications. Despite its importance, scientific knowledge remains limited regarding the possible existence of mismothering types and the factors influencing mismothering. Such knowledge could inform the development of optimal management strategies minimizing the negative impact of mismothering. This study aimed to 1) determine if mismothering can be categorized into different types and, if so, 2) identify risk factors for each type. Mismothering was diagnosed during routine ranch management by personnel continuously monitoring dams' maternal behaviours. Seventy cow-calf pairs identified as mismothering were isolated in individual indoor pens and video-recorded. Information on the dam (parity, calving difficulty, body/udder/teat condition), calf (sex, twinning status, birth weight), and calving conditions (number of calvings in the pasture on the day of birth, temperature, accumulated snow) were collected from ranch records, physical scoring, and weather stations. Trained observers continuously scored affiliative and agonistic cow-calf interactions in the pen for the first 3 hours after the calf initially successfully stood. Cow-calf behaviours were analyzed using Principal Component Analysis and *K*-means cluster analysis to identify mismothering types. Kruskal-Wallis and *post-hoc* Dunn's tests compared behaviours between clusters, while multinomial logistic regression identified risk factors for each type. Four mismothering types were identified: "Inattentive dam – inactive calf" (36/70: calves mostly lying down, receiving little attention (affiliative or agonistic) from their dam); "Inattentive dam – active calf" (21/70: active calves receiving little attention from their dam); "Dam aggressive regardless of the calf's behaviour" (3/70: cows aggressive towards their calves whether they tried nursing or not); "Partly reject nursing" (10/70: cows and calves displaying bonding behaviours but nursing was rejected/prevented). Dams' udder condition emerged as the only risk factor influencing mismothering types. Better udder condition was associated with lower odds of the pair being in the "Inattentive dam – active calf" than the "Inattentive dam – inactive calf" type. Indeed, pendulous udders challenge the calves to locate and nurse from the teats, as they must search in an abnormal crouching position. This delays or prevents nursing, resulting in active behaviours driven by hunger. These results provide evidence for distinct mismothering types in beef cattle and a factor influencing them. Ranchers should monitor udder condition if concerned about mismothering on their operation. Future research should develop management interventions to minimize the impact of different mismothering types and improve animal welfare.

Consistent explorers: daily ranging variability, not duration or frequency, is linked to range motivation in meat chickens

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Using a behavioural demand model, we assessed how motivated meat chickens were to access an outdoor range. We hypothesised that frequent rangers who spent longer on the range would work harder to access it. All procedures were approved by UNE AEC (ARA22-125). Mixed-sex Cobb500 birds (34 females, 54 males) were housed in 9 pens (6.3m×1.6m; 6-12 birds/pen), each with access to a range (1.9m×17m) and visually isolated from neighbouring pens. Range access was provided daily (06:00–19:40). Radio Frequency Identification Technology tracked individual range use. Motivation to access feed and the range was assessed between 30–33 and 34–36 days of age, respectively. To access each resource, birds were required to jump transparent barriers (7cm, 14cm, 21cm), with heights based on previously published behaviour demand models for meat chickens. Barrier height was randomly assigned to each pen on test days. Feed was provided behind the barrier after a 10-hour feed restriction, and the barrier was removed 1h later to give all birds access to feed and minimise impacts on welfare. Range barriers were removed at 16:00, allowing unrestricted access until 19:40. Body weight (BW) and sex were recorded. A binary logistic model was used to predict whether birds would jump a barrier to access the range including the following predictor variables: day of first range use, ranging consistency (proportion of days the range was visited), average daily time on the range, average daily range visits, BW, sex and latency to jump the highest barrier to access feed. Only 30–50% of birds jumped the tallest barrier to access the range or feed. There were negligible effects of latency to jump the tallest barrier for feed on the likelihood that a chicken would jump the tallest barrier to access the range ($\beta=0.000$; Odds Ratio (OR)=1.000; $p=0.040$). More consistent rangers (across days) were more likely to jump the tallest ($\beta= -0.050$; OR=0.951; $p=0.009$) and intermediate ($\beta= -0.031$; OR=0.970; $p=0.019$) barriers to access the range. Heavier birds were less likely to jump the intermediate ($\beta= -2.703$; OR=0.067; $p=0.036$) and smallest ($\beta= -3.802$; OR=0.022; $p=0.009$) barriers to access the range. Females were marginally more likely to jump the short barrier to access the range ($\beta=1.767$; OR=5.854; $p=0.055$). Chickens that consistently accessed the range across days were the most motivated, regardless of visit frequency or duration. Range access matters for these individuals, and welfare may be compromised if access is restricted.

The presence of enrichment promotes positive welfare in dairy calves, increases play, activity and leads to more relaxed feeding with fewer interruptions

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Increased consumer concern for farm animal welfare is leading to the introduction of environmental enrichment to promote positive experiences. In UK farms the use of brushes as enrichment for adult cattle is encouraged, but the effects of brushes on calf behaviours such as activity and feeding have not yet been explored. The use of precision livestock technologies enables the monitoring of large number of animals and has the potential to be used for the assessment of animal welfare. Here we use ultra-wideband location sensors and automatic milk feeders to determine the effects of brushes on a range of movement and feeding behaviours of 226 dairy calves for up to 72 days, where half of the calves in the study had access to brushes for half of the days. We determined proximity to the brushes and distance travelled and play from the smoothed coordinates (over a 10s moving average) reported by the location sensors and aggregated the feeding data from the feeder into daily measures. We used mixed-effects models to test how much time the calves spent near the brushes and how their presence affected behaviours. Calves spent more time in the areas with the brushes when present and there was no significant decrease over time. The presence of the brushes increased the daily distance calves travelled by 2% ($p=0.001$), indicating higher activity. The calves that experienced enrichment walked 28% more than those who did not ($p=0.003$), and played 53% more ($p=0.004$), meaning that the brushes increase activity and positive welfare. Calves also changed their feeding behaviour in the presence of brushes. Feeding rate was reduced by 3% ($p=0.002$), which may indicate a more relaxed feeding and lead to better nutrient absorption. There was also a 19% reduction in the number of entitled visits to the feeder ($p<0.001$) and a 9% increase in their duration, indicating that the calves were less interrupted when using the feeder. The calves spent 2% less time in the area around the feeder in the presence of the brushes ($p=0.02$), which suggests that they are spending less time queuing or attempting to displace other calves from feeding. Overall, adding an element of environmental enrichment increases calf activity, suggesting reduction in idling and boredom. In addition, the presence of brushes resulted in more relaxed and less interrupted feeding, due to fewer displacement at the feeder, suggesting a positive effect on nutrition and welfare.

Effect of pair housing on behaviour and gut microbiota of pre-weaned dairy calves

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Pair housing is a viable alternative to individual housing for pre-weaned dairy calves, yet aspects like the evolution of behavioural synchronisation and of gut microbiota over time are still poorly understood. This study aimed at evaluating lying synchronisation and gut microbiota composition in pre-weaned dairy calves housed in pairs or individually. 56 Friesian female calves were enrolled from two commercial dairy farms in Northern Italy and housed from birth to 56 days, either individually ($n = 28$) or in pairs ($n = 28$; maximum age difference: 24 hours). From two days of age, each calf was fitted with an accelerometer on the right hind leg to monitor lying behaviour. Faecal samples were collected at days 2, 7, 21, 35 and 56 from a subset of individually ($n = 12$) and pair housed ($n = 12$) calves to assess gut microbiota composition. Accelerometer data, recorded at 60-second intervals, were used to estimate lying time as a percentage of the day and as minutes per hour. To identify possible synchronism between pair housed animals and between individually housed calves of similar age, time-series were analysed and overlapped, and the coefficient of determination (R^2) was calculated for each day to assess in a preliminary way the correlation degree between time-series of different animals. Daily lying time decreased from 80–82% to 65–67% over the study period, regardless of housing. Pair housed calves exhibited higher R^2 values, with some pairs showing strong synchrony early on and others increasing from 0.1–0.4 to 0.7–0.8 over time. Individually housed calves showed no such trend (R^2 not exceeding 0.5). Microbiota analysis showed no significant differences in alpha (within-individual richness and diversity) or beta diversity (between-group richness and diversity) between the two housing types, while a farm effect was observed. Significant differences in taxonomic composition were found at 56 days. Individually housed calves exhibited a microbial composition that may reflect a less efficient metabolic state or higher stress (e.g., increased *Fusobacterium* and *Odoribacter*), whereas pair housed calves had genera known to be associated with better productive performance and gut health, such as *Prevotella* and *Ruminococcus*. Lying synchronization was detectable via accelerometers and might provide an indicator of positive welfare in pair housed dairy calves. Valuable differences were found in taxonomic composition of pair-housed dairy calves' microbiota: however, studies with larger sample sizes are needed to explore the evolution of taxonomy differences and their correlations with relevant phenotypic traits.

I can't get no sleep – Effects of husbandry and sex on sleep quantity in dairy calves

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In the present study we measure sleep, which, from human studies, is known to influence physical and mental health. However, knowledge on sleep in farm animals is still very limited. In the present study we use a mobile device to record the electroencephalogram (EEG), the electrooculogram (EOG) and the electromyogram (EMG) in free moving dairy calves. In total, 21 calves were included in the study. The calves were separated from their mothers immediately after birth, and then assigned to one of four housing and management groups: (1) individual calf pen with standard dimensions (120x130 cm), restricted feeding (twice daily; 8 L in total); (2) individual calf pen with standard dimensions (120x130 cm), ad libitum feeding; (3) calf igloo with increased space (100 x 170 cm), restricted feeding (twice daily; 8 L in total); (4) calf igloo with increased space (100 x 170 cm), ad libitum feeding, with sex balanced over treatment groups. Sleep recordings started when animals were 12 days old. Data was recorded for 48 h. Each 30-second epoch was assigned to one of four vigilance states (rapid eye movement sleep (REM), non-REM sleep 1 (N1); non-REM 2 (N2), awake (W)). Linear mixed models were calculated for the percentage of time in the respective state and the changes between states. Housing (limited space vs. increased space), feeding (restricted vs. ad libitum), sex and the interaction between each pair were included as fixed factors. The interaction between feeding and housing shows a tendency to affect the percentage of N2 ($F_{1,14}=3,3$; $p<0,1$), however, pairwise comparisons were not found to indicate a trend between respective pairs. The interaction between sex and housing was found to have a significant effect on the number of changes between sleep stages ($F_{1,14}=5,2$; $p<0,05$), with females in the small system changing their sleep states less compared to females in the bigger system. No differences were found for male animals. For all other parameters, no significant effects were found (all $F>0,04$; all $p>0,1$). Changes between sleep states can be an indicator for sleep quality, with more changes most probably indicating restlessness. The results show that sleep quality is related to space allowance and sex of the animals, with females being more relaxed in the small environment. Knowing that the sample size is small, these results still show the need to have a closer look on sleep when designing husbandry systems with regard to welfare.

The impact of social isolation on laboratory rodent health, replicability and translatability: a systematic review and meta-analysis

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Over 120 million rodents are used in biomedical studies globally each year. However, most of this research is non-replicable and very little translates to human therapies (termed the replicability and translatability ‘crises’, respectively). Furthermore, many laboratory rodents are isolated in barren, ‘shoebox-sized’ conventional housing that compromises welfare, inducing chronic stress. Our previous meta-analysis showed that rodents in small conventional cages are more susceptible to stress-sensitive diseases—such as anxiety, cancer, cardiovascular disease, depression, and stroke—and have shortened lifespans, compared to those housed in larger, well-resourced enclosures that allow natural behaviour. Additional meta-analyses revealed that housing (conventional versus well-resourced) can interact with disease modifiers being studied (e.g., therapeutic drugs), altering research outcomes and impacting replicability. Conventional housing may also overestimate the therapeutic benefits of tested drugs, impacting translatability. Here, we build on this work to investigate chronic stress effects in individually housed rodents. We hypothesize that poor welfare resulting from social isolation similarly impacts animal health. We further hypothesize that these effects similarly alter research findings, reducing both replicability and translatability. To test these hypotheses, we conducted a systematic review. We followed best practices for reducing bias by detailing our research plan in an online protocol prior to conducting the study (<https://hdl.handle.net/10214/28126>). We searched five databases (Ovid, CABI, Web of Science, Proquest, SCOPUS) on May 26, 2024, identifying 2,384 potentially relevant articles. Two independent reviewers conducted all steps to minimize error and bias. We screened all articles for eligibility (published in English, using mice or rats, and using social isolation as an intervention). In total, 121 articles met the inclusion criteria and were used for data extraction. These articles spanned all five previously studied stress-sensitive diseases and mortality, while including one new disease: viral infection. Twenty-eight articles also assessed the efficacy of disease modifiers. Data analysis is ongoing. We are using random-effects meta-analyses, including analyses of statistical interactions (with ‘article’ as the unit of replication). Our results will help reveal how social isolation impacts laboratory rodents’ health and whether these effects alter experimental outcomes. Combined with previous work on rodent housing, these data will allow us to assess the importance of welfare as a key variable that should be considered when conducting animal research, and when addressing both replicability and translatability crises. If our hypotheses are supported, this would suggest that social housing is important not just for animal welfare but also for rigorous, effective biomedical science.

Feather pecking and cannibalism prevalences on laying hen farms with mobile or stationary houses

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Mobile laying hen houses are increasingly used. They have smaller flocks (200-2500 hens) and a high potential to offer attractive free-range areas. These factors facilitate good free-range use, which may decrease the risk of feather pecking and cannibalism. We compared scoring data from mobile and stationary houses recorded in different years, using the same scoring system with satisfactory assessor agreement. The aim was to determine if feather pecking and cannibalism were less prevalent in mobile houses and if differences existed among mobile housing categories. Data were repeatedly collected from 48 mobile houses (M) (167 recordings), half of them during the vegetation period and half outside. Houses varied in size and mobility (on wheels: small ≤ 350 hens ($n=13$), medium 450-600 ($n=12$), large > 1000 ($n=11$); on skids: up to 2050 ($n=11$)). Data from 12 stationary houses with free-range access (FR, 54 recordings) and without (NR, 62 recordings) were also collected during (45%) and outside (55%) the vegetation period. Flock sizes ranged from 2250-6000 hens. Various hybrids were kept, with 81% brown birds in M, 100 % in FR and 73% white hybrids in NR. All birds were non-beak-trimmed. Plumage damage and skin lesions (back and belly) were scored from 0 (no damage) to 2 (severe damage). Robust linear mixed models were used, with the fixed factors 'system' (M, FR, NR or the four mobile housing categories) and 'week of age' and the random factors 'flock' nested in 'house'. Prevalences of scores 1 and 2 increased with flock age ($p < 0.05$). Plumage damage at the back was less prevalent in M (mean $\pm$ SD: 18.3 $\pm$ 27.7 %) than in FR (39.8 $\pm$ 40.6 %; $p=0.0018$) or NR (52.1 $\pm$ 42.0 %; $p=0.0033$). Plumage damage at the belly was lowest in M (9.0 $\pm$ 18.9%) and highest in NR (52.9 $\pm$ 40.0 %; $p<0.0001$). Back injuries were less common in M (2.4 $\pm$ 7.8 %; $p=0.0075$), than NR (14.6 $\pm$ 21.6 %), but not compared to FR (5.7 $\pm$ 15.1 %; $p=0.1488$). Belly injuries followed the same pattern (NR: 20.9 $\pm$ 26.5%, FR: 9.1 $\pm$ 15.0 %, M=4.4 $\pm$ 9.9 %, $p<0.05$). However, single high prevalences in mobile houses (range 0- 98% for plumage damage and 0-78% for injuries), showed that individual problems can still arise. No significant differences were found between the four mobile housing categories. The results indicate that the use of mobile housing systems, regardless of the specific category, helps to mitigate particularly feather pecking and to a lesser extent cannibalism in laying hens, with the free-range use likely playing an important role.

Lessons learned – the past, present, and (potential) future of farm animal cognition research

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Over the past two decades, our understanding of the minds of farm animals has grown substantially. But we need to ask: how has this knowledge actually contributed to improving farm animal welfare? How well do artificial test environments translate to the daily husbandry routines of farm animals? In particular, much of the past research has focused on identifying specific cognitive capacities rather than assessing their practical relevance - their actual need and use - in the husbandry context. Certainly, if we want to trace the evolutionary or developmental trajectory of specific cognitive traits, we need to assess whether and why animals have developed such a capacity. However, in focusing on identifying capacities, too many cognitive paradigms used in farm animal cognition research have relied on excessive training and learned responses, and have often exposed test subjects to artificial contexts - such as isolation - that do not necessarily reflect cognitive decision-making and problem-solving in husbandry settings. Thus, despite this growing body of research, we still know little about the cognitive skills that farm animals actively use in their daily lives - knowledge that is crucial for understanding the challenges they face in their routine husbandry environments. In this presentation, I will summarise past and current research on farm animal cognition and outline a personal vision for the future of this field - advocating for approaches that minimise reliance on trained responses and prioritise testing in social environments. I will also highlight recent technological advances - such as automated behaviour tracking and eye-tracking technology - that can improve our understanding of how farm animals interpret their physical and social environments. Finally, I will discuss how improvements in research infrastructure, such as multi-lab studies, are needed to strengthen external validity and drive progress in this field.

Exploring the role of inhibitory control in horses' coping behaviour

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Appropriate coping is of critical importance in artificial environments, which may include novel and potentially stressful situations. The ability to flexibly adapt to different conditions, allows individuals to successfully copewith housing and training regimes. One underlying mechanism thought to be involved in coping behaviour and behavioural flexibility is inhibitory control (IC), the ability to inhibit prepotent and potentially disadvantageous behaviours. Horses are required to rapidly adapt to various housing and training regimes. Accordingly, understanding why horses differ in their ability to cope is of interest to equine welfare in a number of ways. We tested thirty-one box-housed warmblood mares on a stud farm in a test battery (reversal learning, delay of gratification, spatial A-not-B test) to obtain a valid assessment of all aspects of IC. Furthermore, we observed the horses' behavioural and physiological reaction (salivary cortisol) in two stress-inducing situations (food omission, social isolation) with three repetitions each. All three IC tests captured the horses' ability to inhibit certain behaviours as predicted by each test, ensuring content validity. Furthermore, a PCA revealed a multifaceted IC construct with four separate components (inhibition, indecisiveness, learning capacity, flexibility) explaining 77.5% of the observed variation. The horses' coping behaviour and physiological reaction was best explained by six components (nervousness, stress, anticipation, reactivity, calmness, and vigilance), explaining 66.9% of the variation (repeatability of components: $R^2 = 0.092 - 0.514$). Finally, using a linear-mixed model approach, we found that calmness and vigilance were positively related to inhibition. Indecisiveness was positively related to learning capacity and stress showed a cubic relationship with learning capacity. Anticipation was negatively and vigilance positively related to flexibility. Reactivity was not related to any IC component. These results suggest that there is some overlap between IC and coping behaviour in horses. To understand whether IC is indeed an underlying mechanism mediating coping behaviour, future research needs to assess IC differences between horses coming from more diverse backgrounds, including horses that failed to cope, but also to systematically manipulate housing/training condition to see if IC affects behavioural responses.

Paying attention to attention: the effect of attention states on word learning in typical family dogs

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The use of language as the main form of communication is a human-specific ability. However, due to the domestication process, dogs acquired a variety of social skills, including certain language-processing abilities. Despite this, typical family dogs don't show stable object-word knowledge, and few studies have tried to test typical family dogs in an object-label learning paradigm. Dog trainers usually direct the dogs' attention to the referent of a new word, but dogs, similarly to children, may encounter new words by overhearing them from conversations, or could demonstrate spontaneous focus to an object in a word-learning context. We hypothesized that dogs, like children, may also encounter and possibly learn novel object-labels in multiple attention states, and these attention states may influence word learning success. Our aim was to explore the effects of typical family dogs' attention state during word learning and measure their learning success (N=37) in a novel object-label association task. In each condition the experimenter presented three novel objects and trained the dog to associate a novel pseudo-Hungarian label with a target object. The label was introduced based on the attention state of the dog. In the spontaneous attention state condition the experimenter introduced the label of the object the dog spontaneously focused on. In the directed condition the experimenter redirected the dog's initial focus to a different target object and then introduced the label. In the listener condition the label was introduced via a short conversation between the experimenter and the owner. In the testing phase we measured the number of trials, where the dog successfully indicated the trained target object upon hearing the associated label. We found that family dogs performance was different in the attention conditions (Friedman; chi-squared = 7.6491, df = 2, p-value = .022). Post hoc pairwise Nemenyi-Wilcoxon-Wilcox comparisons indicated a nonsignificant difference between the directed condition and the listener condition (p=.07). However, dogs performed significantly below chance level in the directed condition (One-sample Wilcoxon; V = 102.5, p= .002). Possible reasons behind this observation could be that dogs may interpret the experimenter directing their attention to an object as a warning to not interact with the target object, and the initial focus on one object diverting the dogs' attention from the training.

What key features makes the goat's face so unique to its fellow goats?

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Individual visual recognition in animals requires the ability to discriminate conspecifics based on physical appearance. Recent studies have demonstrated that goats can distinguish between familiar and unfamiliar conspecifics using photographic images. However, the specific facial features that confer individuality and facilitate recognition among goats remain poorly understood. In this study, two groups of female goat kids (100 days old) were trained to discriminate between portrait photographs of unfamiliar, age-matched conspecifics in five 4-choice discrimination tasks displayed on an automated learning device. The device was integrated into the home pen of the animals and was accessible 24/7. Each goat was free to choose when to visit the device and how many trials to perform per visit. Drinking water was provided as a reward at the learning device. Goats in Group A ($n = 13$) were presented with unaltered facial images, whereas those in Group B ($n = 12$) were exposed to the same but manipulated images across the five tasks: (1) grayscale faces, (2) faces with eyes obscured, (3) faces with muzzle obscured, (4) faces without ears and horns, and (5) inverted faces. Each task was trained over six consecutive days. Differences in daily learning performance (percentage of correct trials) between groups were analyzed using a linear mixed model (LMM) with GROUP, TASK, and their interaction as fixed effects. To account for serial correlation in repeated measurements, a first-order autoregressive (AR1) covariance structure was applied, assuming equally spaced time intervals. Additionally, we analyzed the log-transformed absolute number of trials required to reach the learning criterion (TtC) using a similar LMM. The GROUP $\times$ TASK interaction significantly influenced daily learning performance ($p < 0.001$). Post-hoc pairwise comparisons revealed that Group A outperformed Group B in Task 1 (grayscale; $p < 0.001$) and Task 5 (inverted faces; $p < 0.01$). The LMM for TtC also showed a significant GROUP $\times$ TASK interaction ($p < 0.01$), with Group B requiring more trials than Group A, particularly in Task 1 (267 vs. 139) and Task 5 (292 vs. 212). These findings suggest that color and holistic facial configuration are critical for individual recognition in goats, whereas features such as the eyes, mouth, nose, ears, and horns appear less salient. Similar reliance on color and global facial cues has been observed in other species, including insects, birds, and primates—highlighting potential convergent evolutionary mechanisms in face perception across taxa.

Can house crickets (*Acheta domesticus*) weigh costs and benefits? Cognitive tests that inform insect sentience

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Insect sentience is not widely accepted. Consequently insects receive little to no protection with regards to their welfare. No single criteria can provide absolute evidence for the capacity to feel, but an ability to respond flexibly to one's environment can help support the argument for insect sentience. We investigated the capacity for motivational trade-off in the house cricket (females). Phase 1 aimed at identifying preferred foods, using an innate preference test with raw chicken meat, cheese and bell pepper (3 paired trials; N=40 per trial throughout); Phase 2 aimed at identifying aversive stimuli, using an aversion test with three light intensities: 0, 200 and 7000LUX (3 paired trials); Phase 3 aimed at investigating motivational trade-offs using a preferred versus less preferred food presented under three light intensities (6 paired trials). In Phase 1, crickets preferred chicken over cheese ($P=0.020$) and pepper ($P<0.001$), but not cheese over pepper ($P=0.340$). We hence selected chicken and pepper as the preferred and less preferred foods for Phase 3. In Phase 2, crickets showed more avoidance of light ($P<0.001$) and medium ($P<0.001$) conditions compared with dark conditions, but no higher avoidance of light over medium conditions ($P=0.454$). In Phase 3, more crickets showed a willingness to enter lighter conditions if these were paired with the chicken. This very first exploration points to some level of behavioural flexibility in the house cricket but more work is needed to confirm this. Following this we developed a judgment bias paradigm. We trained the crickets to associate one odour (vanilla or peppermint) with a water reward and the other to no reward, then presented them with an ambiguous cue of both odours mixed together. Three treatment groups received three experiences prior to entering the testing arena to putatively induce varying emotions: an unexpected cheese reward, an aversive shaking, or nothing. All crickets presented the cheese fed from it. Results showed that the shaken crickets took longer to approach the ambiguous cue ($P=0.040$) but did not spend less time on it ($P=0.944$) than the other two treatments. These results may suggest that the shaken crickets were disoriented or stressed, rather than pessimistic. Further work will be needed to develop a valid judgment bias test for crickets. Research on how insects evaluate and judge different stimuli can shed light on the possibility for insect sentience and inform us about their possible welfare needs.

Housing and management of backyard ducks in the US

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Despite the popularity of backyard poultry keeping, little is known about the housing and management of backyard ducks in the US. We conducted a US-wide survey of backyard duck keepers with the goal of benchmarking information about flock demographics, current backyard housing and management practices, and owners' perceptions of key management challenges. Following UC Davis IRB review, the online questionnaire was distributed using snowball sampling through advertisements shared via social media, and duck hatchery list serves and websites. A total of 357 anonymous respondents representing 46 of 50 US states met the inclusion criteria: adults keeping flocks of up to 100 ducks in the US. Each respondent provided information about the single flock they interacted with most recently. Flocks were typically comprised of 1-5 (34.7%), 6-10 (30.8%), or 11-20 (21.6%) ducks. Respondents reported sourcing all (45.1%) or some (28.3%) of their ducks from commercial hatcheries. Most flocks were housed in a rural (65.7%) or suburban (30.4%) area. Most had seasonal or year-round access to an indoor space (88.2%) and except for one flock, all had access to an outdoor enclosure. Bowls or troughs were the most popular types of drinkers provided indoors (56% flocks) and/or outdoors (72.5%). Nipple line drinkers, which are common in US commercial duck production, were seldom used. Most flocks had access to outdoor bathing water for wetting the head and body (98.9%) and/or swimming water (95.8%). Most participants had access to a general practice veterinarian (40.9%) or a veterinarian specializing in birds (18.2%). However, many indicated they did not have access to a veterinarian who could examine or treat their ducks (40.0%). Still, most respondents rated themselves as somewhat or extremely likely to contact a veterinarian if they had a sick (63.7%) or injured (56.8%) duck. Most (58.3%) were somewhat or extremely unlikely to contact a veterinarian for an annual health check. Respondents ranked predation as a moderate (27.6%) or major (53.2%) concern. Other key issues associated with raising ducks included leg problems/lameness (moderate: 28.4%; major: 11.8%), diseases (moderate: 20.1%; major: 5.4%) and aggressive behaviors (moderate: 17.2%; major: 3.9%). Overall, the survey results yield new information about resources provided to ducks in backyard settings, and key challenges faced by backyard duck keepers. The information will be used to develop research and informational tools targeting backyard duck keeper needs.

Odourised straw prolongs straw-engagement, and increases play and rubbing behaviour in growing pigs

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Providing pigs with enough suitable enrichment material, such as straw, is challenging due to practical and economical constraints. Pigs are motivated to sniff and explore odours. Therefore, a viable solution could be to provide odourised straw, enhancing pigs' engagement without interfering with management. As part of a larger project on olfactory enrichment in pig production, this study tested whether providing pigs with odourised straw increased their straw engagement, play, rubbing and rolling behaviour. The study was conducted at a Swedish commercial farm and enrolled 1600 pigs over a 12-month period. Pigs were housed in pens of approx. ten littermates. Eighty pens served as controls with no treatment (straw provided on the floor as usual), while the remaining 80 pens were evenly assigned to one of four treatments: Odourised straw provided in a rack with 1) odour changing either every week or 2) every weekday (5x/week), or odourless treated straw 3) in a rack, or 4) on the floor (empty rack). Odourised treatments consisted of essential oils (lavender, aniseed, ginger, thyme, and pine), and the odourless treatment was mineral oil. Behavioural observations were conducted using video footage from weeks 5, 7, and 9 of the growing period. A sub-sample of six groups per treatment were chosen in a balanced manner. Straw engagement duration was measured from the time of straw provision until the behaviour ceased. Recordings of exploration (in contact with straw in rack or on the floor, or in contact with other inventory), play (locomotor, social, straw-related), and rubbing and rolling behaviours were sampled on weekdays from 10:00-11:00. The results show that adding odours significantly prolonged engagement time with both odour treatments having significantly longer engagement time (log-normal generalized linear mixed model: $P < 0.001$). Exploratory behaviour was not significantly affected by the treatments, hence all pigs engaged equally with straw in the rack, or with other inventory. However, there was a tendency for pigs having odourised straw to interact more with straw on the floor (Dunn Kruskal-Wallis: $P = 0.066$). Odour treatments elicited more locomotor play (all P -values < 0.001), straw-directed play (all P -values < 0.001), social play (odour changing daily $P < 0.001$), and rubbing (odour changing weekly $P = 0.002$; all non-parametric Kruskal-Wallis rank sum or Dunn tests). Rolling behaviour was not affected by treatments. Collectively, these findings suggest that providing odourised straw has potential benefits for pig welfare, by increasing engagement time and play behaviour, making it a valuable consideration for commercial pig production.

Effective environmental enrichment for group-housed calves in pastoral dairy systems

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Environments lacking social and physical complexity cause physical suffering, negative affective states, and impair development. There are no studies on the effect of environmental enrichment on the welfare of calves housed in commercially relevant group sizes in seasonal calving pasture-based systems. Over 3 replicates, this study compared indicators of welfare of 120 group housed calves ($n=40/\text{rep}$) in response to one of four enrichment treatments: (1) a hanging blue inflatable ball, (2) a similarly sized and coloured hanging ball dispensing hay, (3) a white hanging sucking star and (4) one of each of enrichment offered simultaneously. The ball is commonly provided as enrichment on pasture-based farms and acted as a control in this study, the hay ball and the sucking star were chosen for their biological relevance, and the combination treatment was included to assess environmental diversity. Calves were mixed into pens ($8.8 \times 4 \text{ m}$) of 10 at 5.9 ± 3.4 days of age, balancing for birth weight ($34 \pm 4.6 \text{ kg}$) and sex (66% female). Visual and tactile contact between pens was prevented. Behaviour was continuously recorded for one hour following each of two daily feeds day 1 and in weeks 3 and 6 (only 1 feed in week 6). Calves were weighed upon entry and at week 6, after which each calf was subjected to a 5-minute novel object test. Data were analysed with linear and generalised linear mixed models, with the calf nested within the pen as the experimental unit. Time spent interacting with the enrichment declined by ~80% over weeks for calves with balls and sucking stars, but did not decline for calves with hay or combination enrichments (treatment $\times$ week; $F_{3,246}=2.65$, $P = 0.049$). Cross-sucking increased from weeks 0-3 for all calves (17%, 30% and 52% increase for ball, hay and combination treatments), except calves in the star treatment. Cross-suckling then declined from weeks 3-6 for calves in the hay (123% reduction) and star (198% reduction) treatments (treatment $\times$ week; $F_{3,246}=2.69$, $P = 0.015$). There was no effect of treatment on play, weight gain, or response in the novel object test. Hay balls or a combination of enrichments were able to sustain the interest of group-housed calves suggesting they provided pleasure, while sucking stars reduced cross-suckling suggesting they helped meet a basic need. Hanging balls were not an effective enrichment compared to the other treatments. None of the enrichment items offered improved biological functioning (i.e., growth) or development (neophobia).

Positive behavioral and welfare effects of structural enrichment on captive European seabass

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Providing environmental enrichment (EE) is a well-established strategy to promote animal welfare by offering novel stimuli that support behavioral, physiological, and psychological needs. In aquatic species, structural EE has been shown to reduce stress, enhance cognitive abilities, and mitigate abnormal behaviors. This study explores the behavioural effects of structural EE on juvenile seabass (*Dicentrarchus labrax*) by introducing vertical ropes into their living environment in marine sea-cages for 3.5 months. Emotional reactivity tests were applied after this rearing period to assess the impact of EE on seabass behavior, assessing behavioural responses such as new environment habituation and exploratory behavior with top-view cameras. Oxidative stress markers were also analyzed in muscle and telencephalon samples as complementary analyses of fish stress response. Results demonstrated that fish reared under enrichment exhibited enhanced exploratory behavior, covering greater distances and using a larger area in the emotional reactivity test, suggesting improved habituation to novel environments. Additionally, this behavioral pattern was associated with the activation of muscle enzymatic mechanisms that prevented oxidative damage, reflecting greater physiological resilience under challenging conditions. These findings highlight the role of EE in fostering positive welfare states in fish by promoting natural behaviors and reducing stress responses. The implementation of structural EE represents a promising, non-invasive approach to improving fish welfare in captivity or controlled environments, warranting further investigation and potential applications.

Biopolymer-Based Nesting Material Enhances Nest-Building Behavior and Welfare in Farrowing Sows

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Nest-building behavior is a fundamental trait observed in domesticated, feral, and wild sows, driven by hormonal triggers to provide shelter, comfort, and thermoregulation for neonatal piglets. This behavior includes foraging, pawing, and rooting. However, in commercial settings, farrowing sows are typically housed in crates with limited opportunities to express these natural behaviors due to space constraints and a lack of suitable nesting material. Providing nest-building material can improve sow welfare and offspring performance, but conventional natural substrates pose challenges such as impaired drainage and biosecurity risks. To address this, we developed a biopolymer-based nesting material designed to mimic natural fibers while being highly soluble and biodegradable, mitigating these challenges. This study aimed to evaluate the effects of this novel material on sow behavior during farrowing. Eighteen first-parity sows (F1 Landrace × Yorkshire) were studied. Farrowing was induced using a split dose (87.5 µg at 08:00 and 14:00) of cloprostenol sodium 24 hours before the expected parturition. One hour postinduction, gilts were assigned to one of two groups based on body weight: those provided with 3 kg of the biopolymer-based nesting material (n=9) and a control group without material (n=9). Behavioral observations were conducted in three time windows: 18–12 hours, 12–6 hours, and 6 hours–delivery. We recorded postural positions (standing, lateral lying, ventral lying, and sitting), postural changes, redirected nest-building, nest-building behavior with the provided material, and nest-building interactions with the crate and floor (NBCF). Statistical analyses were performed using R software, with treatment and time effects analyzed via mixed models. A significant treatment × time interaction was observed for sitting (p=0.019) and nest-building behavior (p<0.001). Additionally, control sows exhibited higher levels of redirected nest-building (p<0.001), and NBCF (p=0.016) for all time windows, while treatment sows engaged more with material (p<0.001) and performed more nest-building behavior (p<0.001) for all time windows. Regarding postural changes, sows provided with the biopolymer-based material spent less time sitting (p=0.02) for all time windows and showed lower postural changes (p=0.049) for the windows 12h-6h and 0h-6h. These findings suggest that the biopolymer-based nesting material successfully promotes natural nesting behaviors, reducing frustration and enhancing sow welfare during farrowing. By allowing sows to express their natural behaviors, the biopolymer-based material may help decrease stress, improve maternal welfare, and may influence sows and their piglets' performance in commercial environments.

Standing in the way of control: physiological predictors of performance in horses in a stop-signal paradigm

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Equestrian activities rely on successful use of the horse's innate behavioural responses, such as the flight instinct that is required for success in the sport of horse racing. It is also necessary, for safe and successful equestrian activities, that the horse learns to inhibit such behavioural responses in specific circumstances. Our recent work identified that physiological arousal, both during training and in the home environment, predicts learning performance in horses during a cognitive flexibility task. In the current study, physiological responses to a Stop- Signal task which tests inhibitory control were investigated and modelled against performance. Twenty horses were conditioned to give a touch response when presented with a target, using positive reinforcement. A light cue was introduced as a Stop signal; in phase 1, touches of the target were not rewarded when the light was on. In phase 2, touches of the target during Stop contingencies resulted in a ten-second time out (negative punishment). The following physiological measures were taken at baseline and during all training sessions. Spontaneous eye blink rate (SEBR) and blink rate variability were used as proxy measures of striatal dopamine activity. Heart rate variability (HRV) was taken as a measure of arousal. Infrared thermography of eye temperature was used as a measure of arousal and valence of arousal. Performance was calculated for each subject based on percentage of correct Stop responses, scored by the trainer (LE) and validated by a second hypothesis-blind rater, with excellent agreement (weighted Cohen's kappa = 0.97). A negative binomial generalised linear model revealed that a decreased right eye temperature ($p < 0.001$) and decreased HRV ($p = 0.02$) were predictors of performance on the Stop-Signal task. It is proposed that an increase in arousal during learning was adaptive for performing well in the Stop-Signal, a relatively difficult task. However, horses that did not become too aroused by the task (indicated by a lower right eye temperature), were able to maintain good performance. Further, consistent with the valence hypothesis, this may suggest horses that did not experience negative valence performed well. Horses with higher baseline SEBR performed significantly better on the task ($p < 0.001$), consistent with an association between tonic striatal dopamine activity and Stop-Signal performance. Higher baseline HRV predicted better performance ($p < 0.001$), consistent with the findings of our recent work. This paper contributes further evidence that arousal during training and day-to-day has critical importance for horse training and welfare.

Dogs experiencing chronic pain from osteoarthritis may experience inhibited Improvement in cognitive test paradigms over time despite pain relief compared to healthy dogs

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Osteoarthritis (OA) is a joint disease that can be associated with persistent pain (OA-pain) and is prevalent across species. Humans with OA often suffer cognitive deficits and reduced affect due to persistent pain. OA-pain is very prevalent in pet dogs, however it is not yet known whether this population suffers comparable diminished cognition and affect. The aim of this longitudinal study was to investigate cognition and affect in healthy dogs (n=15) and dogs with OA-pain (n=15). Validated pain questionnaires, and orthopedic examinations, were used to determine OA-pain status of recruited dogs. Both OA-pain and healthy dogs participated in cognitive and affective tasks, including spatial holeboard (consisted of five phases) and judgement bias, across three time points: baseline, Day 42, and Day 70. Dogs with OA-pain received three monthly injections of bedinvetmab (FDA-approved for the control of OA-associated pain) at baseline, Day 28, and Day 56. Mixed effects models were used for analysis (R package GlmmTMB). We hypothesized that dogs with OA-pain would perform worse in cognitive testing and demonstrate pessimism in affective testing at baseline compared to healthy dogs, but improve significantly over time due to pain reduction. In cognitive testing, we found a significant group*time point interaction for reference memory (training phase), and similar statistical trends in other (non-training) phases ($p < 0.10$), demonstrating that OA-pain dogs did not improve across time points as much as healthy dogs for reference memory. For both reference and working memory, we found a main effect of time across most phases (improvement), but no main effects of group on these outcomes at any phase. In testing affect, dogs in both groups developed longer latencies to ambiguous stimuli in the judgement bias task over time indicating learning of unrewarded stimuli. There was an interaction effect for latency to approach the ambiguous middle stimulus between groups at Day 42 such that OA-pain dogs had longer latencies compared to baseline than healthy dogs ($\beta = 4.76$, $p = 0.025$). Overall, dogs with OA-pain did not show any evidence of cognitive dysfunction nor negative affect compared to healthy dogs at baseline. However, OA-pain dogs did not improve in the spatial holeboard task across time as much as healthy dogs despite reduction in pain. Perplexingly, OA dogs showed more pessimism at later time points, which may be attributed to remembering the judgement bias paradigm across visits more poignantly than healthy counterparts due to effort and memory bias.

Chickens may perceive humans as social buffers and attend to human-given cues

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Positive perception of humans, extensively documented in domestic mammals, remains comparatively underexplored in domestic birds like chickens, with existing studies largely focusing on fear reduction. This research evaluated whether chickens perceive humans positively, accounting for interaction types and breed differences. Two breeds (Lohmann LSL Classic, Brown Classic) experienced physical contact (PC), visual-only contact (VC), or minimal human contact (MC) over 13 days (Days 35–51; PC and VC: 1–2 min/day). Birds were assessed using three behavioral tests. During the separation–reunion test (Days 52–53), hens underwent two 3-min separations (experimenter absent) and reunions (experimenter present) in an open-field setting. Subsequently, the experimenter attempted up to six standardized capture attempts to catch the birds (the capture test). Lastly, the local enhancement test (Days 120–137) assessed hens' ability to use human gestures to locate food. In the separation–reunion test, a significant treatment $\times$ phase interaction (LMM, $F_{2,75.44} = 8.54$, $p < 0.001$) revealed comparable calm behaviors (foraging, non-vigilance) across groups during separations (all $p > 0.05$); however, during reunions, PC birds showed greater calmness than VC (46% vs 20%, $p = 0.002$) and MC birds (46% vs 19%, $p < 0.001$), with no difference between VC and MC ($p = 0.89$). A breed $\times$ phase interaction (LMM, $F_{1,71.96} = 8.74$, $p < 0.001$) indicated Brown hens exhibited less calmness during separations compared to reunions (14% vs 32%, $p = 0.005$), whereas White hens showed no such difference (32% vs 30%, $p = 0.23$). Brown hens also spent notably more time near the experimenter (77.5 s vs 31.3 s, $F_{1,54} = 8.03$, $p = 0.006$). In the capture test, treatment significantly influenced outcomes ($\chi^2 = 6.24$, $p = 0.04$); PC birds were easier to capture than MC birds ($p = 0.03$), while VC birds demonstrated intermediate ease (MC–VC: $p = 0.68$; VC–PC: $p = 0.23$). Additionally, Brown birds were easier to capture than White birds (breed: $\chi^2 = 60.68$, $p < 0.001$). In the local enhancement test, two PC hens (one white, one brown) successfully used human cues (binomial test, white: 15/20 trials, $p = 0.021$; brown: 12/14 trials, $p = 0.006$). Overall, Brown PC hens performed significantly above chance (binomial test, 45/72, $p = 0.022$). These findings suggest chickens experiencing positive human interactions perceive humans as stress buffers and effectively associate human cues with rewards. This foundational knowledge can inform welfare-enhancing poultry practices by adapting human-animal interactions to breed-specific characteristics.

Do welfare-enhancing conditions and measures on stress relate to cognitive training performance in weaned piglets?

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We examined relationships between welfare and performance in operant discrimination training in piglets. We hypothesized that animals in conditions conducive to good welfare (physical enrichment, positive human interactions) and/or with measures showing less chronic stress (salivary cortisol/DHEA-S ratio) and group aggression (body lesions) would perform better. Ninety-four weaned piglets (47 castrated males, 47 females) were housed in enriched (E) or non-enriched pens (NE) and regularly received either positive (HAR+) or negative human interactions (HAR-) ($n_{\text{HAR+}/\text{E}}=24$, $n_{\text{HAR+}/\text{NE}}=24$, $n_{\text{HAR-}/\text{E}}=23$, $n_{\text{HAR-}/\text{NE}}=23$). Piglets were trained on an operant discrimination task by an experimenter (MANUAL, $n=47$) or by an automated apparatus in their home pen (AUTOMATED, $n=47$). Each training method had a habituation phase followed by a learning phase. Saliva was sampled at 35 and 54 days of age. Body lesions were counted weekly between 22 and 56 days of age. Binary outcomes and latencies were analyzed with Cox proportional hazard regression (COX), and numerical outcomes with general linear models, on R(v.4.4.0) controlling for training method and sex. In MANUAL training, piglets with higher cortisol and lower DHEA-S concentrations (higher ratio) at 54d were more likely to reach the learning phase (COX, cortisol: hazard ratio=61, $P=0.03$; DHEA-S: hazard ratio=0.001, $P=0.001$). Piglets with more body lesions mid-study tended to most likely reach this phase (COX, hazard ratio=5.9, $P=0.07$) but later ($F_{1,16}=3.9$, $P=0.067$). NE/HAR+ and NE/HAR- piglets tended to reach the learning phase earlier than other groups (COX, hazard ratio=0.04, $P=0.052$, mean $\pm$ sd: NE/HAR+= 6.8 ± 0.8 , NE/HAR-= 7.5 ± 0.7 , E/HAR+= 9.8 ± 0.6 , E/HAR-= 9.9 ± 0.5 training days). In AUTOMATED training, NE piglets voluntarily initiated ($F_{1,3,2}=23.6$, $P=0.015$, NE= 1166 ± 666 , E= 583 ± 274) and tended to complete more trials ($F_{1,3}=7.3$, $P=0.075$, NE= 374 ± 273 , E= 135 ± 152) and to give more total correct responses ($F_{1,3}=6.8$, $P=0.082$, NE= 186 ± 136 , E= 69 ± 80). Piglets with higher cortisol concentration at 54d also completed more trials ($F_{1,17}=6.6$, $P=0.020$) and gave a higher total number of correct answers ($F_{1,16}=8.2$, $P=0.011$). Lack of pen enrichment promoted participation thus learning in piglets trained by an experimenter. The automated apparatus appeared to be an enrichment as it was used more by piglets in non-enriched pens. Good performance in training might have been related to high stress level in MANUAL piglets. Associations of learning and responding rates with cortisol concentrations may reflect high levels of general activity for AUTOMATED piglets.

Aquaculture-related soundscapes increase startle response, latency to feed, and aggression rate but not the feed intake or physiology of *Clarias gariepinus*

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Sound pollution is a global concern with potential impacts on animal welfare, health, and production rates, all of which are critical for sustainability. Interestingly, aquaculture-related soundscapes remain an overlooked factor that could influence fish behaviour, health and the welfare of farmed fish species. This study assessed the impact of three aquaculture-related soundscapes on *Clarias gariepinus* (African catfish) under laboratory conditions over an 8-week culture period. A total of 210 African catfish (12.86 ± 0.47 g) juveniles were exposed to three recorded sounds typical of aquaculture environments—Recirculatory Aquaculture System (105.76 dB re 1 μ Pa), Aerator (112.35 dB re 1 μ Pa), and Generator (115.56 dB re 1 μ Pa)—under both continuous and intermittent treatments, each in triplicate. A control group (23.85 dB) was maintained under ambient conditions. Behavioural responses, including startle response, latency to feed, cohesion, aggression, opercular rate, and feed intake were observed twice per week using focal sampling techniques for 40 minutes per day. In addition, growth performance (mean weight gain and specific growth rate), physiological responses (cortisol and glucose levels) and oxidative (Superoxide dismutase and catalase) stress markers were monitored. Data obtained were analysed using the generalised linear models in the R statistical package (v.4.2.1). The results revealed a significant increase (all $p < 0.03$) in startle response, latency to feed, cohesion, and aggression rates under both continuous and intermittent treatments compared to the control. However, no significant ($p > 0.05$) effects were observed on feed intake and mean weight gain of African catfish exposed to continuous and intermittent sound playback. Moreover, physiological parameters, including cortisol and glucose levels, remained stable ($p > 0.05$) across treatments, suggesting an absence of acute stress responses. However, oxidative stress markers differed ($p < 0.05$) between treatments. In conclusion, these findings suggest that aquaculture-related soundscapes modulate behavioural patterns in *C. gariepinus* but do not impair feeding efficiency or physiological homeostasis. However, prolonged exposure, particularly under continuous sound conditions, could have cumulative effects on stress resilience, welfare, and growth performance of African catfish. This study highlights the need for additional research into the long-term welfare implications of aquaculture-related noise and its potential effects on fish behaviour, social dynamics, and overall well-being to improve fish welfare and productivity.

Early life matters: intensification of smolt production in Recirculating Aquaculture Systems (RAS) fundamentally compromises salmon welfare at sea

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The welfare of farmed Atlantic salmon during marine grow-out phase has received considerable attention, yet the long-term implications of juvenile rearing conditions remain poorly understood. Commercial operations now predominantly raise smolts in intensive land-based Recirculating Aquaculture Systems (RAS) to enable year-round production, increased productivity, and biosecurity. We conducted a narrative review synthesizing evidence from peer-reviewed literature in fish physiology, aquaculture, veterinary science, and welfare research to examine how intensification of the hatchery phase impacts salmon welfare across their life cycle. Our findings indicate that economic constraints of RAS create an inherent conflict between production requirements and biological needs. Minimum stocking densities required for economic viability prevent natural behaviors and create multiple water quality challenges. High densities combined with limited water exchange lead to rapid accumulation of metabolic wastes, CO₂, and suspended solids, increasing the likelihood of toxicity and pathogen risks. Chronic stress from suboptimal environmental conditions is exacerbated by accelerated growth rates—achieved through genetic selection, high temperatures, continuous lighting, continuous swimming and intensive feeding practices—resulting in systemic physiological impairments such as compromised cardiac function, skeletal deformities, osmoregulatory and endocrine dysfunction, immune suppression, compromised skin and gill health, and a suite of production-related diseases. Moreover, the artificial stability of RAS does not supply the environmental variation necessary for developing the physiological resilience needed for successful adaptation to life at sea. These effects are particularly detrimental during smoltification, where fish already burdened by developmental deficits face additional challenges from protocols designed to maximize throughput over the proper environmental cues necessary for complete physiological transformation. The resulting “pseudosmolts”, while technically seawater-tolerant, lack the physiological robustness needed for thriving in marine environments. Production of larger smolts has also proven counterproductive, with higher incidences of diseases like hemorrhagic smolt syndrome and nephrocalcinosis. Without addressing these fundamental biological conflicts, physiologically compromised fish that are ill-equipped for subsequent life stages are produced, ultimately undermining both welfare and production efficiency. These failures mirror a defining global challenge in animal agriculture: prioritizing short-term efficiency at the expense of biological limits. Yet this recognition creates an opportunity: by treating biological requirements as non-negotiable design parameters—incorporating essential environmental cues, dark periods, and allowing periods of slower growth for proper development—fish farming can simultaneously enhance welfare and reduce production risks.

Play behaviour of dairy calves in different housing systems

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Play may be considered a context-specific positive animal welfare indicator. The aim of our study was to describe play in 3 different housing systems. Our study included 4 batches with 3 treatment groups of 6 calves. Calves were raised either following minimal Norwegian standards (Minimal, 2.4m² individual pens, 7L milk/d), with peer contact (Peer, 23.1m², ad libitum milk 4x1h/d), or with cow-calf contact (CowContact; 133.5m² freestall pen, whole-day contact with their dams, milk from suckling). We predicted that calves raised with peers or their dams would perform higher frequencies of play elements, with greater behavioural diversity, than calves raised alone. From 12-h focal animal video recordings (0700-1900 h), we scored the total frequencies of bucking, kicking, running, jumping, head butting, and head tossing performed by 2 randomly selected 2-week-old calves/group (N = 8 calves/treatment) using Behavioural Research Interactive Software, and calculated the Shannon Diversity Index for play behaviour diversity. Data were analysed in RStudio using generalised linear mixed models with pairwise comparisons. While the estimated mean frequencies/12 h (with 95% Confidence Intervals) for bucking (2.1, 1.5-3.1) and kicking (8.0, 6.0-10.8) did not differ between treatments ($p > 0.05$), Peer (30.4, 20.5-44.9, $z = -4.83$, $p < 0.001$) and CowContact calves (16.9, 10.3-27.7, $z = -3.79$, $p < 0.001$) performed higher frequencies of running than Minimal calves (1.8, 0.6-5.5) as we predicted. Minimal calves appeared to substitute with higher frequencies of jumping (53.7, 39.2-73.6) than CowContact (17.4, 10.5-28.6, $z = 3.83$, $p < 0.001$) with Peer intermediate (32.4, 21.7-48.3), perhaps because of their small pen size. Peer calves showed higher frequencies of head butting and head tossing than Minimal ($z = -8.23$, $p < 0.001$; $z = -4.0$, $p < 0.001$) and CowContact ($z = 7.00$, $p < 0.001$; $z = 3.45$, $p = 0.002$, Minimal: 2.7, 1.5-5.1, Peer: 20.2, 17.2-23.7, CowContact: 4.5, 3.1-6.7; Minimal: 5.2, 3.1-8.9, Peer: 17.0, 13.7-21.0, CowContact: 8.5, 6.1-11.8) Finally, Peer ($t = -15.0$, $p < 0.001$) and CowContact ($t = -12.30$, $p < 0.001$) calves had greater play diversity than Minimal calves (Minimal: 0.9, 0.8-0.9, Peer: 1.5, 1.5-1.6, CowContact: 1.4, 1.4-1.6) as predicted. The results show that play elements varied in different ways in the three housing systems, likely influenced by differences in social opportunities, space for rapid locomotion, and milk availability. Play may have been difficult for the Minimal calves to perform due to environmental and social constraints. While Peer and CowContact calves differed in some play elements, they both showed high play diversity, though their performance of other positive welfare measures may have differed.

Do laying hens show a rebound effect after the closure of a covered veranda?

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Access to areas outside the barn like a covered veranda (CV) is supposedly an enrichment that enhances the wellbeing of laying hens. However, little is known about the effects on the hens when the access to a CV is denied temporarily, e.g. during cold weather. We wanted to know if laying hens of different genetic backgrounds housed in a multitiered aviary barn show a rebound effect after the access to the CV is denied for 3 days. One brown and 3 white genetic lines were tested in 20 pens with 225 hens each, totaling 5 pens per line. The presence in each zone (tier 1 feed and water, tier 2 nestboxes with balcony, tier 3 perches, feed and water), the litter, and the CV was tracked for all birds by a Radio Frequency Identification System. The durations in the zones during 3 timepoints (3 days before/during/after the closure) were compared in a mixed general model. Individual hen nested in pen and genetic line and pen were the random subject factors; genetic line and timepoint served as fixed factors ($\sqrt{}$ transformed, P-values were Tukey adjusted). Daily duration in the CV differed before and after closure ($F_{1,16} = 5.8$, $P = 0.03$), genetic line ($F_{3,16} = 8.0$, $P = 0.002$), and their interaction ($F_{3,16} = 36.5$, $P < 0.0001$). The brown line increased the time in CV after closure (estimate: 0.36 ± 0.006 , $t_{16} = 7.2$, $P < 0.001$), 2 of the white lines decreased their time in CV after closure (estimates: $-0.25/-0.09 \pm 0.005$, $t_{16} = -7.1/-3.7$, $P < 0.001/0.03$) and 1 white line that had used the CV the least (43.6 min. ± 0.04) spent the same time in the CV before and after closure. The one white line that used the CV the longest before closure (LSME: 64.0 min. ± 0.04) had a negative rebound effect. During closure, all lines spent more time on the litter inside the barn than before the closure ($F_{2,32} = 840$, $P < 0.001$) though not uniformly (interaction timepoint*hybrid: $F_{6,32} = 10.5$, $P < 0.0001$). We conclude that closure of the CV created a rebound effect in the brown layer line, likely indicating a stronger internal motivation to use this area. Apparently, hens used the litter area inside the barn as a substitute for the closed CV. Our data provide evidence that different layer genetics use and experience outside areas and their closure differently.

Assessment of inhibitory control in horses - development of a test battery

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Inhibitory control (IC) is a key cognitive ability that enables individuals to suppress impulsive responses in favor of responses that are more appropriate in a given situation, thus enabling goal-directed behaviors. While IC has been extensively studied in humans and some non-human species, its role in equine cognition and behavior remains unexplored. Horses are an interesting study species to further explore IC and its underlying structure since horses, as a prey species, are traditionally required to inhibit behaviours that are disadvantageous in training and husbandry conditions. However, in order to find out whether individual IC abilities interfere with training success or coping capacity, we need to ensure that we can assess IC in horses. Considering the potentially multifaceted structure of IC, we assessed IC in horses using a test battery comprising three established paradigms: the A-not-B test, which measures response inhibition when horses have to adjust a previously learned route to a reward, the delay of gratification (DG) test, in which horses have to wait for a better food reward to measure self-control, and the reversal learning (RL) test, which measures cognitive inhibition when horses have to inhibit the selection of a previously rewarded stimulus. Thirty-one female Warmblood and Thoroughbred horses housed in individual stables were tested in a randomised order. In all three IC tests, the horses exhibited behaviours in line with the predicted inhibition response (i.e. A-not-B test: lower accuracy and higher latency in B-phase; DG test: less success with increasing delays; RL test: less success in reversal phase), thus, ensuring content validity. To find out whether our test battery captures the same underlying capacity, we ran a PCA based on three variables derived from each IC test (A-not-B: ratio latency to cross gap in A/B-phase, accuracy in A/B-phase, trials to reach A-criterion; DG: maximally tolerated delay, mean distraction behaviors, trials to reach discrimination criterion; RL: number of correct trials in 1st reversal session, ratio sessions acquisition and reversal, latency correct choices). A four component solution emerged (inhibition, indecisiveness, learning capacity, flexibility) explaining 77.5% of the observed variation. Considering that the main variables conventionally used per test (accuracy for A-not-B; maximum delay for DG, number of correct trials in 1st reversal session for RL) did not load on the same component, we conclude that IC is a multifaceted construct in horses, that cannot be reliably assessed based on a single test.

Anticipatory behavior of post-weaned sows prior to feed delivery

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Little attention has been paid to the impact of housing condition on the psychological health of post-weaned sows despite being an integral component of animal welfare. Anticipatory behavior (AB) is an increase in activity that occurs in the appetitive phase prior to receiving a known reward. This indicator of reward appraisal is thought to be influenced by an animal's underlying emotional state and may provide insight into their affective state. Thus, we investigated how two housing treatments impacted AB in response to the signaling of feed delivery. Sows (n=24) were randomly assigned to housing in either an individual pen (4.09m²) or standard gestation stall (1.30m²) immediately post-weaning for seven days. Twice daily prior to the delivery of scheduled ~8 AM and ~1 PM feedings, pen-housed sows were moved into stalls adjacent to the stall-housed sows to control the environment where AB was observed. Behavior was video recorded and measured continuously for 15 minutes prior to feed delivery using an ethogram assessing posture, activity, and head placement. AB was defined as the total number of behavioral transitions during the 15-minute anticipation period. The impact of housing on AB was investigated using a linear mixed model with the number of behavioral transitions as the dependent variable, housing treatment, experimental day, and time of day as fixed effects, and sow ID as a random effect. Contrary to our expectations, there was no impact of housing on AB, however, we found a significant effect of time of day ($p < 0.001$). This observation supports the relevance of our AB measure as the sows appear to anticipate feeding more after a longer wait between feedings (~5 vs ~19 h). To eliminate potential confounding effects of feeding time, analyses were repeated with AM measures only and yielded a significant effect of individual animal ($p < 0.001$). AB varied by over 5-fold across the study animals ranging from 7.2 to 35.7 behavioral transitions/min while quartile coefficient of dispersion was consistently between 0.09 and 0.24 except for 3 animals (QCD = 0.29, 0.36, 0.51). Moving penned-sows to a crate prior to observation may have confounded AB responses and negated observation of any potential housing effects. Further investigation will be needed to elucidate the impacts of individual animal differences in anticipation prior to feed delivery. However, these results lay vital groundwork for the implementation of reward appraisal-based methods such as AB for assessing post-weaned sow welfare.

Integrating behavioral health into veterinary care: a national survey in Belgian companion animals

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Health has been defined as a state of physical, mental, and social well-being, emphasizing the need to consider both physical and behavioural health in companion animals. Behavioural issues in pets can significantly impact both their welfare and that of their caregivers, creating a psychosocial burden as caregivers manage the challenges of caring for an animal with compromised health. This national survey explored the prevalence of physical and behavioural issues in dogs and cats in Belgian households, focusing on their effect on caregiver well-being. An online survey was developed to collect data on animal health, types of physical and behavioural issues, perceived caregiving effort, and sources of advice. A total of 2769 valid responses were analysed (976 dog caregivers; 1793 cat caregivers). Health problems were reported in 41% of dog households and 32% of cat households. Physical issues were more common than behavioural ones: 29% vs. 19% in dogs, and 24% vs. 14% in cats. In dogs, the most prevalent physical conditions included mobility, dermatological, and gastrointestinal issues, while in cats, gastrointestinal, dermatological, and urinary problems were most prevalent. Behavioural problems primarily involved anxiety and intra-species aggression in both species. While these rates were lower than those reported in literature, the caregiver burden was substantial. Caregivers of pets with health issues, especially behavioural problems, reported significantly higher perceived care efforts (all p 's < 0.05). Additionally, the survey revealed that caregivers frequently sought advice from first-line veterinarians, highlighting the critical role of veterinary professionals in addressing both physical and behavioural health concerns. This study advocates for an integrated approach to veterinary care and emphasizes the need for veterinarians to be knowledgeable in companion animal behaviour. Ultimately, we argue that interdisciplinary collaboration, caregiver education, and a strong understanding of animal behaviour are essential for improving the welfare of both animals and their caregivers.

Is the animal in pain? A pilot-study on the communication between animal owners and veterinarians

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Pain assessment can be challenging and a good communication between pet owners and veterinarians is important to provide the best possible care for the animal. It enables veterinarians to get an anamnesis that, combined with the clinical examination, will form the base for the choice of treatment. A thorough anamnesis is therefore dependent on the owners' ability to detect pain by observing changes in their pets' behaviour, as well as their ability to communicate these changes in a way that the veterinarian will understand, and vice versa. The purpose of this interview study was to investigate how owners and veterinarians describe pain in cats and dogs, as well as possible changes in the description after the veterinary examination. Interviews of five owners of patients with pain were performed at a small animal hospital in Sweden. Owners were asked to describe the painful condition, before and after a veterinary examination. Further, the veterinarians who conducted the examinations were asked to answer the same questions. Answers from the interviews were categorized in the categories "behaviour", "physiology", "expressions of feelings", "physical expressions" and "vocalization". The data is presented as descriptive statistics. The results showed some differences in how owners and veterinarians describe pain in the included one cat and four dogs. The veterinarians tended to use word and phrases within the category "physical expressions" and "physiology", while owners preferred using terms within the categories "behaviour" and "vocalization". Within the category "behaviour", more veterinarians used words like "stressed", "nervous", "introvert", or "subdued", when the owner used "stopped eating or drinking", "not itself". The study could also show that owners changed their description of pain in the category "behaviour" (from 8 to 1 mention) after the veterinary examination, and with that excluding terms within the category "behaviour". The results from this pilot study indicate that there is a difference in the way pet owners and veterinarians describe pain. One explanation may be the influence of stress on behaviour at the animal hospital, compared to a home environment. More studies are needed to investigate and ultimately improve communication about animal pain between pet owners and animal health professionals.

Dogs' (*Canis lupus familiaris*) reactions to high volume ultrasonic stimuli: evaluating its potential as a non-lethal deterrent for wolves (*Canis lupus*)

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As wolf populations in Europe grow, livestock farmers face increasing challenges in protecting their animals. At the same time, conservation of the protected wolf species (*Canis lupus*) must be ensured. To achieve sustainable coexistence, new non-lethal methods of wolf deterrence are needed to enable both wolf conservation and livestock protection. One option is to deter wolves from approaching pasture fences, preventing them from exploring for possible entry points. Given the hearing range of canids (40 Hz – 60 kHz) exceeds that of humans (20 Hz – 20 kHz) and many livestock species, ultrasound may offer a minimally disruptive deterrent. Due to limited availability of wolves for testing and their close evolutionary and anatomical relationship, domestic dogs are considered suitable models for investigating wolf responses. This study aimed to evaluate the effectiveness of high volume ultrasound in deterring domestic dogs (*Canis lupus familiaris*) as a model for wolves. We tested 47 privately owned dogs of various breeds, aged to 1.5 and 10 years. An ultrasonic deterrent device (M175 from Kemo Electronic) emitting frequencies of 20-42 kHz at 90-120 dB was used. Each dog participated in two trials - one control (no sound) and a test (ultrasound exposure), conducted on the same day in randomized order. Trials lasted 35 s each. Owners led their dogs to a bowl with food placed two meters from the speaker. Sessions were video-recorded and analyzed for duration and frequency of stress-related behaviours. Contrary to our expectations, none of the dogs exhibited pronounced behavioural reactions such as avoidance, startle or fear. However, (generalized) linear mixed model analysis revealed significant differences in the frequency of the mild stress responses vigilant scanning ($p=0.005$, control: 0.49 ± 0.16 ; treatment: 1.55 ± 0.38 occurrences per trial, throughout), withdrawal from the stimulus ($p=0.01$, control: 0.05 ± 0.05 ; treatment: 0.76 ± 0.29) and hiding ($p=0.02$, control: 0 ± 0.05 ; treatment: 0.17 ± 0.05). These mild reactions suggest that, although perceived the ultrasonic stimuli, their reactions were too weak to match the level of avoidance needed to deter a wolf from investigating a fence enclosing potential prey. Since the device operated at maximum sound pressure levels feasible with current portable equipment at the given ultrasound frequencies, we conclude that ultrasound is not an effective deterrent for dogs or wolves.

The welfare assessment of goats: an abattoir-based study in Pakistan

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This study conducted a welfare assessment on 300 'healthy' goats arriving at a local abattoir in Lahore, Pakistan, and a further 32 goats were identified for emergency slaughter upon arrival. The aim of this was to gain an understanding of welfare of goats arriving for slaughter, data that was previously unknown in Pakistan. Welfare indicators were assessed on goats along with interviews of 19 goat owners of different groups including: beopari (traders), middlemen, butchers and farmers. Descriptively, the majority of healthy goats were juvenile (< 1yr age) (80%), male (80%) and arrived from the markets. The majority of healthy goats, 60% with thin body condition score (BCS) 2 and 9% emaciated BCS 1. A total of 16% had fecal/mud soiled bodies. Other commonly observed indicators of poor welfare included respiratory issues (7%), nasal discharge (40%), presence of ticks (10%) and carcass bruises (2.3%). For emergency goats, 82% were juvenile, and 56% were male with low live weight of 22.2 ± 0.69 kg (mean $\pm$ SE). Of these, 28% had BCS 1 (emaciated) and 56% had BCS 2 (thin), with increased fecal/mud soiling (56%), nasal discharge (44%), lameness (50%) and skin lesions (6.3%). Of the female goats, 13.7% were under 18 months of age, with 76% of these being under 1yr. Overall, 87% of goats travelled for at least 6h on various overcrowded local transport sources. Resting time was 77.6 ± 13.1 min (mean $\pm$ SE) during transport and 36.5 ± 4.7 h (mean $\pm$ SE) in lairage. The per-head price paid was higher for fattening-farm goats compared with that for the live animal market goats. Based on formal comparison using one-way ANOVA, price paid ($p=0.062$) and received ($p=0.020$) /goat varied significantly across interviewee groups. There was a significant correlation between the average live weight of goats with price paid ($p=0.038$) and price received ($p=0.034$). There was significant ($p=0.002$) association between the carcass weights of goats and their BCS. The proportion of goats with a BCS 2 (thin) was higher in goats coming from beopari (79%), four-tooth age (80%) and that of BCS 3 (moderate) was lowest in goats from farmers (2%). Therefore, it is concluded that there were poor welfare of goats including handling practices and stressful transport to abattoirs. This baseline study highlighted the need for further research and policy making to raise farm animal welfare standards in Pakistan.

Comparing training methods to promote better animal welfare, pain management, and the 3Rs for animals in the research and teaching industry using the Grimace Scales

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Training for knowledge and attitudes can be a key component of improving animal care, management, and welfare. Much of the research in training techniques is found in the livestock industry. Evidence suggests these techniques could be applied to the animal research and teaching industry (RTI) to uplift animal welfare, pain identification, and the 3Rs (replacement, reduction, and refinement). To support these aims, the identification of pain via the use of grimace scales can be an important skillset for those working with animals. Currently, there is minimal research into the best training methods to improve attitudes towards GS, the 3Rs and pain management practices. A study was undertaken to determine the impacts of two different training methods on participant attitudes towards GS use, the 3Rs, and pain management. A total of 232 self-enrolled participants from the Australian and New Zealand animal research and teaching industry without formal prior training in GS were recruited and randomly allocated into two training groups: technical training (control) or training targeting attitudes (enhanced). Pre- and post- training questionnaires exploring baseline and experimental data were completed by participants and consisted of demographic, Likert scales (1-7) and Yes/No questions. Data was analysed to determine if control, enhanced, or any type of training (control and enhanced cohorts) could improve 3Rs, pain management, and animal welfare. Qualitative data was analysed via reiterative thematic analysis. Semi-quantitative data was analysed using a “estimated average differences” approach from estimate marginal means models. Differences ($p < 0.05$ adjusted for multiple comparisons) were found in participants undergoing any type of training (control and enhanced) and between control and enhanced cohorts in pre- and post- questionnaires. Training (control and enhanced cohorts) in general offered two to eight times more ($p < 0.05$ adjusted for multiple comparisons) positive benefits in participants attitude, knowledge, and the use of GS. Enhanced training offered additional key benefits including two to three times more ($p < 0.05$ adjusted for multiple comparisons) confidence in the use of GS and a more positive changes in participant attitudes towards pain relief and management in animals. More research should be undertaken to continue to optimise the application of these methods to improve attitudes and knowledge for those working with animals in research. The RTI should ensure animal research training programs are not only effective but also consider using methods targeting training for attitudes.

Can they adjust? Understanding the behaviour of adopted northern Canadian community dogs from the perspective of their new owners

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Northern dogs, including pet, community, and free-roaming dogs (FRDs) from remote northern Canadian communities, are often rehomed to less remote areas as part of population control efforts. Despite this, research on their post-adoption behaviour and adjustment is limited. This study aimed to investigate the post-adoption behaviour and adjustment of Northern dogs using a mixed-methods approach. Data were collected from 357 participants through an 89-item survey distributed via social media and author networks. The survey addressed owner and dog demographics, lifestyle factors, and dog behaviour using a shortened version of the Canine Behaviour and Research Questionnaire (C-BARQ). Additionally, an open-ended question explored owners' perspectives of their dog's adjustment to the home. An exploratory factor analysis (EFA) was conducted on the shortened C-BARQ to examine the factor structure. Multiple logistic regressions were used to analyse the influence of lifestyle and demographic parameters on C-BARQ scores. Qualitative content analysis was used to process open-ended responses. The EFA revealed a 13-factor structure, including Stranger-directed aggression, Owner-directed aggression, Dog-directed aggression and fear, Stranger-directed fear, Non-social fear, Touch sensitivity, Separation-related behaviour, Chasing, Escape, Attachment, Excitability, Energy, Trainability and Dog rivalry. Adopted Northern dogs demonstrated relatively high mean scores for Chasing (2.75 ± 1.06), Energy (2.29 ± 0.85), and Attachment (2.38 ± 0.97) on a 0–4 scale, where higher scores indicate greater frequency or intensity of the behaviour. Key influencing factors included age at adoption, access to other dogs, and household environment. Content analysis identified key themes related to the adjustment process and factors influencing it. Overall, 93.8% of owners reported that Northern dogs displayed at least one behaviour problem post-adoption, which may stem from dogs experiencing frustration, related to a lack of control over their new environments and a misalignment with their previous reality. This study highlights the importance of understanding and fulfilling the unique social, physical, and cognitive needs of Northern dogs to ensure a smoother adjustment process post-adoption.

Feeding behavior patterns and performance: within-calf starter intake variability is associated with solid feed intake

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Early solid feed intake is a key component of dairy calf rearing success. It promotes gastrointestinal tract development, influences performance, and reduces weaning stress. This study investigates the association of within-calf variability in starter intake early in life with performance and feeding behavior patterns. Understanding this variability addresses a gap in the understanding of proactive solid feed intake and its effects. Holstein dairy calves ($n = 44$) were monitored from arrival (day 0; age = 1.16 ± 0.93 d) to day 74. Calves were individually housed, feed intake was recorded daily, and calves were weighed weekly. Calves were bottle fed milk replacer at 13.5% solids (27% protein, 10% fat) at 7L/day preweaning (0–62d) and 3.5L/day during weaning (63–70d), with ad libitum textured calf starter (27% protein, 4% fat). We conducted the analysis in two steps: first modeling starter intake, then assessing variability by calculating the interquartile range (IQR). Starter intake was modeled using a generalized linear mixed model with a Tweedie distribution, due to heterogenous, non-normal residuals and non-negative predictions, incorporating calf as a random effect. The effects of days on trial were assessed using linear, quadratic, and cubic terms in a random regression model. For each calf's starter intake curve, we estimated IQR as a measure of day-to-day intake variability. We then used the IQR to correlate (Pearson) to cNFC intake and growth. Correlations were calculated between IQR (0.223 ± 0.076 kg) and initial body weight (44.4 ± 4.96 kg), age to reach 0.5 kg (34.7 ± 9.4 d) and 1.3 kg (53.8 ± 7.2 d) of starter intake, age to reach 15 kg of cumulative non-fibrous carbohydrate (cNFC) intake (56.1 ± 8.3 d), and overall ADG (0.977 ± 0.15 kg/d). IQR was negatively correlated with age to reach 0.5 kg, 1.3 kg, and 15 kg of cNFC intake ($r = -0.73, -0.71, -0.72$; $P < 0.001$), while there was no correlation with initial body weight ($r = 0.07$; $P > 0.05$). Similarly, ADG had no correlation with initial body weight ($r = 0.13$; $P > 0.05$), but was negatively correlated with age to reach 0.5 kg, 1.3 kg, and 15 kg of cNFC intake ($r = -0.79, -0.80, -0.81$; $P < 0.001$). These results demonstrate that higher day-to-day variability in calf starter intake is associated with earlier and greater solid feed intake, consequently improving animal performance.

A descriptive study of beef cow reactivity consistency over time

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Investigating the consistency of cattle reactivity is important, as it directly impacts handling efficiency and productivity in beef production systems. This study evaluated the consistency of crossbred beef cow reactivity across multiple evaluations. The flight speed and cow responses within the chute of 150 individuals (68 heifers, 82 cows, 2-3 parity) were evaluated across four evaluations (E1-4), spaced at least one month apart throughout one year. Evaluations were characterized by three procedures: *i*) scour vaccination at E1; *ii*) no treatment before/after E2 and E4; and *iii*) pregnancy check the day before E3. Flight speed (FS, m/s) measures the speed at which each animal leaves the squeeze chute. The reactivity score (RS) was calculated by summing the following indicators, evaluated within the first 4 seconds after entering the squeeze chute, based on cow movement (1-5), tension (1-4), body posture (1-3), overall response (1-5), and presence (2) or absence (1) of kicks and vocalizations. Flight speed was classified into three categories (group-level), using FS mean $\pm$ 1SD, as follows: low ($<$ mean-1SD), medium ($=$ mean $\pm$ 1SD), and high ($>$ mean+1SD). Cow RS was classified (group-level) as follows: low (RS $<$ 7), medium (RS $>$ 8 $<$ 10), and high (RS $>$ 11). At the population level, FS and RS consistency was analyzed using a generalized linear mixed-effects model, while a cumulative link mixed model was employed to assess FS and RS consistency at group-level. Both models included evaluation, procedure, and parity as fixed effects, with animal as repeated measure and random effect. Evaluation affected FS ($p<0.05$), with higher FS observed at E1 ($1.4^a\pm0.6$), and remaining stable in subsequent evaluations (E2: $1.2^b\pm0.6$, E3: $1.1^b\pm0.5$, E4: $1.2^b\pm0.5$). Evaluation did not affect FS category (low, medium, high) ($p>0.05$). The higher FS at E1 can be attributed to vaccination, likely increasing reactivity, but not their FS category within the group. Evaluation affected RS ($p<0.05$) at a population level. Lower RS scores were observed at E1 ($8.9^b\pm1.4$) and E2 ($9.0^b\pm1.4$), not differing between them ($p>0.05$). Following pregnancy check, RS increased at E3 ($9.7^a\pm1.5$), not differing from E4 ($9.3^a\pm1.5$) ($p<0.05$), but from E1 and E2 ($p>0.05$). At the group-level, cows transitioned among RS categories (low, medium, high, $p<0.05$). Aversive procedures such as pregnancy checks and vaccination influence RS and FS, respectively, at a population level. Unlike FS, RS was not stable across evaluations within categories. This study highlights the importance of considering the effects of aversive procedures when evaluating cattle reactivity, regardless of the indicator used.

Rethinking temperament trait evaluation: a scoping review of tests and methodologies used to assess temperament traits in livestock animals

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Temperament in livestock can influence animal welfare, productivity, and human-animal interactions, yet there has been no comprehensive scoping review that has synthesized how temperament has been evaluated across species and studies. This scoping review examined the terminology, behavioral traits, and tests used to assess temperament in livestock animals. A systematic search was conducted in six databases: Agricola (EBSCO; n = 84), CAB (Ovid; n = 395), National Agricultural Library (n = 120), PMC (PubMed; n = 219), Science Direct (n = 323), and Web of Science (n = 269). A total of 997 articles published in English before December 2024 and containing the keywords “temperament,” “personality,” “behavioral syndrome,” or “individual behavior” were identified for screening. After title and abstract screening, 328 articles underwent full-text review, resulting in 285 articles meeting the inclusion criteria. An additional 123 articles were identified through supplemental searches, yielding a total of 408 studies. Overall, temperament-related research articles were published in Africa (n = 5), Asia (n = 25), Europe (n = 139), North America (n = 110), Oceania (n = 42), and South America (n = 37). Most studies focused on cattle (59.8%), followed by swine (9.6%) and horses (9.3%), with limited research on goats (2.7%), chickens (2.5%), and buffalo/bison (1.5%). While 56.3% of articles used the term “temperament,” others used “personality” (5.9%), “individual behavior” (5%), or a combination of terms (32.8%), revealing inconsistencies in terminology. The most frequently used tests included behavioral observations (21.9% of all tests), crush/chute score (9.2%), and novel object/person test (8.8%). Of the 929 test applications identified across the 408 studies, 33.5% assessed a single trait, most commonly shyness-boldness (n = 194), followed by activity (n = 36), sociability (n = 25), and exploration-avoidance (n = 15). The remaining 66.5% assessed multiple traits, most frequently using multi-trait protocols that did not specify which individual traits were being assessed (33.3%) or tests that assessed combinations of activity and shyness-boldness (13.1%). This review highlights inconsistencies in both terminology and methodology across species, limiting cross-study comparability and practical implementation of individual behavioral assessments in livestock production systems. Future research should prioritize the development of standardized, multi-trait assessment tools to better characterize temperament and support improved animal welfare practices.

Small but mite-y: Influence of northern fowl mite infestation level on laying hen behavior

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Northern fowl mites (*Ornithonyssus sylviarum*; NFM) are the most prevalent ectoparasite negatively impacting North American laying hen productivity and welfare. This study examined how mite infestation level affects laying hen behavior. Pedigreed white laying hens (n=200) were housed in 5 pens (n=40 hens/pen) in a cage-free floor system. All hens were marked with non-toxic livestock markers for individual identification. At 24 wk, all hens were infested with 50 NFM applied to their vent feathers; all birds were monitored for health and welfare to ensure infestation did not reach a critically high level. At 30 wk, the hens in each pen with the highest (HIGH: n=1/pen) and lowest (LOW: n=1/pen) level of mites were identified based on scoring the number of mites in a 4x6cm area anterior to the cloaca (HIGH: score 4 (101–500 mites) to 6 (1,001–10,000 mites); LOW: score 1 (<10 mites)). Continuous focal sampling was used to analyze the behavior from video recordings of HIGH (n=5) and LOW (n=5) birds over two consecutive days at 20 and 30 wk from 06:00–06:15 and 14:00–14:15. The duration and frequency of eating, drinking, standing, sitting, sleeping, walking, environmental pecking, feather pecking, preening, dustbathing, and unknown behavior were recorded. The 20 and 30 wk data were analyzed separately using PROC GLIMMIX (SAS 9.4) with birds' level of infestation at 30 wk (HIGH or LOW) and time of day (morning or afternoon) included as explanatory factors. At 20 wk, birds that were later classified as HIGH ate more frequently in the afternoon (1.67 ± 0.97 ; back-transformed lsmean $\pm$ SE) than in the morning (0.46 ± 0.3 , $P=0.007$) but stood more frequently in the morning (13.42 ± 2.06) and for longer durations (5.88 ± 0.22 sec) than in the afternoon (frequency: 7.29 ± 1.26 , $P=0.001$; duration: 4.39 ± 0.21 sec, $P<0.001$). At 30 wk, HIGH hens (5.47 ± 0.73) stood more frequently than LOW hens (3.60 ± 0.54 , $P=0.046$), whereas LOW hens walked more frequently (8.06 ± 1.73) and for longer durations (113.93 ± 14.18 sec) than HIGH hens (frequency: 3.89 ± 0.90 , $P=0.028$; duration: 35.60 ± 14.31 sec, $P<0.001$). At 30 wk, LOW hens (9.29 ± 2.09) walked more frequently in the afternoon than HIGH hens (3.34 ± 0.88 , $P=0.029$). These findings indicate that hens that later differ in their mite infestation level may differ in behavior prior to infestation. Identifying phenotypic traits related to mite infestation level can inform breeding programs to develop laying hens that are more resistant to NFM. This research was funded by USDA-NIFA (2023-67015- 39683).

Falling down or falling asleep: nocturnal behaviours of horses with sleep disorders

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To achieve rapid eye movement sleep (REMS), horses must lie down with their necks relaxed. About 5% of horses suffer from suspected REMS disorder (REMSD), making them reluctant to lie down and prone to sudden falling incidents. But their detailed sleeping behaviours at their home stable are not known. We studied night-time-behaviours of 10 horses suspected of REMSD based on the owner's video surveillance (PATIENTS) and 8 CONTROL horses, housed in single boxes in their home stables while recording their polysomnography. The horses were habituated to the study equipment for at least 3 days. We scored their lying and standing behaviors, relaxed neck postures (REM-like-sleep, REMSL), swaying and falling down, and calculated percentage from observed night-time duration, and number and duration of bouts. We analysed the differences between CONTROLS and PATIENTS using Mann-Whitney-U and Chi-squared -tests. Our key findings ($p < 0.05$ for all) include that none of the PATIENTS and 25% of CONTROLS had lateral resting, and recumbency occurred in 10% of PATIENTS and 100% of CONTROLS. REMSL was observed in 100% of CONTROLS when lying and in PATIENTS only in a standing. However, 38% CONTROLS showed short REMSL bouts when standing. The REMSL median (interquartile range) total night-time durations, number of bouts and bout durations were for PATIENTS 0.7% (1.3%), 27 (21) bouts and 0.17 (0.18) min, and respectively for CONTROLS 1.2% (2.5%), 10 (13) bouts and 1.9 (1.5) min. PATIENTS spent 0.9 (0.9) % of their night swaying in 0.12 (0.10) minute bouts, while CONTROLS had 0 (0) for these measures. PATIENTS stood still more often and for shorter bouts than CONTROLS; 104(111) vs. 35(23) bouts, and 5.8 (8.2) minutes vs. 14.4 (7.6) minutes per bout. All PATIENTS fell during the night with a median of 34 (39) bouts, while none of the CONTROLS did. Rolling was observed in 20% of PATIENTS and in 75% of CONTROLS. Horses suspected to suffer from REMSD are prone to falling and reluctant to lie down to sleep. Interestingly they do not avoid rolling, although perform much less than control horses. They also swayed longer and stood still more frequently and for shorter bouts than control horses. The bouts of neck relaxation observed in the standing control horses needs further investigation. REMSD patients had frequent, very short attempts to enter REMS while standing that lead to falling down. We suggest the behaviors are reflecting an inappropriate activation of REMS atonia while standing.

Continuous recording of oral abnormal repetitive behaviors in Jersey and Holstein post-weaned heifers

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Dairy cattle perform abnormal repetitive behaviors (ARBs) like tongue rolling (TR) and non-nutritive oral manipulation (NNOM). Few studies have focused on post-weaned heifers. We used continuous sampling to assess the population prevalence of oral ARBs in this age class. We delineated the form of tongue rolling to include when this behavior involves an object in the repetitive pattern (object tongue rolling, OTR) and characterized the types of NNOM based on what the animal is specifically manipulating (Feed bin, Water trough, Bedding, Other). Our objective was to assess differences in these oral ARBs between the most common breeds of dairy cattle in the United States, Jerseys (n=8) and Holsteins (n=8). We expected that Jerseys would perform more of all 6 ARBs (TR, OTR, NNOM: Feed bunk, Water trough, Bedding, Other) than Holsteins. Heifers (105±10.1 d) were enrolled after a minimum of 4 d (average 13.7±4.3 d) after entering into a loose housed pen. The pen was bedded with rice hulls and heifers were fed a total mixed ration ad libitum from a bunk. It was always filled to capacity (8 individuals) and through rolling enrollment, there were 4.1±1.4 focal heifers on each day of video recording. One individual was observed at a time and scored continuously for all behaviors from 08:00-14:00 h on one day. A Wilcoxon Rank Sum test was used to compare breeds. Jerseys and Holsteins spent similar amounts of time engaged in Other NNOM (1.86±0.58 vs. 0.74±0.29%, p=0.30), Bedding NNOM (0.09±0.04 vs. 0.02±0.02%, p=0.28), Water trough NNOM (0.09±0.05 vs. 0.04±0.03%, p=0.16), and TR (0.39±0.28 vs. 0.19±0.12%, p=0.90), respectively. Jerseys performed significantly more OTR than Holsteins who performed none (0.11±0.06 vs. 0±0% of time; p<0.01). Jerseys also tended to perform more Feed bunk NNOM than Holsteins (0.09±0.04 vs. 0.01±0.01%; p=0.05). In agreement with our predictions, Jerseys performed more OTR and Feed bunk NNOM than Holsteins, but, unexpectedly, show no differences in the remaining behaviors. We are currently coding video to expand this analysis to a larger sample and for a full 24 h/heifer, and suspect that the limited data presented here may not yet paint the complete picture of our results.

Changes in the frequency of social interactions in captive shoebills after separation of male and female

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Captive breeding programs are one way to protect species threatened by extinction. In such programs, “pairing”—the practice of housing a male and female together to encourage reproduction—is commonly used. For highly solitary animals, preventing direct conflict between pairs during the non-breeding season is considered effective in increasing breeding success. Therefore, certain zoos have attempted to separate males and females in non-breeding season and maintain pairs during the only breeding season. We investigated whether temporary separation affects breeding and aggressive behavior of shoebills (*Balaeniceps rex*), an endangered species classified as vulnerable (VU) on the IUCN Red List. Despite global breeding efforts in zoos, only two successful cases have been reported. A pair of shoebills has been kept together since 2016 in the Kobe Animal Kingdom in Japan; however, breeding has been unsuccessful. The male and female were separated into different enclosures for approximately 4 months from May 2024. We observed them from September 2022 to December 2024 (63 days in total) and compared the frequencies of breeding behaviors (bill clattering, bowing, nesting, and circular flighting) and aggressive behaviors (attacks and threats) across three periods: the pre-separation periods from September to December 2022 and 2023 (P1 and P2), and the post-separation period from September to December 2024 (P3). Observations were conducted using continuous recording, and behavior frequency was calculated per hour. One-way ANOVAs revealed significant effects of period on the frequency of male bill clattering and bowing (bill clattering: $F(2, 62) = 13.98, p < 0.001$; bowing: $F(2, 62) = 6.29, p = 0.003$). Tukey’s HSD tests showed that both behaviors occurred significantly more frequently in P2 and P3 than in P1 (all $p < 0.05$), with no significant difference between P2 and P3. The male showed no significant changes in other behaviors in any periods. No attacks by the female were observed during any of the periods. Nesting was the only breeding behavior observed in the female, and its frequency did not differ between periods. These results suggest that temporary separation did not increase breeding behavior or reduce aggression. One possible explanation for this is that the separation period overlapped with the pre-breeding period. Pairing occurs immediately before the breeding season in the Oriental white stork (*Ciconia boyciana*), which has a breeding ecology similar to that of the shoebill. For shoebills, it may be more effective to finish the separation just before the breeding season.

Effects of swine appeasing pheromone on weaning stress: physiological evaluation of plasma glucose levels in piglets

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Weaning is a complex process that causes behavioral, physiological, and metabolic changes in piglets, including increases in cortisol, neutrophil/lymphocyte ratio, and plasma glucose as responses to stress. Plasma glucose, in particular, is associated with environmental change stress and aggressive behavior and is also a marker of chronic stress in pigs subjected to aversive management. This study aimed to assess whether the use of an appeasing pig pheromone (a synthetic analogue of the Maternal Swine Appeasing Substance – MSAS, naturally secreted by the sebaceous gland on the mammary gland skin with the unique function of inducing an appeasing effect on nursing offspring) could reduce weaning stress in piglets. Previous studies have shown the use of a maternal pheromone in weaned pigs significantly reduced weight loss during the critical first week post-weaning. The experiment was conducted on a commercial Piglet Production Unit farm located in Santa Catarina, Brazil. A total of 2,062 piglets were selected and divided into two groups: 1,012 received a placebo, and 1,050 received the pheromone. Treatments (3 mL) were applied to the head of the animals, 24 hours before weaning. The groups were kept in separate physical structures. Plasma glucose levels were measured using test strips (Accu-Chek Active) in a sample of 50 animals per group before the products were applied. After weaning, the piglets were transported separately to the nursery, where plasma glucose was reassessed 1 hour after housing and again 48 hours later. Behavioral ethogram was also used. Statistical analysis, carried out by repeated measures ANOVA (within-subjects), there was no difference between the groups in the weight and behavior parameters of the animals. The type of treatment (Control vs. Pheromone) had no significant effect on glucose levels ($p = 0.189$). However, the time factor was highly significant ($p < 0.001$), showing that glucose levels varied over the three measurements taken (0, 1, and 48 hours). There was no significant interaction between treatment and time ($p = 0.369$), suggesting that the changes in glucose levels were similar between the groups. It is concluded that the porcine appeasing pheromone did not significantly influence glucose levels in piglets. Nonetheless, the use of the pheromone may still hold potential and could be further investigated when applied at different times, such as during the nursery phase after weaning. These findings highlight the need to explore other biomarkers, as well as to develop objective and accessible methods for evaluating animal welfare.

An evaluation of the relationship between beef cattle grazing activity traits and conception methods during the breeding season

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Efficient use of native rangelands and improved reproductive success are primary objectives in beef cattle production. Grazing behavior during the breeding season may be influenced by pasture characteristics, including size and water availability, as well as physiological differences due to reproductive status. This study aimed to evaluate the relationship between grazing activity and conception method in crossbred Angus cows over a 2-year period. Cows ($n = 76$) were blocked by age and then randomly assigned to be fitted with a Knight GPS tracking collar. All cows, except first-calf heifers ($n = 12$), were synchronized for fixed-timed artificial insemination (FTAI) and bulls were turned out 7 d after for a 65 d breeding season. Cattle were managed in an intensive rotational grazing system ($n = 36$; mean size: 22.13 ± 13.53 ha). Cows were retrospectively classified into the following groups: conception to FTAI (AI; $n = 23$), natural service (Bull; $n = 37$), and non-pregnant (Open; $n = 16$). Average daily distance traveled (km/d) and elevation gain (m/d) were measured at 10 minutes intervals. Data were analyzed using the MIXED procedure in SAS 9.4, including the main effects of conception method, number of water sources, pasture size and their interactions. Pasture size was retroactively classified as Small ($n = 25$), Medium ($n = 35$), or Large ($n = 16$). Daily distance traveled, and elevation gain exhibited a conception method $\times$ water source $\times$ pasture size interaction ($P < 0.001$). AI-bred cows traveled the greatest distance in large and small pastures with only one water source available ($P < 0.001$). In contrast, Open cows exhibited the greatest distance traveled when two water sources were available ($P < 0.001$). In medium pastures, regardless of water source availability, distance traveled was comparable across conception methods ($P \geq 0.697$). Open cows in large pastures with two water sources gained the most elevation ($P < 0.001$). Elevation gain was more evenly distributed across conception methods in small pastures ($P \geq 0.998$). Regardless of pasture size, AI cows exhibited greater elevation gain when only one water source was available ($P < 0.001$). These data indicate that water source availability influenced the behavior patterns of cattle more effectively than pasture size. Cattle conceiving to FTAI utilized the rangeland most effectively, potentially in response to limited estrus behavior during breeding. By strategically managing pasture resources and cattle behavior, producers may improve conception methods and grazing efficiency in native rangelands.

Effects of selection for divergent levels of social motivation on behavioral repertoire and synchronization in Japanese quail (*Coturnix japonica*)

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Behavioral synchronization—when individuals engage in the same behavior simultaneously and in close proximity—can promote group cohesion, coordination, and cooperation. However, inter-individual behavioral differences in social tendencies may influence how and to what extent synchronization occurs. To examine how such variation shapes behavioral repertoires and group synchronization, we used the 76th generation of Japanese quail (*Coturnix japonica*) from lines originally selected for high (S+) or low (S-) social motivation, based on a treadmill test measuring the distance run to rejoin conspecifics. Ten trios of S+ and ten of S- were placed in enriched arenas for 24 hours with ad libitum access to food and water. During four one-hour observation windows, scans every minute recorded each individual's behavior and inter-individual distances. All synchronization bouts—defined as all three individuals performing the same behavior simultaneously—were identified, along with their duration and inter-individual distances at the start and one minute after the bout ended. Results showed that S- quail exhibited more locomotion ($S+ = 6.7 \pm 5.7\%$ vs $S- = 8.5 \pm 4.2\%$, $F=4.59$, $p=0.05$), whereas S+ quail were more inactive ($S+ = 35.7 \pm 12.8\%$ vs $S- = 26.7 \pm 12.0\%$, $F=10.14$, $p=0.005$), particularly engaging in “sit relaxed” behavior ($S+ = 28.6 \pm 12.0\%$ vs $S- = 18.4 \pm 11.8\%$, $F=14.00$, $p=0.001$). S+ individuals displayed longer overall synchronization durations ($S+ = 675.4 \pm 335.2$ s vs $S- = 418.2 \pm 213.8$ s, $F=11.18$, $p=0.004$), especially during “sit relaxed,” where they spent more time ($S+ = 492.8 \pm 352.9$ s vs $S- = 159.5 \pm 177.3$ s, $F=18.32$, $p<0.001$), synchronized more frequently ($S+ = 3.0 \pm 2.1$ vs $S- = 1.4 \pm 1.5$, $F=13.57$, $p=0.002$), and sustained longer bouts ($S+ = 186.6 \pm 126.7$ s vs $S- = 116.3 \pm 52.7$ s, $F=6.73$, $p=0.02$). S+ groups also showed higher Kappa coefficients for “sit relaxed” ($S+ = 0.106 \pm 0.075$ vs $S- = 0.018 \pm 0.066$, $F=13.61$, $p=0.002$), indicating more structured (non-random) synchronization. During synchronized resting bouts, birds reduced inter-individual distances (During bout= 21.1 ± 11.6 cm vs After bout= 26.0 ± 11.2 cm, $F=11.80$, $p<0.001$), suggesting a preference for physical proximity during rest. These findings indicate that higher social motivation enhances behavioral synchronization, particularly in restful states, potentially reinforcing social bonds and promoting group cohesion. Such mechanisms may support more stable, cooperative, and less competitive social dynamics. Further research is needed to confirm these patterns and explore how varying social profiles shape group functioning in different contexts.

A pilot study of physical activity and sleep in dogs and dog owners participating in a joint outdoor exercise program

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Sufficient levels of physical activity (PA) and sleep are crucial for health and wellbeing in both dogs and humans. However, PA levels in humans are alarmingly low, and increasing levels of canine overweight suggest a corresponding lack of PA in companion dogs. Joint exercise programs for dogs and humans may be a strategy to increase activity levels. The aim of this pilot study was to measure activity levels and sleep in dogs and their owners during an eight-week outdoor exercise program with joint jogging and circuit training sessions. Activity was measured on 24 hour-basis with Actigraph GT3X the week before and during the last week of the exercise program. Dogs with at least three days of valid data ($n = 15$) and owners with at least four days ($n = 15$) were included. Daytime was defined as 07.00–22.59 and nighttime as 23.00–06.59. PA was expressed as counts per minute (cpm) and classified as “sedentary” (dogs and owners), “light to moderate PA” (dogs), “light PA” (owners), “moderate PA” (owners) and “vigorous PA” (dogs and owners). Sleep in owners was detected with the Tudor-Locke algorithm and a ≤ 150 cpm cut-off was used to define sleep-like behaviour in dogs. Paired t-tests and Wilcoxon matched-pairs signed rank test were used for pre–post comparisons. High levels of sedentary behaviour were registered in both dogs and owners, however with a significant decrease of 12 minutes per day in dogs and 41 minutes in owners ($P = 0.02$ resp. 0.01). There were no changes in light and/or moderate PA in either dogs or owners ($P > 0.05$). Vigorous PA in dogs did not change, and amounted to approximately 27 minutes per day. In owners, vigorous PA increased significantly ($P = 0.04$) from 15 to 20 minutes per day. Dogs spent approximately 90% of the nighttime period in sleep-like behaviour and owners had a sleep efficiency of approximately 90%, with no pre–post changes. Results suggest that this joint exercise program may be suitable for decreasing daytime sedentary levels in dogs and owners and increasing vigorous PA in owners. Jogging with their owner was however not enough to increase PA levels in dogs. Nighttime data suggest good sleep in both species, both before and during the program. Future studies with control groups and long-term follow-ups are needed to confirm these findings, and to further explore the importance of the human-dog bond for healthy physical activity habits in both species.

A systematic review of public perspectives of zoo animal behaviour and welfare

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Negative public perceptions of zoo animal welfare can translate to reduced visit likelihood and lower visitor engagement with conservation initiatives, in turn undermining zoos' goals related to conservation, animal welfare, and public education. Understanding what factors influence public perceptions is therefore important. We conducted a mixed-methods systematic review on 114 peer reviewed articles to identify factors influencing perceptions of zoo animal welfare and how these perceptions inform public behaviour. Thematic analysis identified human, animal, and environmental factors/themes as affecting perceptions of animal welfare, with animal behaviour being particularly important. For example, behaviours perceived as natural and/or active were viewed favourably, while those perceived as inactive and/or abnormal were viewed negatively. Visitors were not, however, always accurate in their judgements of which behaviours were natural/unnatural, and natural behaviour was not always equated with good welfare. For example, inactivity was often perceived as abnormal in animals who naturally sleep for large portions of the day and was not considered desirable to observe nor beneficial for welfare, even though inactivity was perceived to be natural. In contrast, social behaviours such as play and dominance were generally assumed to indicate good welfare, whereas aggression was perceived negatively; yet how accurately visitors interpret the function of social behaviours (e.g. dominance versus aggression versus play) was ambiguous. Additionally, although activity was generally seen as a positive indicator of welfare, repetitive locomotion or stereotypy was perceived as unnatural and as an indicator of poor welfare. Visitor understanding of zoo animal behaviour and welfare may be increased via engagement strategies: however, the theme '*welfare interpretation*' highlighted that educational material addressing animal welfare, including aspects of behaviour, has produced inconsistent results on visitor perceptions. Further research is needed to assess the accuracy of visitor interpretation of zoo animal behaviour, and to identify what factors are influential to visitor judgements (e.g. perceived affective state, perceived enclosure size), as this may influence zoos' visitor engagement strategies regarding animal behaviour and welfare.

Effect of a specific sensory additive on human fear test response and wellbeing in broilers production before catching

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The catching phase is a critical stage causing a lot of stress and injuries in broiler production. The aim of this trial was to assess the effects of a sensory additive, based on *Citrus sinensis* essential oil, on broiler behavior during the catching process. Broilers flocks (Hubbard 757) were followed from one day old to 8 weeks of age. The study was conducted across 8 Belgian broiler farms, each containing two barns of 13000 birds per barn: a control and a treatment barn. Both groups were fed a standard diet. The treatment group received the water supplemented with 100 ppm of a specific sensory additive (Phodé laboratory, France) for at least 12 days before catching. In each barn, broiler behaviour was evaluated using the Human Fear Test (HFT), derived from the Welfare Quality Protocol and designed to measure the level of fear and stress experienced by broilers when exposed to human presence (10 footsteps in the barn). The test involves 3 stages: 1) the time (seconds) it takes for the animals to stop running away from the experimenter; 2) the time (seconds) for 1 or more animals to start moving towards the experimenter; 3) the time (minutes) for the first chicken to pick experimenter's shoe. Additional welfare data were collected, including scratches and pododermatitis scores. Data were analysed using a paired Student's t-test. Feed intake and live weight were recorded and the Average Daily Gain (ADG) calculated. The number of downgraded chickens was also collected at slaughter. Results showed that treated broilers exhibited fewer fear indicators. In the first two stages of the HFT, times to hit each of the targets were reduced by 57% and 46% respectively in treated animals compared with control ($p < 0.0001$; $p = 0.06$). This suggested a reduction in fear of humans. During the third stage, time was reduced by 8% ($p = 0.05$) and suggested greater confidence towards humans and a higher tendency to explore their environment. Although no effect was observed on scratches and pododermatitis, treated broilers showed a 36% reduction in the number of downgraded chickens compared to the control group ($p = 0.06$). No significant differences were observed between control and treated groups for ADG. This could be related to the short period of treatment. Supplementing broilers with specific sensory additive before catch improves their well-being by reducing human fear stress and injuries risk. More studies are needed to better understand the relationship between flavour, behaviour and welfare.

The effects of pelleted forage on cross-sucking surrounding milk meals in pair-housed dairy calves

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Cross-sucking is an abnormal oral behavior that is a potential barrier to the adoption of social housing of calves, which has important cognitive and behavioral benefits. The objective of this study was to assess if providing pelleted timothy hay to pair-housed dairy calves could reduce the duration of cross-sucking or decrease the frequency of cross-sucking bouts for the first 21 days after pairing (5 ± 3 d of age; Mean $\pm$ SD). We enrolled 24 calves (12 pairs; 6 pairs control, 6 pairs assigned to receive *ad libitum* pelleted timothy hay). Calves were fed 7.4 L/d of milk replacer by bottle in two equal feedings and had *ad libitum* access to water and calf starter grain by bucket. Calves were video recorded for 21 days once paired. Two trained observers ($\kappa = 0.80$) watched crosssucking events twice daily for the hour before and two hours after milk feeding. Cross-sucking was defined as one calf suckling on the navel, udder area, or between the back legs of the other calf. We used mixed linear regression models to evaluate the association of providing pelleted timothy hay with cross-sucking bouts, bout duration, and the hay $\times$ day interaction, repeating by day, and using pair as the subject. Data was non-normally distributed (Shapiro-Wilk criteria > 0.95) and was common log transformed with a 1.0 correction factor for modeling. The back transformed geometric means and geometric SD are reported. We found no hay $\times$ day interaction, or association of hay with the duration of daily cross-sucking bouts surrounding milk feeding ($P > 0.10$). The geometric mean daily duration was 73.17 ± 9.63 seconds for controls and 92.41 ± 14.75 seconds for hay pairs. We found no hay $\times$ day interaction, or association of hay with the frequency of daily cross-sucking bouts surrounding milk feeding ($P > 0.10$). The geometric mean daily frequency of cross-sucking bouts was 19.76 ± 1.96 bouts for controls and 22.15 ± 2.63 bouts for hay pairs. The mean pelleted timothy hay intake for hay pairs was 89.41 g/d over the duration of the trial and was 220.51 g on day 21. Our results are different than others who found that larger calf groups reduced cross-sucking bouts when offered hay. Providing pelleted timothy hay to pair housed calves does not appear to reduce cross-sucking bouts or duration, though the behavior occurred for a short duration surrounding milk feeding.

Foraging for flavour: how edible enrichment shapes behaviour in brown- and white- feathered birds on commercial rearing farms in Ontario

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Feather pecking (FP) is a significant welfare issue in egg production. To mitigate FP, edible enrichment: pecking blocks (PB) is proposed as a management strategy. Observing pecking directed towards this enrichment may indicate a reduction in FP, as it indicates redirection and fulfillment of foraging behaviour. This study assessed the relative preference for three types of commercial PBs (A: mixed grains B: mixed grains and molasses, C: mineral based) in 2 shapes: square 22 X 22 X 16 cm and round 15 X 8 X 3 cm with a mass of 10kg. Interaction with the PBs (Pecking, scratching) was observed in strains (White- or Brown- feathered hens). Six rearing farms in Ontario (Canada) participated in a longitudinal study on PB use. Each treatment involved 12 pens – with PBs and without (control). PBs (A, B, C) were placed on the aisle floor at a ratio of 1 PB per 1,000 birds at 12 weeks of age, while control pens did not receive PBs. Cameras were mounted above the PBs (or equivalent locations in control pens), covering 12 areas. Recordings of 3h starting 2 hours after lights on and ending 2 hours prior to lights off for 1 day when birds were 18 weeks of age (25,920 min total). A trained observer used instantaneous scan sampling at 10-minute intervals to count pecks towards each PB type or substrate material in the control pens, and pecks within 15cm of the surrounding substrate. The effects of strain and treatment and interaction on the number of pecks were analyzed using a generalized linear mixed model with Poisson distribution and farm as a random effect. Preliminary results show a significant interaction between strain and PB type for the number of pecks ($P=0.002$), with Brown hens delivering more pecks to block A (96.8 ± 6.8 pecks/block/strain) than type B and C (81.4 ± 06.4 and 76.9 ± 5.5 pecks/block/strain). In contrast, the White birds showed similar pecks with block A and B (46.6 ± 5.1 and 47.7 ± 5.1 pecks/block/strain) over block C (32.2 ± 3.6 pecks/block/strain). Both strains showed fewer pecks in the control treatment (Brown: 12.9 ± 1.0 , White: 5.4 ± 0.7 pecks/block/strain). The differences in strain interaction with edible enrichment suggest different relative preferences which should be considered when optimizing enrichment strategies on commercial farms. Further analysis on the long-term effects of PB during rearing on behaviour in laying flocks is on-going.

Behavioral changes in captive Bengal slow lorises (*Nycticebus bengalensis*) with enrichments

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The Bengal slow loris (*Nycticebus bengalensis*) is a nocturnal primate found across 14 Asian countries, yet its populations are in steep decline due to habitat loss and illegal wildlife trade. Despite its ecological significance, the species remains understudied in captivity, where individuals frequently develop Abnormal Repetitive Behaviors (ARBs) indicative of chronic stress. Such behaviors not only compromise welfare but also impact physiological health, including reproductive success and digestive function. This study investigated the effects of enrichment on the behavior of three Bengal slow lorises housed at an animal institute in Dubai: a rescued adult female and her two captive-born offspring. Behavioral observations were conducted over 21 days, seven days without enrichment as a control period, followed by 14 days of enrichments which were categorized as structural, cognitive, food and sensory. The behaviors were monitored using scan sampling technique, where the evaluation was conducted at 11:00 am until 11:30 am serving as the pre-enrichment period and 03:00 pm to 03:30 pm as the post-enrichment period. The enrichments were placed in between the time intervals at 12:15 pm and removed at 12:30 pm, to prevent the prolonged exposure to the enrichment modules. Findings from the control week indicated excessive grooming and low sniffing behavior. Statistical analyses in R, including change point detection were conducted to visualize the behavioral patterns of the animals. Results revealed significant reductions in ARBs, including a 6.79% decrease in excessive grooming upon adding food enrichments. Furthermore, the lorises exhibited increased exploratory behaviors such as a 2.73% rise in sniffing and object interaction after placing cognitive enrichments. Chi-square independence and Bonferroni correction tests confirmed that enrichment type played a significant role in behavioral shifts. These findings underscore the necessity of diverse enrichment strategies in mitigating stress-related behaviors and improving captive welfare. By demonstrating the efficacy of targeted interventions, this study contributes to the broader discourse on primate care and offers valuable insights for conservation and management efforts in endangered species.

Moving individually housed dairy calves early (11 days of life) rather than late (56 days of life) to group-housing: effects on behaviour, stress levels and health - A pilot study

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In dairy farming, it is common practice to house calves individually during their first days or weeks of life. The aim of the present study was to investigate the influence of an early (11th day of life) versus late (according to German animal welfare livestock ordinance latest possible day: 56th day of life) transfer from individual to group housing on calves' health, stress levels and behaviour. Ten dairy calves were divided into two treatment groups (early: n=5; late: n=5). Before rehousing, calves were housed individually in 4.2 m² hutches with visual contact to others. Afterwards, they were housed in 10 m² hutches in groups of 4 almost similarly aged calves, including non-experimental calves and calves of both treatments. It was hypothesised that late rather than early rehousing has a negative impact on their behaviour and stress levels, but positive effects on health. Calves' behaviour, health and physiological reactions were examined in the 3 days before (=baseline) and 3 days after the rehousing time point (i.e. before/after day 11 for early and day 56 for late) and are expressed as difference to the 3-day baseline. Results from the GLMM showed that the calves in the late treatment group had higher heart rates ($p = 0.024$; all LS-mean $\pm$ SE: early: -7.46 ± 2.51 ; late: 8.08 ± 3.75 bpm), higher rectal temperature ($p = 0.023$; early: -0.05 ± 0.07 ; late: $0.40\pm 0.11^\circ\text{C}$) and tended to show more agonistic behaviours ($p = 0.06$) after movement to group housing compared to the early rehoused calves. On the other hand, early rehoused calves showed higher heart rate variability ($p = 0.0008$; RMSSD early: 8.03 ± 1.35 ; late: -10.47 ± 2.02 ms), more exploratory behaviour ($p = 0.024$; early: 139.77 ± 23.08 ; late: -6.79 ± 35.41 s per observation duration of 90 min) and more locomotor and object-related play behaviour ($p = 0.016$; early: 204.86 ± 28.84 ; late: 6.37 ± 43.07 s per observation duration of 90 min) after rehousing compared to the late treatment. No differences ($p > 0.05$) were found regarding social or solitary grooming, social play behaviour or the occurrence of cross-sucking. Regarding health, there were no differences ($p > 0.05$) in umbilical health, the occurrence of respiratory and enteric diseases between treatments. Results of this pilot study indicate that rehousing at 8 weeks of life leads to lower levels of behaviours indicative of positive welfare and more stress than rehousing on the 11th day of life, while there was no influence of the age at rehousing on the health of the calves.

Barn climate advice and pig tear staining: preliminary insights into an emerging welfare indicator

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Barn climate influences pig welfare and has been associated with tear staining (TS), a potential welfare indicator. This intervention study examined whether barn climate advice affects TS in finisher pigs and evaluated TS's utility as a welfare indicator. Five Dutch *Beter Leven* onestart farms participated in a larger study, with one production unit per farm equipped with a *Slimme Stal* sensor (Connecting Agri & Food) to monitor barn climate. A crossover design was used with two batches per farm (advice vs. control), where farms were blocked and treatments randomized by batch starting month. In the advice group, a climate advisor reviewed sensor data and recommended adjustments. Up to five focal pens per unit were monitored for TS, lesions, tail biting severity, and lameness during two visits per batch—approximately two weeks after setup and one week before slaughter. TS (both eyes), tail biting, and lameness were scored on a 0–100 visual analog scale, and lesion numbers were classified according to the Welfare Quality® protocol. For each batch, changes in welfare indicators between visits were calculated. Climate data were summarized as hours exceeding thresholds for CO, NH, and a temperature-humidity index, while hourly outdoor temperature was averaged. Linear mixed-effect models (with treatment as a fixed effect and pens nested within farms as a random effect; base model) showed that treatment did not significantly affect TS changes (Left: $P = 0.175$; Right: $P = 0.747$), though the control group recorded more hours of elevated CO (+266h; $P = 0.0399$) and NH (+439h; $P < 0.001$). Alternating individual climate variables and changes in welfare indicators in the TS base models (left and right) did not reveal significant linkages between TS and climate parameters. However, left-eye TS changes were positively associated with increased ear lesions ($\beta = 1.98$, $P < 0.01$) and nearly so with increased lameness ($\beta = 0.64$, $P = 0.083$) and total lesions ($\beta = 0.30$, $P = 0.067$), while right-eye TS changes correlated with increased lameness ($\beta = 0.77$, $P < 0.05$) and nearly with front lesions ($\beta = 0.66$, $P = 0.074$). Although climate advice did not significantly impact TS, the linkage with other welfare indicators highlights the potential validity of TS as a welfare measurement. Importantly, further research is needed to validate TS as a robust welfare indicator, to delve deeper into eye-side differences, and to clarify the interplay between environmental and physiological stressors in pig production.

Pecking blocks reduce feather pecking and improve plumage condition of hens in enriched colony systems

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Pecking blocks (PB) are a form of edible enrichment designed to improve laying hen welfare by enhancing foraging and reducing harmful feather pecking behaviour. Their effectiveness in enriched colony cages (EC), which are still widely used in some countries, has not been studied. We tested whether providing PB in EC affects severe feather pecking (SFP) and plumage cover. We used a 2x2x3 factorial design in which treatment (pecking blocks (TRT) or no pecking blocks (CONT)), genetic strain (796 Dekalb White (DW) and 796 Bovans Brown (BB)), and EC style (30-bird (N=12), 32-bird (N=16), and 60-bird (N=12)) were the main effects. TRT groups were provided PB continuously from 18-70 weeks of age (WoA). The plumage of ~20% of hens in each EC were scored on a 3-point scale in five body regions nine times throughout the trial. Beginning at 25 WoA, live focal animal sampling of ~20% of the hens within each EC was conducted monthly to count the number of SFP exhibited. A multinomial GLMM compared the fixed effects of strain, treatment, and EC style on plumage score by determining estimated probabilities for each score level within each body area. SFP data was categorized as 1 (0 SFP observed) or 2 (>0 SFP observed), and a binary GLMM compared the same fixed effects by determining odds ratios of observing SFP. DW had a higher probability of better plumage in 3/5 body areas than BB ($P<0.001$), and odds of observing SFP was 5.6 times greater in BB than DW ($P<0.001$). Within BB, TRT hens had a higher probability of better plumage in all areas scored than CONT ($P<0.03$), and the odds of observing SFP was 0.515 times less in TRT than CONT ($P=0.016$). Within DW, CONT had a higher probability of better plumage in all areas than TRT ($P<0.003$). However, odds of observing SFP were not different between TRT and CONT in DW ($P=0.531$). Hens in 32-bird EC had the highest probability of better plumage in all areas scored, and hens in 60-bird EC had the lowest ($P<0.005$). The odds of observing SFP did not differ between the 30- and 32-bird EC ($P=0.350$), but both were lower than in the 60-bird EC ($P<0.001$). In conclusion, PB were shown to be effective at reducing SFP and feather loss in the brown strain but not the white. Differences in EC style reinforces the multifactorial nature of the risks of SFP and feather loss.

Perching requirements for pullets: preferences for grasping and elevation

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Hens are known to be motivated to roost as high as possible in their housing system. It is unknown whether they would be more motivated to use a perch that allows them to grasp (the industry standard) or a platform at a higher elevation. We investigated the preferences of pullets for perching on structures that allow their toes to wrap versus those that do not, and whether different elevations affect this preference. 120 DeKalb White and 120 Bovans Brown chicks were housed in groups of 10 (2.19birds/m²) in 24 floor pens, grouped as only Whites (n=8), only Browns (n=8) or Mixed (n=8). Each floor pen was fitted with two wire platforms and two round metal perches installed on opposite sides of the pen, accessible by wire ramps. The platforms were designed with flat steel edges that did not allow the pullets to grasp, and the perches were 3.2cm in diameter as commonly found in commercial rearing aviaries. Throughout four 4-week long periods from 3-19 weeks-of-age, platforms and perches were systematically offered in a manner such that the pullets were required to choose between grasping versus elevation. In the high perch/low platform (HiPer) treatment, the perch was the highest available structure within the pen while in the high platform/low perch (HiPlat) treatment, the platform was highest. Video recordings were analyzed during each period to count the number of birds roosting on perches (PERCH), platforms (PLAT), and ramps (RAMP). A generalized linear mixed model was used to determine effects of strain, age, and treatment, as well as their interactions on the use of the structures. Overall, an average of 53.1±2.9% of birds/pen chose to roost on PLAT, which was more than PERCH (17.5±1.7%birds/pen), and both were used more than RAMP (8.0±0.8%birds/pen) (p<0.0001). Brown birds sought elevation less than white or mixed pen birds (p=0.0009). Structure use increased with age (p=0.0173), with PLAT use being the highest in period 3, and PERCH use increasing in period 4. There was a location by treatment interaction (p<0.0001): in HiPlat, 71.6±3.7%birds/pen roosted on PLAT and 4.4±1.0% roosted on PERCH whereas in HiPer, birds were more evenly distributed between PLAT and PERCH (35.9±3.1% and 29.6±2.3%birds/pen). Overall, pullets' preference for roosting on the platform outweighed their preferences for elevation and for grasping a round perch. Despite the industry standard of providing round perches to pullets, these results indicate that elevated platforms might be better suited for rearing systems.

Dairy cow-calf contact systems: a characterization of practices in USA and Canada

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There is limited research on dairy cow-calf contact systems on commercial farms regarding the impact of this practice on the welfare and health of the animals. This observational study describes management practices on 12 U.S. and 2 Canadian dairy farms practicing dam-calf contact as the primary rearing method for their calves until weaning. Farms were visited three times: Spring, Summer, and Fall 2024. A questionnaire was completed with producers during a farm visit to get a detailed understanding of their farm, including dam-calf contact management practices. Descriptive results are presented. The farms enrolled on the study have practiced dam-calf contact for between 1 to 17 years. Average herd size was 49 lactating cows (range: 23 to 200). Many of the farms process at least part of their milk (8) or sell their products directly to consumers (9). Daily milking frequency included once (4), twice (7), 3 times over a 2-day period (1). Nine of the farms source their genetics from pure-bred or cross-bred dairy breeds, while the remaining farms use dual-purpose genetics. During the winter season, 8 farms keep dam-calf pairs indoors and 4 provide outdoor access at least part of the day. During the grazing season, most of the farms (10) provide pasture access to dam-calf pairs. Calving occurred continuously year-round on 10 farms, and the others calve seasonally in both spring and fall. Calves suckle their dam as the primary colostrum source on 10 farms and all farms rely exclusively on the dam for calf nursing until weaning. Duration of daily contact varied between whole-day (6), part-time (less than 24h/d; 1), and a transition from whole-day to part-time as calves age (5). On 7 of the farms, male calves were also reared with their dam during the milk feeding period. Average weaning age varied between farms and for male and female calves on the same farm (females: 3.6 months [1.5-6 months]; males: 4.5 months [2-6 months]). There is a disparity in the dam-calf practices between and within the farms for daily contact allowance and weaning strategies, perhaps in relationship to a lack of best practices for dairy cow-calf contact. Similarities are present around the overall farm management practices and the development of farm income diversification.

Early peer housing allows for behavioural opportunities in dairy calves

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Many studies have described the benefits of peer housing for dairy calves, few have explored the effect of pairing age on calf behavioural pattern development. Thus, the aim of our study was to describe the behaviours patterns of dairy calves raised with differing amounts of peer contact. Pre-weaned Holstein heifers were raised on a commercial farm in Brazil, and assigned to: Individual Housing (IH, n = 44), Early Pair Housing (EPH; paired at 6-7 d of age, n = 24 pairs), or Late Pair Housing (LPH; paired at 29-30 d of age, n = 24 pairs). The offered milk volume varied according to age, ranging from 4 to 8 L/d per calf. From 6 to 50 d of age, behavioural observations (5 min scans over 30 min) were conducted after each milk feeding (08:00 and 15:00h). Play, exploration, idle, abnormal oral behaviours, and feeding behaviour were recorded 5 d/wk. To assess behavioural patterns development over time, data were aggregated to calculate cumulative behaviour values. Using RStudio, the cumulative behaviours with treatment as a covariate were modelled. EPH calves exhibited the highest cumulative exploratory behaviour (191 ± 4 scans/calf), compared to IH calves (69 ± 4 scans/calf; $P < 0.01$) and LPH calves (82 ± 4 scans/calf; $P < 0.01$). Additionally, EPH calves displayed higher cumulative play behaviour than LPH calves (20.3 ± 1.2 vs. 14.5 ± 1.2 scans/calf; $P < 0.01$) but did not differ from IH calves (18 ± 1.2 scans/calf; $P = 0.42$). EPH had lower cumulative idle behaviour (17 ± 4 scans/calf), compared to IH calves (167 ± 4 scans/calf; $P < 0.01$) and LPH calves (132 ± 4 scans/calf; $P < 0.01$). Abnormal oral behaviours were more frequent in IH calves (26.3 ± 1.8 scans/calf; $P < 0.01$) and LPH calves (21.7 ± 1.7 scans/calf; $P < 0.01$) compared to EPH calves (14.2 ± 1.7 scans/calf). Feeding behaviours did not differ significantly across treatments (IH: 15.6 ± 1.2 ; EPH: 15.7 ± 1.2 ; LPH: 16.0 ± 1.2 scans/calf; $P = 0.66$). In conclusion, pre-weaned calves with early peer contact may develop differently, becoming more exploratory and playful while engaging less in abnormal oral and idle behaviours than calves with delayed or no peer contact. These findings reinforce the importance of not only social housing but also pairing calves earlier, as it affects their behavioural development.

Perch use of male layer chickens under experimental rearing

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In Swiss organic egg production, male layers are reared for meat production. However, little is known about how male layers cope with Swiss rearing requirements, e.g., how and to what extent male layers use elevated structures during rear. The aim of this study was to investigate how male layers use perches with varying access to perches in comparison to female layers. All pens were equipped with two elevated grid areas and perches above the second grid area. For male layers, access to top perches was either provided with ramps (M+) or without ramps (M), whereas for females the top perches were accessible without ramps only (F). In total, there were ten pens per treatment, each with 20 Lohmann Brown chicks reared from 1 day of age until 13 weeks of age (woa). Video observations were conducted every other week to count the number of birds on the top perches and in the litter. At three times of day (dawn, midday and dusk) per video observation day the quality of movement (e.g. balancing) was analysed for 10 minutes each. Data was analysed using (generalized) linear mixed effects models with treatment, time of day, woa (linear and quadratic terms) and all two-way interactions as fixed effects and pen as random intercept. From woa 7, the percentage of birds using the top perches increased more in F (woa 7: 67.3 % [95 CI: 62.2 – 73.6 %]; woa 13: 89.9 % [87.3 – 93.3%]) than in M (woa 7: 52.1 % [45.3 – 64.5 %]; woa 13: 62.9 % [58.2 – 72.1 %]) or in M+ (woa 7: 59.0 % [47.5 – 60.8 %]; woa 13: 63.9% [52.0 – 66.5 %]). Litter area was never used for roosting during dawn and dusk by birds in F, M and M+ pens. Number of balancing events per minute decreased on average by 57.3 % [46.0 – 67.0 %] across all woas, with a tendency ($p = 0.08$) of M and M+ having 51.8 % [23.7 - 86.8 %] and 64.7% [33 - 100 %] higher values per minute than F. The findings show that males used perches. Observed differences to female perch use might be explained by a lack of perch space affecting males earlier than females due to differences in body size development. Further studies are needed to better understand perch space and perch dimensions needed for rearing male layers.

Effects of two free farrowing systems on the productive performance and welfare of sows

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Traditionally, caged farrowing crates have been used to optimize space and reduce piglet mortality, but these systems have been identified as detrimental to sow welfare. The objective of the present study was to evaluate the effect of two new types of farrowing pens on sow welfare and productive performance using animal-based indicators. The study was conducted in Huesca, Spain, between January and April 2022. A total of 80 hybrid sows (Large White × Landrace) were randomly assigned to two types of farrowing pens: Actiwel farrowing crates (Ti1), with a total area of 5.98 m², and Model 2030 closed-compartment farrowing crates (Ti2), which prevent visual contact between sows and have a total area of 5.4 m². Both pens provided dedicated spaces for sows and piglets, along with a restricted-access area to reduce piglet crushing risks. Saliva samples were collected to measure cortisol levels, and welfare indicators such as injuries, socio-maternal behavior, and body condition were assessed. No significant differences in cortisol concentrations were found before farrowing (Ti1: 2.49 nmol/L and Ti2: 3.31 nmol/L), but by the end of lactation, cortisol levels were significantly higher in Ti2 (Ti1: 2.14 nmol/L, Ti2: 3.58 nmol/L). No significant differences were observed in socio-maternal lesions before farrowing; however, the incidence of shoulder lesions increased in the Ti1 and Ti2 groups (41.1% vs. 41.4%), and the presence of dirt on the teats increased by 22.2% in Ti2, while in Ti1 a 1.9% decrease was observed after the lactation period. Lesions associated with the use of the farrowing crate, such as bursitis (0.9% vs. 18.1%) and carpal lesions (3.7% vs. 8.3%), showed a significant increase in the Ti2 group compared to Ti1. On the other hand, the incidence of lameness increased by 5.6% in Ti1, while it decreased by the same percentage in Ti2. Vulvar discharge was rare, affecting fewer than 2% of sows. No significant differences were found in body condition between the two systems, with 70% of sows maintaining an acceptable condition before farrowing and after lactation. In conclusion, although both farrowing systems demonstrated an improvement in sow comfort in comparison to traditional crates, Ti1 exhibited a reduced negative impact on injuries and stress, thus demonstrating that this system offers enhanced welfare outcomes. This study underscores the need for continuous evaluation of farrowing systems to balance animal welfare with productive performance.

Optimizing nestbox design: the impact of airflow and visual seclusion on farmed mink (*Neogale vison*) behaviour and welfare

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Housing design is crucial to improve farmed mink (*Neogale vison*) welfare. This study investigated how nestbox modifications in airflow and privacy influence mink behaviour. Airflow aids thermoregulation, particularly during warmer months when insufficient ventilation could lead to heat stress. Increasing airflow in nestboxes may provide a cooler microenvironment, potentially increasing comfort and reducing behavioural indicators of poor welfare (e.g., stereotypies and tail gnawing). Visual seclusion provided by the nestbox offers mink a sense of concealment, allowing rest and minimizing environmental disturbances (e.g., human movement nearby). We hypothesized that mink would prefer the nestbox with increased airflow over the standard style, and that mink would prefer the more secluded nestbox over one with increased visibility. Forty-seven male-female sibling pairs were housed in dual pens with access to a nestbox on each side. To test for airflow preference, 24 mink pairs could choose between a control nestbox and one with ventilation holes. To test seclusion preferences, 23 mink pairs could choose between an opaque plastic nestbox and a transparent plexiglass nestbox with reduced visual seclusion. Behaviour was scan-sampled five times daily, three times weekly, from July to October to record nestbox use, location, activity (e.g., active, inactive, abnormal behaviours), and sibling interactions to indicate overall welfare and assess behavioural responses to the experimental conditions. Preference was determined by dividing the time spent in each nestbox by the total time spent in either nestbox. Preliminary chi-square and GLM analyses revealed significant nestbox preferences and environmental influences. Although mink spent 63% of nestbox time in the increased-airflow nestbox, this was not a statistically significant preference. Unexpectedly, mink preferred the nestbox with decreased visual seclusion, spending 66% of nestbox time in the transparent nestbox ($\chi^2(1) = 11.965$, $p = 0.001$). Resting was the primary behaviour observed in the nestbox in both experiments (airflow: 62%; seclusion: 70% of total time spent in nestbox), with no stereotypic behaviours recorded. The significant preference for visibility challenges assumptions that full nestbox seclusion is necessary for optimal welfare. In both experiments, nestbox use declined as temperature increased (airflow: $F_{1,57} = 22.1$, $p < 0.000$; privacy: $F_{1,42} = 11.5$, $p < 0.002$), highlighting the role of environmental conditions in nestbox choices. These findings provide insights into how nestbox design can impact mink behaviour. Examining how these preferences align with other behaviours and welfare measures will inform evidence-based pen optimization for mink farming.

Spotting the signs: early life traits associated with tail damage in pigs

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Tail biting in pigs is a multi-factorial phenomenon, with both intrinsic (animal-level) and extrinsic (environment- and management-level) risk factors. Demonstrating the causality of these risk factors is challenging due to the highly unpredictable nature of tail biting behaviour. Furthermore, intrinsic and extrinsic risks may change over time and across different stages of production, making it challenging to perform causal analyses. A better understanding of the factors that predispose pigs to tail biting later in life may give producers tools for better on-farm management and interventions. To address this knowledge gap, we analysed a subset of data collected from a large perspective cohort epidemiological study with the aim of identifying early life traits and their effects on tail damage at different stages of production. Individual data from birth until slaughter were collected from 79,552 tail-docked pigs, across eight pig production sites in Australia. Data on early life traits, including but not limited to litter size, health status, and weaning age, were collected. Tail damage was scored from weaning until the end of the finisher period. The relative importance of early life factors on the incidence of tail damage at different production periods (weaner, ~3-8 weeks; grower, ~9-16 weeks; finisher ~17-25 weeks) was analysed using multilevel Cox proportional hazard regression models. Litter size affected the risk of tail damage, with pigs from litters of more than 10 piglets born alive having increased daily instantaneous hazard during the weaner (Hazard ratio, HR: 2.9, 95% CI 1.67 to 5.04), grower (HR:1.4, 95% CI 1.15 to 1.83) and the finisher period (HR: 1.7 95% CI 1.34 to 2.06), compared to litters of less than 10 piglets born alive. Although poor health status during lactation did not increase the daily hazard for tail damage during the weaner period, it did during the grower (HR: 1.35, 95% CI 1.14 to 1.60) and finisher (HR: 1.5, 95% CI 1.29 to 1.74) periods. Weaning pigs before 25 days of age increased the daily hazard of tail damage during the weaner (HR: 5.15, 95% CI 3.22 to 8.23), grower (HR: 2.14, 95% CI 1.70 to 2.70) and the finisher (HR: 1.83, 95% CI 1.31 to 2.57) stages of production. This research shows that the early life factors such as litter size, health status and weaning age increase tail damage later in life, but the strength of their effect varies depending on the age of pigs.

Giving donkeys a good life: an applied example of designing housing to meet the behavioural needs of donkeys

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1. The Donkey Sanctuary

Despite their differing requirements, donkeys are often managed and treated like horses and ponies. This compromises their behavioural needs and can have a negative impact on their welfare. Here we report a project aimed at improving the housing and environment of a herd of donkeys to allow them greater agency and behavioural flexibility. A One Welfare approach was taken whereby opportunities to improve biodiversity and ecosystem services, alongside visitor experience and ease of management were also explored. The project area was 0.7ha with limited natural browse available. Comprehensive data on all aspects of the site and its usage were collected to provide a baseline and inform the project design, including behavioural observations, Qualitative Behavioural Assessments (QBAs), and ecological surveys (soil health, botanical surveys and condition assessments). Pre-intervention observational data revealed the area to be overgrazed except for latrines with poor shelter and shade provision. The positioning of available shade created potential conflict between the donkeys desire for shade and exposure to visitor interaction. Resource guarding, agitation and aggression were observed due to feeder placement. Behavioural observations were supported by the QBA scores which differed significantly depending on whether there was overcrowding around the feeders ($P < 0.001$). Donkeys were significantly less happy, less relaxed, more anxious and competed for resources more when there was overcrowding around the feeders. The mood of donkeys was significantly worse ($P = 0.01$) and the energy state of the donkeys greater ($P < 0.001$) when overcrowding was present. There was also a significant difference in the QBA scores of donkeys depending on the type of access they had to a paddock ($P < 0.001$). Donkeys were more curious, less happy, less relaxed, less at ease, more bored, more agitated, more aggressive, more anxious, more playful and more fearful when they had no access to a paddock. The mood of donkeys was significantly more positive ($P < 0.001$) and their energy state was significantly calmer ($P < 0.001$) when they had paddock access. From the baseline data, the priorities for the housing redesign included increased opportunities for shelter, shade and privacy from the public, greater environmental variation, year round access to grazing, and improved feeder placement. It was also important that the housing could be easily adapted to accommodate different-sized donkeys as futureproofing. Whilst the delivery stage of this project is in its infancy, monitoring has been ongoing from the outset, and will continue into the future, with positive outcomes already being recorded.

Care of the elderly hen: Do keel bone damage and foot problems affect the roosting preferences of older laying hens?

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Laying hens are highly motivated to roost on elevated structures at night. However, it is unknown whether painful conditions such as keel fractures or foot lesions affect motivation for perching or preferences for perch structures. We housed 32 Dekalb White (DW, 72 Weeks of Age (WOA)), 32 Bovans Brown (BB, 72 WOA) and 32 White Leghorn (WL, 54 WOA) laying hens separately in 4 floor pens/strain (N=12). Within each pen, there were 2 birds of each health status (n=8); healthy, keel bone damage (fracture or severe deviations, determined by palpation and radiographs), foot problem (including footpad lesions, epithelial proliferation, bumblefoot, and toe damage), or both, with birds individually identified using numbered backpacks. Three roosting structures were offered in a series of pairwise comparisons over three 2-week periods: round perch (diameter=2.54cm), flattened oval perch (2.54x5.08cm), and a wire platform (38cm), all were 1.5m long and elevated 81cm above the ground. All birds had previous experience with round perches, however, the flattened oval perch was novel. Behaviour was recorded over 48h each week (96h/period). Observers, blinded to hens' condition, performed scan sampling once hourly during the dark period to identify individual birds' locations within their pen. Data were analysed using a General Linear Mixed Model with fixed effects of strain, condition, location, and the interactions of strain*location, condition*location, and strain*condition*location. The interaction effects were used to test the hypotheses that strain and condition would affect the birds' location. Data shown are adjusted counts of birds of each strain and condition observed at each location. There was an interaction of strain*location ($P<0.0001$). BB hens were observed on the ground (35.65) most often compared to DW (18.94) and WL (15.47). DW and WL roosted on the platform (35.81 and 34.54) and the round perch (31.59 and 29.46) the most, followed by the oval perch (26.84 and 24.10), respectively, though the differences between elevated structures were not significant. Although there was a three-way interaction between strain, condition and location ($P=0.0372$), there were no clear or consistent relationships between condition and roosting preference in any strain ($P=0.0039$). In conclusion, keel damage and foot health did not affect older laying hens' use of elevated structures. Hens of different strains preferred to roost on different structures, however, the majority of hens preferred to use the platform and the round perch more than the oval perch.

Comparing the influence of housing conditions and age at the start of preparation for stallion licensing on the horses' behavior during a novel object test

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The demands that are associated with the preparation for stallion licensing may have significant effects on the welfare of young horses that can be assessed through behavioral testing. In this study, the novel object test is used to compare the effects of group and individual housing systems and ages at preparation onset on equine behavior. 29 Warmblood stallions underwent 12 weeks of standardized preparation for stallion licensing. A Novel Object Test (NOT) was performed at weeks 2 and 11, using inflatable pool rafts as novel objects (NO). The horses were left alone for 10 minutes in a lunging arena familiar from regular lunging units. Stallions were grouped by age at preparation onset and housing: 24 months old box (n=10), 24 months old group (n=9), and 30 months old box (n=10). There was a significant difference between the first and second NOT. The horses took more time to fixate the NO for the first time (Test1: 15.8±4.2 s, Test2: 53.5±16.4 s; p <0.001) while the total number (Test1: 7.4±1.7, Test2: 3.2±0.8; p <0.001) and duration of fixations (Test1: 25.8±4.8s, Test2: 12.7±4.8 s; p <0.001) decreased. In addition, the number of times sniffing the object (Test1: 3.2±0.5, Test2: 2.1±0.4; p <0.05) and touching it with the muzzle (Test1: 2.9±0.6, Test2: 0.8±0.2; p <0.001) were lower during the second test. Moreover, there was more bucking (Test1: 0.1±0.07, Test2: 0.5±0.3; p <0.05) in the second test as well as in the horses that were kept in individual stalls (Box: 0.6±0.3, Group: 0.09±0.08; p <0.05). The boxed horses also approached the object more often than the ones kept in groups (Box: 7.5±0.5, Group: 4.8±0.6; p <0.01). Otherwise, there were no further differences in the behavior between age and husbandry groups. Even though age and husbandry had little effect on the results, there were significant differences in the behavior between the first and second NOT which suggests that the preparation for licensing did affect the stallions' behavior during the NOT. The decreased exploration of the NO and the environment in the second test may indicate increased anxiousness. However, these findings need to be verified in further studies. The HorseWatch project is financially supported by the German Federal Ministry of Food and Agriculture (BMEL) based on a decision of the Parliament of the Federal Republic of Germany, granted by the Federal Office for Agriculture and Food (BLE; grant number 2820HS017).

Farmed fish welfare in Egypt: Surveying current practices and future directions for tilapia culture

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This study aimed to map the status of tilapia farming in Egypt's Nile Delta region, in particular the knowledge, attitudes, and practices (KAPs) of Egyptian tilapia farmers towards the current state of animal welfare in the sector and the major challenges they face in their daily operations. To this end, we conducted a structured face-to-face survey with 104 tilapia farmers across three governorates, using a questionnaire composed of closed-ended questions, including Likert scales and multiple-choice items, covering farming practices, feed management, health and safety measures, and the economic aspects of tilapia farming. Descriptive statistics and chi-square tests were used to analyse the data. We found that just 11% of the surveyed tilapia farmers had received any sort of training on the importance of animal welfare, while 76% said they could benefit from such training. Farmers perceived maintaining good water quality ($n = 92$; 88%) as the most important metric for achieving good tilapia welfare. However, fewer reported being able to effectively intervene on this factor ($n = 40$; 38%), compared to changing feeding practices ($n = 68$; 65%), minimising handling ($n = 58$; 56%) and carrying out veterinary checks ($n = 48$; 46%). In addition, we found evidence of better production outcomes among trained farmers, with significantly fewer of them reporting high mortality rates ($p < 0.05$) and significantly lower reported frequency of poor growth ($p < 0.05$). Most farmers ($n = 79$; 76%) expected the Egyptian tilapia production sector to continue to grow and intensify. We present the data as an overview of Egyptian tilapia farmers' knowledge, attitudes and practices relating to fish welfare, and as a basis for future efforts to improve the welfare of farmed tilapia in Egypt given the lack of awareness around this topic and the fact that it is gaining increasing importance elsewhere. We see a need for establishing minimum animal welfare standards in Egyptian tilapia farming either through regulators or certification schemes. There is also a clear need for establishing training programmes that cover animal health and welfare aspects in aquaculture.

Comparative behavioral analysis of Berkshire and LWD piglets in Free Farrowing System

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In pig husbandry, management practices should be tailored to the specific characteristics of each breed. The Free Farrowing System (FFS), which improves sow and piglet welfare by removing confinement, has been studied primarily in LWD (Landrace × Large White × Duroc) piglets. However, behavioural characteristics of pure-bred Berkshire piglets under FFS remain unclear. Given that Berkshire pigs may show distinct behavioural traits, understanding their behaviour under FFS may contribute to the development of breed-specific husbandry strategies. This study aimed to compare the behaviours of Berkshire and LWD piglets under FFS to identify breed-specific behavioural traits in Berkshire piglets. The experiment was conducted at Tokai University using the PigSAFE pen, an alternative to farrowing crates. Data were collected over two periods: July–August 2023 and February–October 2024. A total of 14 Berkshire piglets (7 castrated males, 7 females) and 25 LWD piglets (13 castrated males, 12 females), each group from two sows, were included in the study. Behaviour of sows and piglets was continuously recorded by video for 24 hours on postnatal days 4, 7, 10, 13, 16, 19, 22, and 25. Video footage from 10:00 to 14:00 on each observation day was analysed by a single observer using instantaneous sampling at 3-minute intervals. Observed behaviours were categorized into self-maintenance, social, and abnormal behaviours. Results showed that Berkshire piglets displayed a higher frequency of nosing at the sow's udder ($16.4 \pm 5.6\%$ vs. $9.5 \pm 3.8\%$, $p < 0.01$) and belly nosing ($0.1 \pm 0.3\%$ vs. $0.0 \pm 0.0\%$, $p < 0.01$), indicating a stronger suckling motivation. Berkshire piglets also exhibited more social behaviour ($2.5 \pm 1.5\%$ vs. $1.0 \pm 0.7\%$, $p < 0.01$), play behaviour ($0.74 \pm 0.55\%$ vs. $0.3 \pm 0.5\%$, $p < 0.01$), and social play ($0.83 \pm 0.67\%$ vs. $0.2 \pm 0.3\%$, $p < 0.01$) than LWD piglets. No significant difference was observed in the frequency of agonistic behaviours in both breeds. These results suggest that Berkshire piglets may be more active and socially engaged than LWD piglets, without an increased incidence of aggressive behaviour. This behavioural profile may inform management practices tailored to Berkshire under FFS.

3D Pose estimation reveals variations in discomfort-alleviating motions when getting up in restrictive cubicles

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Cubicles can induce discomfort in dairy cows by constraining their movements causing painful collisions with stall hardware. These adverse physical stimuli prompt cows to perform atypical motions when transitioning from lying to standing. The extent of such behaviours varies between bout, even in identical cubicles, suggesting differences both in how cows experience discomfort and in how – or whether – they attempt to alleviate it. Understanding patterns in the occurrence of such motions is crucial to the improvement of cubicles. To investigate whether atypical motions group into distinct patterns, we recorded 711 rising bouts of 183 dairy cows housed in a barn with standard cubicles – with head and neck bars – between December 2021 and April 2022. Using 3D pose estimation, we tracked the displacement of four anatomical landmarks (poll, withers, T13, and sacrum) throughout each rising sequence. We scored the following indicators of abnormal posture transition: total bout duration, head lunge distance, lunge angle, backwards crawling distance, and readjustment movement duration—each presumed to reflect attempts to alleviate discomfort. Bouts were clustered based on their indicator scores using k-means. Silhouette width revealed an optimal number of two clusters. Principal component analysis (PCA) was fitted to identify which variables most distinguished clusters. A distinct separation was only shown along principal component 1 (PC1) which explained 45% of variance. The indicators scoring most on PC1 were readjustment duration (0.7), total duration (0.69), and crawling distance (0.52). PC1 was interpreted as readjustment movements before lunge. There was no pattern in the distribution of individual scores on the remaining principal components between the clusters. Total duration had a coefficient of variation of 34%, lunge distance 50%, angle 7%, crawling 98% and readjustment 60%. Head lunge angle and distance loaded on PC2 and had a negligible loading on PC1 (-0.02 and 0.09). Backwards crawling is a common atypical rising pattern according to expert assessors. We found it to occur in 59% of bouts, which also means that it is not systematic. The variability shows that response to restrictive cubicles are diverse. Atypical motions can be expressed in tandem; PC1 and PC2 suggest that readjustments do not correlate with lunging behaviour even though readjustments had been hypothesised as a way of preparing forward space for the head. The study failed to determine patterns of atypical motions, which could suggest that these behaviours rather happen on a continuum.

Effect of a new fennel essential oil composed environmental enrichment on the feeding behavior of rabbits

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To improve production and reduce stress in cage-raised rabbits, efforts focus on enriching the environment with species-specific elements. Fennel essential oil, with its anxiolytic, anti-inflammatory, and digestive benefits, may aid this enhancement. With that, the aim of this preliminary study was to evaluate a new sensorial environmental enrichment with fennel essential oil and evaluate its effects on the feeding behavior of growing rabbits. A total of 20 weaned New Zealand White rabbits at 36 ± 3 days of age were allotted to individual cages (80x60x45cm) in a randomized block design with four treatments and five animals per treatment: T1) basal feed + hay (hay considered as the enrichment); T2) basal feed + hay + enrichment block with no fennel; T3) basal feed + hay + enrichment block with fennel; and T4) basal feed + enrichment block with fennel. Enrichment blocks were produced with wheat, molasses, bentonite, limestone and, for the T3 and T4, fennel essential oil (0,03 mL). The blocks were mechanically pressed and dried for 48h at 50° C. The rabbits were fed once a day, and had access to water and feed *ad libitum*; the same applied for hay and blocks on respective treatments. Focal feeding behavior observations were made twice a week, for 15 days. Trained observers stood in front of the cages after feed offering, and watched the animals for two minutes. Observed behaviors consisted of feeding, eating the enrichment (hay and block), drinking, and stop feeding to perform self-cleaning, activity behaviors (exploring, hopping, sniffing), abnormal behaviors (sham chewing, cage licking or biting, digging, head swings), or ignore the feed by simply stay sitting or lying. ANOVA was conducted if the data were homogenous; otherwise, the Kruskal-Wallis test was used. Treatments with only one enrichment option (T1 and T4) spent more time feeding (93 ± 8.4 and 98 ± 8.1 s, respectively) when compared to treatments with both enrichments (T2 - 51 ± 10.3 s, and T3 - 55 ± 9.4 s) ($P < 0.01$). Numerically, T4 was the treatment which spent less time eating the block (13 ± 21 s). Furthermore, rabbits from T3 either interrupted feeding to perform activity behaviors (49 ± 8.8 s) or stayed lying (94 ± 9.4 s) the most. We hypothesized that rabbits with a single enrichment show greater interest in feeding, promptly accessing the feed tray after feed is provided. Furthermore, fennel appeared to act as a feeding stimulator, also attracting the rabbits' interest and serving as an enrichment tool that promotes more unruffled behaviors.

Assessing owner ratings of dog pain sensitivity and their association with everyday dog behavior through questionnaires

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Little is known about how dog owners perceive their dogs' pain sensitivity and expression. The aim of this study was to explore how different questionnaire-based measures capture owners' perceptions of their dogs' pain sensitivity, and whether these perceptions correlate with the owners' assessment of the dogs' everyday behavior. Questionnaire data was collected from 979 owners of Labrador Retrievers. The questionnaire contained several sections, including demographic questions, the Canine Behavioral Assessment and Research Questionnaire (C- BARQ), and 12 items assessing how painful owners believed different situations would be for their dog (rated from 0 to 5). Owners also rated their dog's general pain sensitivity (GPS) on a scale from 0 to 4. C-BARQ subscale scores, as well as an average pain sensitivity score (APSS) based on owner ratings of their dog's pain in the different situations, were calculated. The pain scenario questions showed an acceptable internal consistency (Cronbach's alpha = 0.85, average inter-item correlation = 0.31). Preliminary results using Spearman's rank- order correlations showed a significant correlation between APSS and GPS of 0.40 ($p < 0.001$). Both the APSS and GPS were also correlated with the C-BARQ subscale 'Touch Sensitivity' ($r_s = 0.21$ and $r_s = 0.18$, respectively, $p < 0.001$ for both). Of the other C-BARQ subscales, the APSS score was most strongly correlated with 'Excitability' ($r_s = 0.20$, $p < 0.001$), 'Non-Social Fear' ($r_s = 0.16$, $p < 0.001$), and 'Dog-Directed Fear or Aggression' ($r_s = 0.14$, $p < 0.001$). No significant differences between male and female dogs in either APSS or GPS were detected using Mann-Whitney U tests. These preliminary results suggest that owners' perceptions of their dogs' pain sensitivity were relatively consistent across different measures in the questionnaire and correlated with some behaviors in other situations. However, the relatively low correlations with C-BARQ subscales also indicate that pain sensitivity may be somewhat independent from other dog personality factors. These correlations and their connection to stress and personality in dogs and their owners will be explored further.

Essentials of Clinical Ethology

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The scientific study of animal behaviour started in the early thirties of the past century with well-known protagonists such as Niko Tinbergen. Ever since, the discipline has provided tools to apply its knowledge in many disciplines ranging from genetics to neurobiology. This knowledge of animal behaviour is also applied in clinical settings, behavioural diagnosis and therapeutical interventions to solve and prevent behavioural problems, a field known as *clinical ethology*. Worldwide, many companion animals suffer from various behavioural problems (e.g. dog, cats, rabbits, parrots, ferrets). A recent study in the USA, showed that 99.12% of the pet dogs had at least one problem behaviour of variable intensity, as based on a dataset of 43,517 dogs. Behavioural problems can be signals of reduced adaptive capacity with implications for animal welfare and may result in public concerns when it comes to biting incidents. The field of *clinical ethology* is characterized by the integration of interdisciplinary knowledge and incorporation of ultimate as well as proximate perspectives and working in multi-disciplinary teams. In case of domestic animals, where both human and animals share the same environment and may face the same environmental challenges, questions arise like *what can we learn from each other?* considering the fact that an estimated 285 million people suffer of anxiety disorders, 265 million people have depressions, and millions suffer of dementia or other mental disorders. In this presentation *Essentials of Clinical Ethology* I will explore the benefits to foster further on integrated knowledge, whereby the information on behavioural development (genetics, early life experiences like mother-child relationship and socialisation processes), behavioural diagnosis, treatment (e.g. [re]conditioning, psychopharmacotherapy) and the prevention of behavioural problems play a central role. The ultimate goal is to improve mental care for both animals and humans in the future and provide a better welfare for all. The integrated disciplines can be seen as a most illustrative example of the *One Health-One Welfare principle*.

Genetics of anxiety and OCD in dogs

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Given the convergent evolution of social cognition and cooperation of dogs and humans, domesticated dogs may be a better model for psychopathology than non-human primates. Purebred dogs are highly inbred, limiting phenotypic noise from modifying genes and increasing effect sizes of small numbers of segregating loci. Importantly, other than old age and terminal sickness, behavioral problems are the most common reasons for euthanasia in dogs, making further research in these areas an important need for dog welfare. To better understand the evolutionary origins of anxiety and OCD, we characterized the genetic underpinnings of canine anxiety and OCD and how this relates to the human equivalents. We harnessed a large longitudinal sample ($n=3,348$) of dog genomic (1.1M SNP Axiom Canine HD array) and behavioral (Canine Behavioral Assessment and Research Questionnaire) data from the Morris Animal Foundation Golden Retriever Lifetime Study. We conducted Genome Wide Association Studies (GWAS) using a case-control design and the GCTA mixed linear model association (MLMA-LOCO) method, applying Bonferroni correction for multiple testing. Controls excluded all dogs taking behavioral medication; cases excluded all timepoints that dogs took behavioral medication. Cases were based on the highest anxiety or OCD score across all timepoints and included cumulative anxiety, anxiety subtypes (dog-directed fear, stranger-directed fear, nonsocial fear and separation-related problems), and an OCD-like behavior score. We identified evolutionarily conserved regions of the human genome and the functional consequences of significant variants. We identified 14 significant ($p < 3.1 \times 10^{-7}$; 0.27). Identified genetic markers advance our understanding of the pathophysiology of anxiety and OCD and point the way for more effective prediction and treatment of dog and human behavioral problems. Future analyses aim to validate significant SNPs on additional purebred and mixed breed cohorts and lab-based sequencing. We will assess whether the genetic weight of anxiety in humans matches that found in the dog sample. As most significant regions were found in non-coding regions, future analyses will explore the epigenetic basis of canine anxiety in these cohorts.

Exploring cat quality of life: bridging subjective perceptions and objective assessments

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Assessing an animal's quality of life (QoL) often relies on caretaker reports, which provide valuable insights into behavioural and health changes but may overlook key welfare factors. Understanding which aspects influence caretakers' perceptions of their cats' QoL and how they align with more objective measures can help improve assessment tools. We hypothesised that medical needs, age, outdoor access, enrichment, and human-animal interactions significantly impact QoL perceptions. Additionally, we aimed to develop a simple monitoring tool for cats' QoL and assess its correlation with a more detailed measure. To this end, caretakers (N = 421) completed an online survey on their cats' characteristics and health (e.g. age, body condition, signs of good/impaired health, medical needs), husbandry (social environment, outdoor access, environmental features relevant to cat welfare such as resting places, enrichment etc.), human-animal interactions, cat behaviour (e.g., frequency of different behaviours towards conspecifics and caretakers including play, aggression, and vocalisations) and impressions on emotional states. They rated their cat's overall QoL on a 0–100 scale (QoL_scale), while a more comprehensive measure (QoL_extensive) was derived from a principal component analysis (PCA) of 54 behaviour, health and emotional states items. This analysis identified six components: Vitality, Attentiveness, Negative Emotions, Healthy Impression, Sociability (e.g., towards humans and other cats), and Aggression. Then, QoL_extensive was calculated by averaging the values of the individual components. Two regression models examined predictors of QoL_scale and QoL_extensive, incorporating factors such as medical needs, body condition, outdoor access, and enrichment. For QoL_scale, the six QoL_extensive components were also included to investigate how they relate to the more subjective assessment. Our results showed that key predictors of QoL_scale included the absence of disease ($\beta = -0.19$), enrichment ($\beta = 0.20$), attentiveness ($\beta = 0.25$), and lower apprehensiveness ($\beta = -0.21$). For QoL_extensive, significant predictors included age ($\beta = -0.29$), body condition ($\beta = 0.16$), human-animal interactions ($\beta = 0.17$), stimulation ($\beta = 0.16$), and access to adequate activity areas ($\beta = 0.12$). QoL_scale and QoL_extensive correlated weakly ($r = 0.30$, $p < 0.001$), suggesting they capture related but distinct aspects of cat welfare. Our findings highlight the need for a comprehensive QoL assessment approach. While caretaker perceptions provide valuable information, they may not capture all welfare-relevant aspects, as evidenced by the poor correlation between the scales. A combined approach integrating simple behavioural and physical condition assessments with detailed questionnaires is recommended to enhance the accuracy of future feline QoL research.

Effects of single- or pair-housing on the welfare of shelter dogs: behavioral and physiological indicators

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Social isolation can be a stressor for dogs in shelters, but dogs are typically housed alone to reduce injury and disease spread. While prior studies have indicated that cohousing dogs can produce behavioral and physiological benefits, these studies have typically focused on laboratory dogs or shelter dogs that have been kennelled for several months. Thus, those results might not necessarily generalize to shelter dogs, many of which have shorter lengths of stay than those dogs studied to date, and might be cohoused soon after intake. We investigated the behavioral and physiological effects of single- or pair-housing shelter dogs, most of which had recently entered the shelter (within 25 days). Using a dog-dog assessment, we pseudorandomly assigned dog-friendly dogs to single- or pair housing. We collected behavioral data on 30 single-housed and 31 pair-housed dogs daily across seven days by collecting four 1-min videos per day. We also collected urine for cortisol:creatinine analysis on a subset (22 single-housed; 18 pair-housed) for eight days (each day of the seven-day study plus a baseline sample on Day 0, prior to dogs' enrollment). Finally, for dogs that had entered the shelter within 1 day of being enrolled, we calculated length of stay (LOS). We found pair-housed dogs engaged in three stress related behaviors in significantly fewer intervals than single-housed dogs: lip licking $F(1, 59) = 9.28, p = .003$; ears back, $F(1, 59) = 4.13, p = .047$ and whining. $F(1, 59) = 53.84, p < .001$. We also found a statistically significant interaction between housing $\times$ day $F(6, 228) = 2.169, p = .046$ for the change in cortisol:creatinine. For LOS, two coefficients in the model were statistically significant: housing type ($\beta = -4.56, t = -2.139, p < .05$); and weight ($\beta = .11, t = 2.463, p < .05$). Our results add to the evidence that pair-housing compatible dogs could benefit both their proximate welfare, as evidenced by their behavioral and physiological responses, and their ultimate welfare, as evidenced by shorter lengths of stay. Our study expands prior research into a more naturalistic shelter population: dogs that are housed short term and are often paired with another dog soon after their entry into the shelter. Our study had several limitations including a relatively small sample size, a short observation period (7 days) and a shelter that already had a robust enrichment program, all of which are opportunities for future research.

Clicking with cats: assessing socialization methods on Domestic Cat (*Felis catus*) behaviour in the animal shelter environment

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Large numbers of domestic cats (*Felis catus*) pass through animal shelters each year. The shelter environment can challenge a cat's wellbeing and health, with negative effects that are exacerbated with increased length of stay (LOS). Decreased welfare can manifest as undesirable behaviours (e.g., hiding or aggression) lowering a cat's chance of adoption and increasing LOS. There is interest in studying strategies to improve shelter cat wellbeing and promote timely adoptions, although few studies have evaluated "clicker training" (CT), a form of operant conditioning, as a method of social enrichment. This study compares the effects of CT on shelter cat behaviour with other socialization techniques, including structured play sessions with a human and "treatment-as-usual" (TAU, the routine interactions between staff and cats). In the first study, cats (initial N=24) were quasi-randomly assigned to one of three conditions (CT, N=8; play, N=7; TAU, N=9) and received behavioural evaluations prior to, during, and after treatment, including the Human Approach Test (HAT), and those recommended for shelter cat assessment by Ellis (2022; Animals 12: 2897): the Fear, Anxiety, and Stress (FAS), Response to Petting (RTP), and Participation in Play (PIP) tests. Changes in individual cats' test scores over time (N=15) were evaluated and group scores were compared to assess for differences in treatment effectiveness. Four of the five CT cats successfully learned one novel behaviour over 10 training sessions. There were no changes in HAT outcomes for 13/15 cats. However, of the five cats scored as "no contact possible" at baseline (one in the CT and four in the play group), the only cat whose score changed to "contact possible" was in the CT group. In the play group, four cats remained "no contact possible" and one reverted from "contact possible" to "no contact possible". There were no significant differences in FAS, RTP, and PIP test outcomes across tests, likely due to ceiling effects. There was an age effect in the PIP test, with younger cats scoring higher, beginning at baseline ($\chi^2_1 = 5.35, p = 0.022$). In Study 2 (ongoing), we added the standardized Cat Stress Score and the Room Entry Test, as well as a socialization score that integrates shelter staff ratings. The outcomes of this study will provide insight on study design challenges experienced when conducting research in an active animal shelter and highlights the need for more research into the potential benefits of clicker training on shelter cat welfare.

Does cat's personality and behaviour during veterinary consultations influence their physiological parameters?

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Elevated physiological parameters—heart rate, blood pressure, respiratory rate, and temperature—are common in cats during veterinary visits due to stress. This study aimed to evaluate how a cat's personality and behaviour influence physiological parameters in a clinical setting. 17 healthy cats (7 males, 10 females, aged 4 months to 10 years) were enrolled in this study. To evaluate cats' personalities, cats individually underwent three neophobia tests: open field, novel object, and unknown human, each lasting 3 to 5 minutes. Behavioural data, including vocalisations, exploration, latency to approach, and time spent interacting with the novel object or human, were recorded. After the behavioural tests, a clinical evaluation was conducted in a consultation room, lasting a maximum of 30 minutes and divided in two phases: anamnesis (15-minute interview) and parameters (maximum 15-minute measurement; heart rate, respiratory rate, blood pressure, and temperature, all collected following the same order and standard clinical routine procedures by the same evaluator). Cats were allowed to roam freely during the anamnesis, and behaviour was video recorded based on an adapted ethogram considering exploration, vocalisation, approach to owner, alertness, hiding, being petted, and rubbing. Physical restraint for measuring the parameters was tailored to each cat's tolerance, with minimal handling or gentle wrapping for resistant cats. Physiological data were annotated electronically. Behavioural data were analysed using BORIS® software. Principal component analysis was used to extract personality traits identified in the neophobia tests based on behaviours with factor loadings ≥ 0.6 . Linear regression models analysed the relationship between personality, behaviour during the clinical evaluation, and physiological parameters with age, neutered status, and sex as covariates. None of the behavioural patterns identified from the neophobia tests were associated with physiological parameters. However, during the clinical evaluation there were associations: in the anamnesis phase, cats that spent less time exploring had higher body temperatures ($p = 0.04$); cats with higher blood pressure vocalised less ($p = 0.04$) and were more alert ($p = 0.04$). Cats that approached more humans and were petted more had higher heart rates ($p < 0.01$, $p = 0.04$, respectively). In the parameters measurement phase, a greater human approach increased heart rate ($p < 0.01$) and body temperature ($p = 0.03$). Overall, personality traits did not influence physiological parameters; however, certain key behaviours correlated with specific physiological measures. Further analysis may clarify whether these behavioural changes should be considered in the clinical interpretation of these parameters.

Care to share? Using social feeding behaviour as a novel method of assessing social motivation

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Cattle are motivated to maintain social contact, but individual preference for social proximity can vary across contexts. During feeding, individual variation in spatial patterns by cattle are associated with management (e.g., timing or space allowance during fresh feed delivery) and social factors (dominance status). Little is known about how spatial feeding behaviour reflects individuals' preference for social proximity in indoor-housed cattle. We investigated animal distribution in a novel social-feed trade-off test as a potential measure of social motivation. In five 22-minute sessions, groups of three Holstein dairy heifers ($n=12$, mean $\pm$ SD 6.41 ± 1.06 months of age, weighing 230 ± 26.70 kg) could freely move between two troughs, visually separated and 26 m apart. At one trough, heifers were offered 150 g of grain every two minutes (high side) and every four minutes at the other trough (low side). The Ideal Free Distribution theory (IFD) predicts that animals disperse themselves proportionally to available resources. We thus hypothesized that heifers would distribute among the two troughs by feeding with one social partner at the high side versus feeding alone at the low side so that, on average, individuals would spend 33% of their time feeding alone. Moreover, we hypothesized that deviations from this value would reflect high (or low) social motivation. Animal dispersal was assessed via video scan-sampling at 10 s intervals. We found that heifers spent on average ($\pm$ SE) just 24.95 ± 3.21 % of their time feeding alone, potentially reflecting how much the animals valued social contact. Time feeding alone varied among heifers from 0 to 56.6 % of the time; this variation was weakly associated with differences in sociability as assessed by the time animals took to return to peers following social isolation (slope 0.06 ± 0.03 , $R^2=0.08$, $p=0.09$), but not with heifers' willingness to leave peers to access grain when tested in an alternative social-feed trade-off test (slope -0.05 ± 0.03 , $R^2=0.81$, $p=0.18$). Collectively, our findings suggest that different measures of social motivation are not necessarily consistent. We conclude that instead of regarding 'sociability' as a single trait, refined assessment approaches (e.g., assessed following social deprivation or not, tested in the presence of highly desired resources like grain, etc.) should consider that variations in external circumstances likely influence the motivation for social contact.

Do trees matter? A comparison of pig behaviour in agroforestry and grassland systems in a temperate maritime climate

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Compared to indoor housing systems, outdoor systems provide pigs with enhanced opportunities to satisfy behavioural needs like rooting and exploring. Such outdoor areas often consist of grassland. However, wooded areas may be more suitable, as these offer protection from adverse weather and may trigger more diverse behaviour due to reduced homogeneity. We assessed pig behaviour on grassland and agroforestry plots (oaks spaced $\pm 6\text{m}$ apart), in a temperate maritime climate area with few sun hours (hours with light intensity $>1\text{ kW/m}^2$, trial average: 5 hours/day). We used four groups/treatment/batch (batch 1: May-July, batch 2: September-November). Groups of 6 boars ((Landrace $\times$ Large white) $\times$ Hampshire) were fed ad-libitum, kept on a $\pm 333\text{ m}^2$ plot with a 6 m^2 insulated hut for 5 weeks and then moved to a similar adjoining plot (within treatment) for another five. Instantaneous scan sampling was used (260 scans/pig, 8-18 weeks of age, 8.30h-16.00h). Treatment, temperature, precipitation, wind, cloud cover and temporal variables (1st or 2nd plot, weeks within plot, and AM/PM) were included as fixed factors in logistic regression models if improving AIC by ≥ 2 . Batch and group were included as random factors. Pigs spent the majority of the observed time outside their hut (raw average proportion: 0.68 ± 0.42 SD). As expected, agroforestry pigs were outdoors more than grassland pigs (OR: $1.7[1.2-2.5]$, $P=0.003$). Furthermore, they spent more of their outdoor time walking (OR: $1.5[1.3-1.8]$, $P<0.001$), suggesting greater exploration. However, we found no treatment effect on outdoor time spent rooting ($P>0.10$). Unexpectedly, agroforestry pigs spent more outdoor time on social behaviours like sniffing/nuzzling (OR: $1.8[1.4-2.3]$, $P<0.001$) and fighting (OR: $3.8[2.6-5.4]$, $P<0.001$). The last included playfighting and was rare overall (raw average proportion of outdoor time: 0.02 ± 0.09 SD). All measured weather and temporal variables affected the time spent outdoors to some extent ($P<0.001$), rain and high temperature leading to the greatest decrease and increase, respectively (OR dry/rain: $3.8[3.4-4.2]$, OR $11-15^\circ\text{C}/>19^\circ\text{C}$: $0.4[0.4-0.5]$). Additionally, at temperatures $>19^\circ\text{C}$ less outdoor time was spent walking, standing and rooting than at lower temperatures, whereas more was spent lying and wallowing (all $\text{OR}>2.0$ or <0.5 , $P<0.05$). Marked differences ($\text{OR}<0.5$ or >2 , $P<0.05$) between the lower two temperature categories (<11 and $11-15^\circ\text{C}$) only occurred for lying and huddling (both reduced below 11°C). In conclusion, we found that providing agroforestry rather than grassland access affected pig behaviour, with some indication of a better fit with behavioural needs. Furthermore, rainfall and high temperatures markedly modulated behaviour even in a temperate maritime climate.

Novel insights into lactating sow behavior after release from temporary crating

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Farrowing crates were introduced to reduce piglet mortality but confine the lactating sow creating welfare concerns. Temporary crating offers a compromise between piglet survival and the sow's needs by allowing the sow more freedom of movement when the piglets are older and less susceptible. Yet questions remain about how the sudden release from confinement impacts sow behavior and welfare. To explore this question, we have applied measures taken from information theory, Shannon's entropy and the data compression ratio. Shannon's entropy is a measure that quantifies the information content of a symbol sequence, scales with richness or number of unique symbols, and provides a quantitative measure of behavioral diversity. Data compression algorithms take advantage of redundant patterns; the more homogenous a sequence, the more it can be compressed, and thus, the degree of compression quantifies the diversity in relationships between different behaviors. We applied these novel metrics to measure diversity in behavior and diversity in the sequence of behaviors of lactating sows by video recording 36 sows from three to eight days post-farrowing. Sows were either continuously confined in closed temporary farrowing crates (n=13) or were released from crates on day four (n=12) or day seven (n=11). A 1.7m by 0.6m hinged farrowing crate was oriented diagonally in a 2m x 2.1m pen and, when opened, provided the sow 3x more space. Scan sampling and instantaneous recording methods were used to code sow positions and activities (eating, drinking, nursing, vacuum chewing, inactive, investigate piglet, nose piglet, biting fixture, and exploring environment) at 2-minute intervals from 6am to 6pm each day. Bayesian inference techniques were used to model treatment effects and determine 95% credibility intervals. We found that irrespective of treatment, after opening the farrowing crate sows displayed greater diversity of position as well as less fixed patterning of these positions. Entropy increased from a value of 1.44 (0.97 – 1.93) to 2.79 (2.32 – 3.27), and the compression ratio decreased from 6.16 (5.08-7.13) to 3.65 (2.51-5.01) after crate opening. Farrowing crates mask individual behavioral expression as we observed noticeable individual differences in positional diversity in uncrated sows but not in crated sows. Similar results were seen when we analyzed sow activity sequences comprised of various maintenance and maternal behaviors. Taken together, these results suggest farrowing crates reduce sow welfare by limiting the free expression of species-typical behavior. Our results also highlight the applicability of entropy and data compression to behavioral analysis.

The effect of fermentable diets fed to pigs on startle reflex and response to a novel arena

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Increased dietary fibre is thought to reduce behavioural abnormalities in pigs that are not provided foraging opportunities by decreasing gastric emptying time and increasing satiety. However, in rats, fermentable diets increase anxious and aggressive behaviours. We hypothesised that pigs fed soluble, fermentable carbohydrates would have altered responses to behavioural tests indicating anxiety. Twelve pens of nine-week-old, mixed sex pigs ($n = 288$) were fed one of three weaner diets (14 MJ/kg DE); Control- wheat/barley base (3.2% crude fibre (CF), 10.9% neutral detergent fibre (NDF), 4.0% acid detergent fibre (ADF)), Soy hulls- wheat/soy hulls base (6.0% CF, 14.6% NDF, 4.6% ADF) and Pulse- wheat/faba bean base (3.7% CF, 10.8% NDF, 4.9% ADF). The soy hull diet contained increased fermentable substrates, whilst the pulse diet contained more common fibrous feed ingredients used in local pig feeds. On d0, 7 and 14, focal pigs ($n = 6/\text{pen}$) were monitored for startle magnitude, scale of pig response to being startled, and duration in response to three auditory stimuli at 3-minute intervals. On d13, a novel arena test was conducted with behavioural responses to the arena (minute 1), traffic cone (minute 2) and unfamiliar human (minute 3) scored. Count/score data were analysed using negative binomial regression, and duration/latency data using a non-parametric test (Kruskal-Wallis) in SPSS (v25 IBM, Armonk, NY, USA). There was no effect of treatment on d0 and 7, but at the third auditory stimuli on d13, magnitude score and duration were greater in pigs fed the Soy hull (2.3 ± 0.22 and 3.6 ± 0.17 sec) than Control (1.4 ± 0.19 and 2.7 ± 0.18 sec) and Pulse (1.5 ± 0.18 and 3.1 ± 0.17 sec) diets ($p < 0.05$). In the novel arena, crossed lines (minute 1) were not affected by treatment, but time pigs spent engaged in escape attempts was highest in Pulse (9.8 ± 1.60 sec) and lowest in Control (3.8 ± 0.90 sec), with Soy hull pigs intermediate (7.0 ± 1.63 sec; $p < 0.001$). Pigs from the Pulse treatment tended to take longer to approach the novel object (minute 2; 34.2 ± 3.12 sec) than Control (25.8 ± 3.15 sec) and Soy hulls (24.9 ± 3.21 sec; $p < 0.10$). There was no treatment effect during minute 3 with exposure to unfamiliar human. Whilst not consistent across tests, both fermentable diets resulted in behavioural shifts indicating increased anxiousness. Further work should elucidate metabolic mechanisms.

Impact of limited and unequal wing use on resource utilization and keel bone integrity in laying hens

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Laying hens are increasingly housed in environments that require three-dimensional navigation. At the same time, keel deviations and fractures remain an important welfare issue in laying hen production. Reduced wing activity and muscle weakness are potential risk factors for keel deviations and fractures. Further, common white and brown-feathered strains show different propensities for vertical space usage. We investigated whether wing use affects behaviour regarding resource use, wing muscle thickness and keel bone integrity in laying hens. Thirty white-feathered and 30 brown-feathered pullets (18 weeks old) were divided into 12 floor pens (5 hens/pen, strains mixed). Each pen had two elevated tiers (70 cm high). Two nest boxes and two feeders were provided, one on the ground and one on an elevated tier. At 25 weeks, equal numbers of brown- and white- feathered hens were assigned to one of three treatments: (1) a sling treatment on one wing (Sling), mimicking standard veterinary treatment for wing injury, (2) full immobilization by moving hens into small individual cages (Cage), or (3) no wing restriction ($n = 20/\text{treatment}$). Before (week 0) and after treatment (week 5), time spent at nest boxes and feeders were recorded using RFID in Sling and Control pens, while wing muscle thickness was measured via ultrasound and the keel bone examined via X-ray in all birds. We tested the significant effects of treatment, strain, week, and their interactions on the proportion of time spent at ground or elevated nest boxes and feeders. We also tested for changes in muscle thickness, with the odds of having a keel fracture (presence/absence) with treatment, strain, and their interactions, and the initial keel status as a covariate. In terms of behaviour, elevated nest box usage in brown-feathered Sling birds decreased (week 0: $54 \pm 17.4\%$, week 5: $12 \pm 9.4\%$; $p=0.03$) while no decrease in elevated resource usage was observed in Sling and control white- feathered birds. After 5 weeks of Cage treatment, the pectoralis thickness in white-feathered birds was reduced by 17% ($p<0.001$), whereas this was not affected in brown-feathered birds of any treatment. Keel fractures were not influenced by the wing treatments in either strain. Limited or unequal wing use mainly affected the behaviour of brown-feathered birds, significantly avoiding elevated resources, though this was not necessarily associated with changes in wing muscle physiology or keel fractures. This study emphasizes the importance of considering genetic strain, wing use and housing design to ensure bird's access to resources.

Stability of social network metrics for indoor-housed pigs (*Sus Scrofa*) after group disruption

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Domestic pigs are social animals that forms stable groups when space allows. However, commercial indoor production often limits space and involves frequent regrouping, causing more competitions and social disruptions. The stability of social networks among familiar pigs in such an environment remains unclear, particularly after group disruptions. This study explores the stability of social dynamics for indoor-housed pigs by investigating their social network metrics. Five groups of 18 boars (replicated over time) were enrolled in the study at weaning (4-weeks of age). They were reared in stable groups in partly-slatted, straw-bedded pens for 4 weeks (BASELINE). Afterwards, each group was split into three subgroups of 6 for 7 days before being reunited (REUNION) in a new pen. Continuous behaviour sampling of social interactions (nosing, social resting, mounting and agonistic interactions) for individual pigs was conducted for 30 minutes on two separate days, during the most active period identified by scanning 24h footages. These data were used for Social Network Analysis (SNA) to calculate out-degree (number of animals actively interacted with) and betweenness (frequency as the shortest-path between interactions) centrality, as well as out-strength (sum of frequencies of all outgoing direct interactions), in a directed, weighted network for each group. Correlations of the same SNA metrics were assessed across stages (BASELINE vs. REUNION) and between different behaviours within each stage to explore relationships between various social interactions. Both out-degree centrality and out-strength of nosing snout/head correlated between BASELINE and REUNION (out-degree: $r_p=0.38$, out-strength: $r_s=0.41$; $P<0.001$), suggesting pigs who actively engaged in non-agonistic social nosing maintained similar social interactions across the two stages. Betweenness metrics did not correlate between the two stages, implying subtle shifts in group dynamics. None of the network metrics for agonistic interactions correlated between the two stages, indicating that the pattern of agonistic interactions was altered when pigs reunited. Considering different social behaviours, the out-degree centrality and out-strength between mounting and agonistic behaviours correlated in BASELINE (out-degree: $r_s=0.36$, out-strength: $r_s=0.51$; $P<0.001$). However, the out-degree centrality and out-strength of mounting and non-agonistic behaviours also correlated in both BASELINE and REUNION (out-degree in BASELINE: $r_s=0.46$, out-strength in BASELINE: $r_s=0.64$, out-degree in REUNION: $r_s=0.45$, out-strength in REUNION: $r_s=0.59$; $P<0.001$). Thus, mounting in juvenile boars could convey social information incorporating both agonistic and non-agonistic elements. These results suggest that social disruption between familiar pigs alters their social dynamics and could have welfare implications. Therefore, adjustments of grouping in pigs should be minimised.

Boosting statistical power in ethology: continuous data are superior to ordinal and binomial data

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It is common practice among applied ethologists to score gradations in behavioural expressions or animal welfare measures using ordinal scales (OS) with a few (usually 2-5) categories. Several scholars have advocated, however, to use tagged visual analogue scales (tVAS) instead of OS whenever the variable truly varies in severity along a continuum. One of the main arguments is that this would increase the statistical power and hence reduce the sample size required to confirm or reject research hypotheses. This is the first study in which this assumption has been tested using 10,000 stochastic simulations based on 3 real datasets with tVAS data: sow gait scores (0-150mm scale with tags at 30mm intervals), pig heat stress scores (0-150mm scale with tags at 30mm intervals), and cow panting scores (0-50mm scale with tags at 10mm intervals). We compared the sample size required to achieve 80% power when the data were analysed as binomial (BI), 5-point ordinal categories (5P), or tVAS data for detecting i) a difference between fictitious treatment X vs Y, and ii) for detecting an association between the welfare scores and a related variable (resp. feeding interval duration, rectal T°, and the Heat Load Index). The mean scores, as well as the difference between the treatments (δ) and the strength of the associated variables (ϵ) were simulated to vary, in order to broaden the possible scenarios and investigate the degree to which findings can be generalized. The outcomes of the tests of treatment differences revealed that the sample size required was consistently lowest for tVAS data and on average 17.7% (range 10 – 30%) and 90.7% (range 50 – 360%) higher for 5P and BI data respectively. For the regression analyses, the sample size required was also consistently lowest for tVAS data and on average 74.3% (range 61 – 211%) higher for 5P (regression analyses were not performed on BI data). These simulations confirm that the statistical power is higher when continuous variables are scored using a continuous tVAS instead of an ordinal or binomial scale. Choosing and designing an appropriate scale for collecting data is an important, but often neglected, consideration for reducing the number of animals required for hypothesis testing.

Full repertoire of Pekin duck vocalizations & effects of specific vocalizations on conspecifics suggest alarm and calming calls

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Pekin ducks are exposed to various stressors throughout their lives, but stressor identification usually happens in reaction to decreased production rather than identifying in real time. Decades of wild bird literature have shown that a duck's vocalization reflects their welfare. If we are able to understand the information portrayed by ducks' vocalizations, then they could be used to identify stressors monitoring vocalizations in real-time. To accomplish this, we first developed a vocal repertoire for Pekin ducks. We used a total of 29 adult Pekin ducks and placed 1 to 4 ducks of varying sexes into a sound chamber (~30min) with various positive and negative stimuli and their responsive vocalizations were recorded. Vocalizations were then clipped and named based on a predetermined naming system. We found that Pekin ducks produce up to 16 different vocalizations along with 4 egg laying vocalizations. Next, we determined how specific vocalizations affect the physiology of conspecifics. We tested Pekin ducks with playbacks of 5 different vocalizations from the repertoire, with a no noise and white noise as controls (N = 15 ducks/sex/treatment). These vocalizations were as follows: (1) Am Long (2) Honk (3) Pip (4) Harmonic stack and (5) Egg laying squiggle. Trials consisted of an initial recording in a closed off room with 5 consecutive measurements of heart rate (HR), blood pressure (BP), and respiratory rate (RR). A specific playback was then played on repeat while 8 more measurements of HR, BP, and RR were taken. After the playback, 5 measurements of HR, BP, and RR were taken. Ducks were randomly selected, and the playbacks were given at random. Data from all BP, HR, and RR were subject to a principal component analysis (Proc Princomp in SAS 9.4). The significant principal components (Prin 1 loaded strongly with BP and Prin 2 loaded strongly with HR and RR) were then analyzed by ANOVA with repeated measures (Proc Mixed SAS 9.4). A $P \leq 0.05$ was considered significant. Our results showed that ducks experienced an increase in blood pressure when played back the honk vocalization ($P = 0.0453$) and the white noise control ($P = 0.0309$) when compared to the no sound control. Specifically, the egg vocalization significantly decreased the hens' blood pressure when compared to the two controls ($P = 0.0255$ vs no sound; $P = 0.0237$ vs white noise). This study represents a critical steppingstone toward using vocalizations as a real-time flock welfare indicator.

A first look at the ear directed behaviours of weaner pigs after the development of ear necrosis

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Pigs perform damaging behaviours, such as ear, tail, and flank biting, in intensive production systems that can cause injury to the skin. There is a large focus on tail lesions caused by tail biting, but less attention to ear lesions, particularly those associated with ear necrosis. Ear lesions have a more complex etiology as unlike tail lesions, ear biting is not the sole cause with pathogens also being involved in the case of ear necrosis (EN). EN is associated with health and welfare issues (e.g. decreased growth and pericarditis), and it is suggested that pigs may be attracted to bite affected pigs thereby exacerbating the problem and further reducing welfare. However, there are also suggestions that affected pigs may 'defend' their injured ears. This study aimed to evaluate if EN is associated with ear biting behaviour. We hypothesized that pigs with EN were more likely to be victims of ear biting than those without EN. Weaner pigs were individually scored for EN once weekly for six weeks. Because EN is prevalent on-farm and treatment is uncommon, no intervention was applied to pigs with EN. Video recordings of eight pens (n = 90 pigs; 10-12 pigs per pen) between 7-9 weeks of age were chosen retrospectively based on the proportion of pigs in the pen with moderate to severe EN (approx. 25% of pigs affected, two pens; 50%, four pens; approx. 75%, two pens). All occurrences of ear biting behaviour and whether EN was present on the ear biter or ear biting victim was recorded during one 20-minute continuous period. The average frequencies of ear bites performed and received by pigs with and without EN were calculated on a per pig basis for each pen. A non-parametric test (Wilcoxon exact; SAS v9.4) was used to determine if there was a difference in the amount of ear biting performed and received between pigs with and without EN. Pigs with EN received more ear bites than those without EN (2.7 ± 0.98 and 1.4 ± 0.37 bites/pig, respectively; $P < 0.01$). Pigs without EN tended to ear bite more than those with EN (2.7 ± 0.84 and 1.7 ± 1.1 bites/pig, respectively; $P = 0.08$). As the presence or absence of EN is likely only one variable involved in ear bites performed and received, we are unable to determine causation. However, this study provides a first look at EN as a risk factor for ear biting.

Seeking social touch: the involvement of the opioid reward system on the hedonic response of fish

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According to the ‘incentive salience hypothesis’ reward processing involves the motivation to obtain a reward (i.e., “wanting”) and the hedonic pleasure felt during its consumption (i.e., “liking”), which are suggested to be mediated by opioid neurotransmission, with evidence coming from humans and other mammals. Experiments were conducted with a total of 15 threadfin butterflyfish, *Chaetodon auriga* (Forsskål, 1775) and five Bluestreak cleaner wrasses, *Labroides dimidiatus* (Valenciennes, 1839). We argue that, in mutualistic associations, fish seek to interact with cleanerfish not only due to the immediate benefits of being cleaned but also because of its hedonic impact, modulated by the opioid system. For that we asked two questions: do fish ‘like’ to be cleaned?; and if so, how much do they ‘want’ to be cleaned? To tackle the first, we used a conditioned place preference paradigm. Here we compared data on performances before and after conditioning, and used robust paired samples T-tests (Yuen’s test for trimmed means), paired effect sizes δt for repeated measures and explanatory measures ξ were used to describe the effect. To analyze data on the effects of naloxone and DAMGO on preference data, times were converted to preference indexes and these data were then submitted to bootstrap versions of the heteroscedastic one-way ANOVAs for trimmed means. We found that fish showed a preference for the compartment paired with a cleaner, an effect that was proportional to the time spent interacting with the cleaner during conditioning. Treatment with the μ -opioid receptor agonist DAMGO dose-dependently increased preference, while treatment with the antagonist naloxone decreased it. To test for fish “want”, we used a detour task, and data was treated with robust repeated measures ANOVAs for trimmed means. We found that client fish are able to circumvent barriers to reach a cleanerfish-adjacent compartment, with the strongest response in the second trial, and response strength decreasing to baseline levels in the third trial. Response strength was not affected by treatment with either naloxone or DAMGO. Our results show that cleaner-client interactions are hedonically positive for clients, an effect that is mediated by the opiodergic system, suggesting the presence of a hedonic opiodergic function. Visual contact with cleanerfish is sufficient to activate incentive salience programs, but the opioid system was not found to participate. Overall, we provide first evidence confirming the incentive sensitisation theory in a teleost fish and the pharmacological dissociation between liking and wanting.

Comparison of different dominance indices for determining social rank positions in groups of weaned piglets

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Mixing of pigs is usually followed by fighting to establish a rank order in the group. For the present study, the rank orders in 33 groups of weaner pigs (groups of six and 12 pigs) were determined using different dominance indices. Therefore, the behaviour of pigs was video-recorded for 72 hours after weaning and mixing. For each individual in a group, the number of wins and defeats as well as the identity of the respective opponent were determined by video-analysis and collected in an NxN matrix (N = group size). Based on the collected data, the following indices were calculated: David's Score (DS), normalized David Score (nDS), Average Dominance Index (ADI), Frequency Based Dominance Index (FDI) and Rank Index (RI). Therefore, the software R (R Core Team, 2021) and the R packages "steepness" and "dominance" were used. For all groups, the steepness of the hierarchy was analysed using the nDS and a clear expression of the rank orders was demonstrated by randomization tests ($P < 0.05$). The calculation of the dominance indices revealed high Pearson correlations between DS/nDS, ADI and RI (0.936 - 0.981), but low correlations between FDI and the other indices (0.331 - 0.393). In groups of 12, there were differences of up to seven rank positions when comparing the FDI with the other indices. In groups of six pigs, the individual rank positions resulting from the different indices differed by a maximum of two positions, which was more often the case with the FDI. The present study shows that the use of different dominance indices can result in different individual rank positions for the same group members. Since no real social ranking was known in the groups, selecting an optimal index is difficult. However, experimental examples with a given ranking order showed that all indices can also deliver incorrect results - depending on the data structure. Due to its calculation method, the FDI seems to be less suitable for groups of weaner pigs. The nDS also allows the calculation of steepness of the hierarchy, which can be seen as an advantage. For a comparison of different group sizes, ADI and RI are recommended because they are scaled to a specific range, and thus are independent of group size. We conclude that the results of individual rank positions in a group of pigs should be critically questioned, and depending on the data structure, a different index may be suitable.

Let's be Open: Improving Data Sharing Practices in Applied Ethology

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Science is built on data, and yet publications rarely report them in full. Data sharing accelerates scientific progress by enabling new analyses, replication, validation, and correction of findings, and supporting the training of researchers. These benefits extend to all stakeholders, including our animal subjects, who stand to gain from both accurate conclusions and maximum value being extracted from every dataset. Despite these well-recognized benefits, many researchers are reluctant to share data. Perceived barriers include concern over others using their data without proper credit; risk of increased scrutiny, which could expose errors and methodological weaknesses, potentially leading to corrections or even retractions of published work; and lack of incentives to spend time and effort making data publicly available. Shifting from an individual to a collective perspective on data sharing can reduce perceived risks and encourage researchers to view their contributions as part of a larger scientific effort, fostering a culture of open science. In this presentation, I will describe current data sharing practices in the applied ethology community and identify opportunities for improvement. To guide more effective and responsible data sharing, I propose 5 criteria for making data sharing practices COUNT: (1) Complete – Provide comprehensive datasets, including the raw data as well as scripts used for data processing, analyses, tables, and figures whenever possible, to facilitate replication efforts; (2) Open – Use non-proprietary file formats and deposit in public repositories to ensure accessibility; (3) Understandable – Include metadata, data dictionaries, and other relevant documentation for ease of locating and interpreting data; (4) Nonidentifiable – Remove or anonymize sensitive information to protect the privacy of individuals and ensure ethical compliance; and (5) Tidy – Structure data in a standardized, well-organized format to reduce errors and facilitate analyses and data integration across studies. Beyond individual efforts, institutional and journal policies must evolve to recognize research data and programming scripts as important scientific contributions, including integrating them into the peer review process and academic reward structures. To better serve the applied ethology community and our stakeholders, we must recognize the data itself as fundamental to scientific progress – not just the narratives we construct around them.

Tracking broiler breeder movements: examining sex differences in space use with UWB technology

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Understanding the movement patterns and space use of broiler breeders in commercial housing systems is essential for optimizing both welfare and reproductivity, and gaining deeper insights into movement behaviour could contribute to the design of novel breeder houses that better accommodate the birds' needs. This study used a Real-Time Location System based on Ultra-Wideband (UWB) tracking technology to analyse the mobility of broiler breeders within a commercial housing system, with a particular focus on sex differences. In a commercial breeder house containing 6,000 Ross 308 females and 500 Ross 308 males, a total of 12 females and 8 males were equipped with numbered UWB tag backpacks, but following data inspection, 8 females and 7 males remained for analysis. Data were collected continuously for 21 days between 52 and 55 weeks of age. The house was equipped with 12 UWB anchors distributed across three rows, and these anchors could detect the position of the tags (and thus birds) in the house. Using these detections, distances moved by the birds were determined using the Euclidean distance between subsequent positions. The house was furthermore divided into two compartments (59m in length) and each compartment featured three functional zones: a litter area (3.25m wide), elevated slats (3m wide), and nest boxes (0.75m wide), allowing assessment of the use of functional zones by the tagged birds. To assess area use, the total area was further subdivided into 40 distinct areas (5.9m x 3.5m). Linear mixed-effects models were used to examine the distance moved, time spent in functional zones, and overall area use, with sex as a key factor in the analysis. Males moved significantly greater distances per day than females ($p < 0.001$). An interaction effect was observed between functional zone and sex ($p < 0.001$), with females spending more time on the slats and in the nest boxes than males, while males spent more time in the litter area than females. However, no statistically significant difference was found between males and females in the number of zones visited. These findings suggest that broiler breeders utilize large portions of the available space, and that males and females exhibit distinct space-use patterns. Further analyses will focus on movement patterns during the light-dark cycle and on assessing how consistent birds are in their choice of resting location during nighttime.

Standing out from the flock: using automated assessment of behaviour to understand individual sheep behaviour and welfare

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In extensive farming systems, welfare is often perceived to be good, as animals have greater freedom to express a wider behavioural repertoire than in intensive systems. However, animals are often managed as a group and early disease detection in individual animals may be difficult. Therefore, the potential for improving welfare by using technology to monitor individual animal disease and behaviour is attractive. This opportunity was investigated by the EU-funded TechCare project. Sensors for behavioural measurement can be animal-mounted (e.g. accelerometers) or remote (e.g. video cameras) and focus on assessing specific behaviours or proxies. Exploratory studies to evaluate behaviour in sheep living in extensive environments were conducted using neck-mounted accelerometers, Bluetooth (BLE) beacons and receivers (WISPs) or Ultra High Frequency (UHF) ear tags and receivers. Sheep have high fidelity to specific areas of their home range and show consistent diurnal patterns of behaviour. We hypothesised that chronic (e.g. disease) or acute (e.g. predation) conditions may cause changes in diurnal patterns and landscape use. Over two years, 30 twin-rearing ewes and 30 lambs (1 per litter) wore neck mounted accelerometers whilst maintained on lowland grazing for April-October. Movement indexes (MI) were collected at 5-minute epochs throughout the period. Additionally, 40 post-weaning lambs and 49 ewes in a hill field wore WISPs in neck collars or UHF ear tags for 4 weeks, and receivers were placed at key resources/locations (e.g. feed blocks). Common sheep diseases (lameness, parasitism, mastitis) were assessed using standardised measures at 2-week intervals, assessed in gathered sheep, in all studies. Stepwise multiple linear regression was used to analyse factors affecting movement patterns. Although the MI data could not be convincingly matched to specific behaviours, a diurnal pattern of behaviour recorded by the accelerometer was discerned and preliminary observations suggested that this may be affected by welfare measures. WISP data allowed lamb movement patterns and landscape preferences to be visualised and demonstrated that breed ($P<0.004$) and litter size ($P<0.006$) influenced field use. UHF data showed visits to the feeder varied by day (55-275/d) and ewe age, with fewest visits on days with highest rainfall and in younger ewes ($P<0.05$). Incidence of disease issues in these cohorts were too low to allow impacts of welfare challenge to be assessed. Overall, the data suggest potential for long term monitoring of individual sheep movement patterns in an extensive system, which may facilitate individualised management of sheep welfare.

Behavioural and cardiac responses of European seabass in sea-cages: Insights for welfare states assessment

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Aquaculture has expanded significantly in recent years, making it essential to develop advanced methods for monitoring fish welfare and optimizing management. Understanding how fish respond to environmental and anthropogenic factors is crucial for improving welfare standards. This study examines the physiological and behavioural responses of European seabass (*Dicentrarchus labrax*) reared in open-sea cages, assessing the influence of environmental, temporal, and operational variables. It was conducted in experimental facilities in the coastal waters of Port Andratx (Balearic Islands, Spain), part of the Laboratory of Marine Research and Aquaculture (LIMIA-IRFAP). A total of 1000 seabass (~1 kg) were distributed into four net pens (250 fish/pen). Using surgically implanted biologgers (DST milli HRT, Star-Oddi®), heart rate (HR) and external acceleration (ACC) were continuously recorded over two 15-day periods (March and July), enabling the classification of four behavioural states: resting, regular activity, reactive stress response, and proactive stress response. Biologgers were implanted in a subset of fish ($n = 18$) following a standardized surgical protocol under anaesthesia (MS-222), involving a 2–3 cm ventral incision, logger positioning in the abdominal cavity, fixation with sutures, external tagging, and a 5-day recovery period prior to data collection. Linear Mixed Models and Generalized Additive Models revealed strong circadian rhythms, with significant variations driven by anthropogenic activity at the facilities ($p < 0.01$). Operational activities such as feeding and maintenance significantly increased HR and ACC, while reduced activity on weekends indicated the impact of human disturbances. Seasonal differences were also evident, with heightened stress responses in summer, as indicated by elevated HR and ACC values, due to increased water temperatures and intensified maritime activity. Notably, proactive stress responses—characterized by both high heart rate and high acceleration—were significantly more frequent during warmer periods ($p < 0.05$), suggesting heightened metabolic demands and environmental challenges. A Random Forest model, trained on controlled experimental data, classified the four behavioural states with a cross-validation accuracy of 72.30 %, revealing differences between monitoring periods. In March, fish showed higher regular activity, while in July, an increase in resting states suggested acclimation to open-sea conditions. Across the diel cycle, resting peaked at night, with midday increases in proactive stress responses aligned with feeding schedules. These findings underscore the value of combining physiological and behavioural metrics with machine learning for real-time welfare assessment. By offering detailed insights into fish activity and stress responses, this study advances Precision Fish Farming and supports more sustainable, welfare-oriented aquaculture practices.

Monitoring flock-level spatial behavior for stress detection in commercial laying hens

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Flock-level automated monitoring of laying hen spatial behavior could provide a non-invasive, objective and continuous method to detect stress-related deviations on large-scale farms with multi-tier aviary systems. This study visualized and quantified: 1) The consistency of spatial behaviors (i.e. vertical transitions through an aviary system and litter occupancy) over time 2) Changes in spatial behaviors in response to acute stressors. Four flocks of ISA Brown laying hens (960 hens/flock) were housed on a semi-commercial farm with a 3-tiered aviary system at commercial density. Flocks were exposed weekly to a visual stressor (predatory bird) and an auditory stressor (thunder sound) for 10 weeks in the same order, and hens were continuously recorded with 2 video cameras per flock. Hen spatial behaviors, counted automatically with computer vision and averaged per minute, graphically and descriptively showed high consistency across weeks, especially vertical transitions during afternoon resting without management-related or experimental interventions. A Friedman's test (post-hoc: exact all-pairs comparison test, $p_{\text{adjusted}} = \text{FDR}$) identified significant differences in spatial behavior across the day. During predator exposure, litter occupancy decreased (-20, $P=0.0003$) compared to the 30 min. pre-stress occupancy, but not during sound exposure (-9, $P=0.1495$). In contrast, vertical transitions/min. increased during recovery from predator exposure (+9, $P=0.0169$) and sound exposure (+8, $P=0.0326$). A generalized linear mixed model (family: nbinom2) with 'Week' as a random analyzed 5-min. time intervals pre- and post-stress. This model detected a 53% reduction in litter occupancy both during the 6-min predator exposure ($P<0.001$) and the 1-min. sound exposure ($P<0.001$) compared to pre-stress levels. While the litter occupancy reduction persisted in the 5 to 25 minutes after predatory bird exposure, litter occupancy increased in the 5 minutes after sound exposure ($P>0.001$) and went back to pre-stress levels 25 minutes after sound exposure ($P=0.326$). These findings suggest that detecting stress-induced changes in vertical movement patterns and litter occupancy is feasible in large layer flocks. However, for stress detection to be effective in practice, it is important to optimize both the duration of observation following stress (i.e., how long deviations persist) and the thresholds used to identify abnormal behavior. These thresholds must be optimized based on each flock's normal diurnal activity rhythm to ensure accurate identification of stress-related changes when applied in practice by farmers.

Development of sheep responsiveness to human body odor, specifically odor cues driven by emotional states

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Sheep strongly react to human visual and vocal cues, yet their responses to human odors remain underexplored. This study aimed to investigate whether *Ovis aries* respond to human body odor, specifically whether body odors sampled under distinct emotional states (fear, joy) are discriminable to adult and young animals. Axillary odors were collected from 38 humans after they watched a 20-min film designed to elicit fear or joy. The responsiveness of 6-day-old lambs ($n = 20$) and adult ewes ($n = 35$) to these odors was assessed using a habituation-dishabituation paradigm. Stimuli consisted of axillary swabs presented to the animals at the tip of a stick. The habituation odor was presented four times, followed by a dishabituation odor, with fear (FO) and joy odors (JO) counterbalanced as habituation or dishabituation stimuli. Both lambs and ewes exhibited habituation to repeated odor stimuli, as indicated by decreased exploration duration, but no clear evidence of dishabituation to the novel odor was observed (i.e., no significant increase in exploration duration). However, they displayed behavioral differences depending on the odors during the habituation phase. Lambs exposed to FO compared to JO exhibited more escape responses (FO: 0.66 ± 0.24 times vs JO: 0.09 ± 0.06 times, $p = 0.031$) and were engaged in longer oral grasping of the swab (FO: 3.75 ± 0.94 sec vs JO: 1.08 ± 0.62 sec, $p = 0.023$). Also, during the habituation phase, adult ewes exposed to FO showed longer durations of ear postures associated with negative emotions (backward/asymmetric positions; FO: 26.79 ± 1.71 sec vs JO: 21.81 ± 1.05 sec, $p = 0.038$), while those exposed to JO exhibited more neutral or positive ear postures (horizontal positions; JO: 8.98 ± 2.46 sec vs FO: 2.17 ± 0.97 sec, $p = 0.024$). In conclusion, while the habituation-dishabituation test did not clearly demonstrate the discriminability of FO and JO odors in lambs or ewes, the findings observed during the habituation phase suggest that 6-day-old lambs detect these odors without clear differential hedonic reactivity. Conversely, adult ewes appear to subtly differentiate the emotional valence of human axillary cues through ear movements. These preliminary results underscore the need for further investigation into the developmental and sensory mechanisms underlying sheep's reactivity to human odors associated with distinct emotional states.

Manners over mood? Dogs' trainability—not their emotion—earns them office access

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Dog caregivers increasingly take their dogs to the workplace. Such practices are gaining interest from business scholars and practitioners alike, since “office dogs” have been found to favorably impact employees. Yet, caregiver perceptions of their dogs' behavior has been less researched, and potential differences between “office dogs” and other dogs have not yet been addressed. In fact, we have no insight into the behavioral features that influence caregivers' decisions to take their dog to work. Such differences could point to dogs being taken to workplaces based upon particular behaviors or, relatedly, to these dogs coping differently with human work settings. This study aimed to map the behaviors of “office dogs” and other dogs to detect behavioral features predicting office access. Our main aim was to assess whether behaviors related to trainability (i.e., training difficulty, energy level) and emotion (i.e., aggression, fear, attachment, separation anxiety) predict whether dogs are taken to workplaces. Trainability-related predictors would suggest selection informed by pragmatic, humancentric considerations, whereas emotional predictors would suggest dog-centric considerations. Hypotheses were tested in a survey study with 259 dog caregiving employees across various job types (48.3% clerks; 17% management; 8.1% self-employed; 6.2% laborers; 20.4% other), with 49.8% taking their dog to work. Participants completed an online survey measuring dog and caregiver background information and dog behavior. Specifically, using a shortened version of the C-BARQ, we assessed dogs' training difficulty (3-item), energy level (2-item), aggression (4-item), fear (5-item), attachment (2-item) and separation anxiety (3-item). Logistic regression analysis examining the association between the six predictors (behavioral features) and caregivers' indication to take their dog to work (yes/no) showed that training difficulty ($\beta=1.04$, $SE=0.22$, $p<.001$, odds=2.83) and energy level ($\beta=-0.39$, $SE=0.18$, $p=.030$, odds=0.68) were significant, whereas aggression, fear, attachment and separation anxiety were not ($p>.05$). Thus, dogs perceived as easier to train and those with lower energy levels were more likely to accompany their caregivers to work. While this study did not address explanations or reasons for these differences (e.g., breed differences, underlying caregiver expectations) and while exploratory, the findings suggest that “office dogs” may be intentionally or unintentionally selected for behaviors that align with workplace compatibility—favoring trainability and lower energy. This selection likely reflects human-centric considerations (i.e., ease of management) rather than dogs' emotional well-being. These insights contribute to growing discussions on “office dogs”, and highlight the need for further research on caregivers' assessment of their dogs' ability to cope with work environments.

Behavioural reactivity of indigenous and commercial lambs towards humans

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Understanding breed differences in farm animals is essential for optimizing management strategies that enhance both welfare and productivity. This study examined whether two sheep breeds commonly farmed in South Africa—one indigenous (Namakwa Afrikaners: NA) and one commercial (Dorper: DO)—responded differently to challenging situations. A total of 323 NA and 358 DO ewe and ram lambs, aged four months, managed together in a single flock and receiving the same amount of human contact were assessed once over seven years using three behavioural tests: the arena, docility, and scale tests. The arena test involved a stationary, seated human positioned between the test animal and its flock mates. We calculated the animal's average distance from the human and the distance it travelled. The docility test evaluated how long it took an animal to enter a marked area and be contained by a mobile handler within three minutes. The scale test assessed behavioural responses while the animal was restrained, using a five-point scale (1 = calm; 5 = wild). Additionally, vocalizations and urinations/defecations were recorded during all tests. The General Linear Mixed Models procedure in R was used for all three tests. Results showed that in the arena test, breed had no significant effect on the average distance to the human or the time spent in closer sections ($P > 0.05$). However, DO spent significantly more time in the section farthest from the human ($P < 0.05$). NA vocalized more frequently than DO ($P < 0.0001$), and ewes vocalized more than rams ($P < 0.05$). In the docility test, there were no breed or sex differences in test success or time contained ($P > 0.05$), but NA took longer to enter the marked area than DO ($P < 0.05$). Similarly, ewes took longer than rams ($P < 0.05$). Both NA and ewes vocalized more than DO ($P < 0.0001$) and rams ($P < 0.05$). The scale test revealed no significant breed or sex differences in handling scores ($P > 0.05$), but NA vocalized more than DO ($P < 0.05$). Across years, most behavioural variables varied ($P < 0.05$), except success rate, time to enter, time contained, and vocalizations in the docility test. Ewes and NA lambs exhibited higher anxiety levels, indicated by increased vocalizations. These findings suggest that NA and ewes require careful management to minimize stress during handling and separation.

Emotional contagion from humans to horses through odors

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In the past few years, numerous studies have shown that domestic mammals are sensitive to human emotions, highlighting their reactions to our facial and vocal expressions. Recent experiments revealed that odors may also be involved. For example, in a habituation-discrimination test we showed that horses can discriminate human odors from fear and joy contexts, and asymmetric nostril use indicated that they seem to perceive the latter positively. In this new study involving 43 horses, we examined whether these human emotional odors, which have been shown to carry emotional information with consequences on human behavior and physiology, could further influence horses' behavior and physiology. With a between-subject design, we conducted tests to evaluate horses' fear response (suddenness test, novel object test) and their reaction to humans (grooming test, human approach test), while wearing cotton pads carrying human odors from a fear context (watching a horror video), from a joy context (watching a joyful video), or unused pads (control odor) applied to their nostrils. Observations from experimenters who were blind to the odor conditions revealed that horses exposed to odors from the fear context showed stronger fear reactions and interacted less with humans, compared to horses exposed to odors from the joy context or control odors. Specifically, when exposed to fear-related odors, horses interacted less with the human during the approach test (generalized linear models (GLM), $p=0.032$), directed more attention toward the novel object (GLM, $p=0.027$), and exhibited stronger startle responses, as indicated by higher startle intensity ($p=0.04$) and maximum heart rate (GLM, $p=0.0042$) in the suddenness test. These findings suggest emotional contagion from humans to horses via olfactory cues, highlighting the importance of odors in human-horse interactions. This is particularly interesting, as many equestrian activities involve humans remaining outside the horse's field of vision while still within its olfactory range. More broadly, this underscores the importance of chemosignals in interspecific interactions.

Identification and classification of pig vocalisations in the context of tail-biting

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Tail-biting behaviour is a real problem in pig farming. Early action being the main leverage to reduce damages linked to this behaviour, identifying early indicators is an essential point to improve breeding practices. Vocalisations carry a large amount of information and seem to be an interesting hint to identify the beginning of a tail-biting outbreak. Our ultimate goal was to identify vocalisations characterizing starting outbreaks, but our specific aim here is to determine whether vocalisations can be classified on the basis of simple parameters in order to be automatically recognised. We recorded sounds in four French commercial farms with conventional breeding and non docked pigs. Recordings were made continuously during the post-weaning phase (6 weeks). The analysis of the 24 hours preceding the detection of injuries related to tail-biting behaviour by the farmers allowed us to collect 10251 vocalisations out of 120 hours of recordings. From this database, we created 10 ear-defined categories, including barks, screams (long, short and modulated) and grunts. Twenty-one frequency, energy, time and harmonic parameters of these vocalisations were analysed using the Praat© software. Our analysis showed that these categories are distinguishable based on our parameters. The most discriminating parameter was the duration of the vocalisations: its average value varies between 0.21s for a bark and 0.94s for a grunt ($p < 0,05$). Only the squeaks-croaks (short vocalisations) pair on one hand and the chuckles-mixed (average duration) pair on the other hand are not different in terms of duration. The energy parameters were another very good discriminator, with only three categories characterised by average values that cannot be distinguished by the q75 parameter : long screams (4147 Hz), “gruiii” (4146 Hz) and mixed vocalisations (3999 Hz) ($p > 0.05$, $p < 0.05$ for other comparisons). As we aim to automate the differentiation of vocalisation categories, we carried out a hierarchical classification following a PCA, with 3 axes synthesising 55% of the global information. This analysis showed that the synthetic variables based on our 21 chosen parameters make it possible to separate vocalisations in three different classes. These classes, despite being less precise than our ear-defined categories, are consistent with groups of categories that we could create by ear. Our results indicate that we could differentiate pig’s vocalisations from 21 easy-to-compute acoustic parameters. Associating these sounds to specific events and automating their detection could be a way to detect specific behaviours, such as tail-biting in farms.

Expression of sickness behaviors is linked to personality traits in dairy calves with neonatal diarrhea

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Illness early in life may affect later development, such as personality traits. The objectives of this study were to assess (1) how prior diarrhea status (i.e. healthy vs sick) influences personality trait development in Holstein dairy calves, and (2) how sickness behavior associated with diarrhea (e.g. changes in milk feeding and activity) are affected by personality. Calves ($n = 40$) housed in groups of 15 were offered 15 L/d of milk replacer from an automated feeder. Calves were fitted with accelerometers and were fecal scored daily for 21 d. Diarrhea was diagnosed when calves had loose feces for ≥ 2 d or watery feces for ≥ 1 d; cases were further classified as severe (≥ 4 d with diarrhea; $n = 20$), mild (< 4 d with diarrhea; $n = 10$), or healthy (0 d with diarrhea; $n = 10$). At 24 ± 3 d, after recovery from diarrhea, calves underwent personality tests over 4 consecutive days in sequence: novel environment, novel object, startle stimulus, social isolation. Behavioral responses in tests were analyzed using principal component analysis. Four orthogonal traits were identified: shy, fearful, active, and explorative, which together accounted for 75% of observed variance. In all calves, mixed linear regression models assessed association between diarrhea status and each personality trait, with group pen as a random effect. In diarrheic calves, mixed linear regression models assessed association between personality traits and relative changes in milk intake, drinking speed, steps, lying time, and lying bouts on d 0 of diarrhea, with the baseline set at 0% on d -3 relative to diarrhea diagnosis. Fixed effects included birth weight, diarrhea age, and diarrhea severity, with group pen as a random effect. Healthy calves had a tendency to be more active ($P = 0.08$) and more explorative ($P = 0.06$) than mild or severely sick calves. Greater drops in milk intake were seen in more shy ($\beta = -7.1\%$, $P = 0.01$), fearful ($\beta = -6.6\%$, $P = 0.04$), and active ($\beta = -7.0\%$, $P = 0.02$) calves on d 0 compared with more bold, non-fearful, and non-active calves. Active calves also tended to have greater drops in steps on d 0 ($\beta = -10.8\%$, $P = 0.06$). These results suggest that diarrhea early in life does not influence personality traits; however, personality influences the expression of sickness behaviors during diarrhea, particularly changes in milk intake for shy, fearful, and active dairy calves.

Associations between feed efficiency and feeding patterns in yearling Angus bulls

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Our objective was to evaluate the relationship between feed efficiency and feeding behavior at an automatic feeder in yearling Angus bulls. Bulls ($n = 207$) were housed within four pens, balanced by body weight (24-28 bulls/pen). The contemporary group feeding trial lasted 90 days and was repeated over two years with different sets of bulls, with weights collected monthly. Each pen had 4 electronic feeders (SmartFeed, C-Lock, Inc.) that were filled daily at approximately 0630 h and 1700 h. Bulls were retrospectively classified into high feed efficiency (HIFE) and low feed efficiency (LOFE) groups based on combined residual feed intake and feed:gain ratio ranks. Five bulls from each efficiency group were selected per pen per year to create two clearly discrete subsets, resulting in 40 bulls per group for analyses. To examine month-to-month variations, daily behavioral summaries were analyzed using the MIXED procedure in SAS 9.4. All behaviors, visit frequency, feeding time, feed intake, and consumption rate increased over the course of the trial ($P < 0.0001$). Given these shifts in feeding behavior across the trial, hourly feeding patterns were examined to explore how LOFE and HIFE groups adjusted their behavior. Hourly feeding behavior patterns were analyzed for the start (month 1) and end (month 3) of the feeding trials. The model included the main effects feed efficiency group, month, hour, and their interaction, with bull within pen as a random effect and hour treated as a repeated measure. LOFE bulls initially had longer daily feeding times than HIFE bulls ($P = 0.005$), but this difference was no longer significant by the end of the trial ($P = 0.07$). However, at both time points, LOFE bulls spent more time feeding around feed deliveries ($P \leq 0.04$). LOFE bulls showed higher visit frequency around the morning feed deliveries at the trial's start ($P \leq 0.03$). By the end of the trial, they exhibited greater visit frequency around both morning and evening feed deliveries ($P \leq 0.03$). LOFE bulls exhibited greater total feed intake (kg/h) during morning and evening feeding periods ($P \leq 0.05$). LOFE bulls also exhibited a faster feed consumption rate during morning feedings at the trial's start and end ($P \leq 0.03$). These findings demonstrate distinct behavioral differences between feed efficiency groups, particularly around feed delivery times. Thus, feeding behavior patterns in a competitive environment could serve as an important feed efficiency selection criterion for beef bulls.

Development of an automated tool for monitoring tail length and lesions in pig slaughterhouses

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Tail biting is one of the main challenges in pig production, affecting animal welfare, economics, and productivity. In undocked pigs, tail lesions and variations in tail length result from this aberrant behaviour. Although routine tail docking is forbidden by Council Directive 2008/120/EC, 77% of pigs in Europe are still tail-docked. The slaughterhouse serves as a crucial place where animals from diverse origins gather, enabling extensive data collection, including welfare status. Assessing welfare at the slaughterhouse centralises a vast amount of information in a single evaluation site. Currently, most welfare evaluations in slaughterhouses rely on visual assessments, restricting the number of animals evaluated limited by the high line speeds. Technology presents a promising tool for continuous and individual assessment but, its application in slaughterhouses still remains a challenge. This ongoing study aims to develop a computer vision sensor capable of classifying tail length and tail lesions that could be attributed to tail biting behaviour in a commercial slaughterhouse. A preliminary trial was conducted to manually measure tail length in pig carcasses using a measuring tape and recording lesion status after scalding. Tail pictures of the same carcasses were taken using a camera installed after the singeing process. These manual measurements were used to label 870 images for algorithm training. Following the algorithm training, two machine learning models were tested using 672 new images, categorised into seven and four tail length and lesion classifications. The results showed an accuracy (F-score) of 55.2 for seven categories and 76.2 for four categories. Although based on a small sample, these preliminary results suggest the sensor has the potential for automatically assess tail length and lesions in pig carcasses. Five additional trials will be conducted to gather at least 5,000 images to further evaluate the model's accuracy.

Automated detection and classification of laying hen vocalizations using a pre-trained transformer

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Vocalizations provide valuable information about animal behavior, motivation, and affective states, making them ideal for effective and non-invasive monitoring of individuals or groups. However, manual inspection of sound recordings is time-consuming and prone to human error. Recent advances in machine learning enable automated sound event detection and classification, reducing both time and domain expertise requirements. Here, we leverage a large pre-trained Transformer-based model to detect the onset, offset, and type of laying hens' vocalizations. Specifically, we fine-tuned the model that integrates spectrograms and text tokens using ~2,300 manually labeled vocalizations from four trials (two birds each, eight hens total), yielding 14 minutes of chicken calls. The calls were grouped into five categories: Clucks, Whines, Arks, Squawks, and Calls (unclassified). We evaluated performance in an open set (unseen individuals) and a closed set (shuffled calls). Using cross-validation, we measured performance at both call-level (proportion of calls accurately detected) and duration-level (proportion of total call time accurately detected). For call-level detection, the model achieved an F1 score of 0.872 (precision=0.922, recall=0.829) on the open set and 0.892 (precision=0.937, recall=0.851) on the closed set. Similarly, for duration-level detection, the model attained F1 scores of 0.784 (precision=0.859, recall=0.725) and 0.823 (precision=0.876, recall=0.776) for the open and closed sets, respectively. Importantly, the model also classifies detected calls within the same pipeline, leveraging attention mechanisms to bypass a separate classification stage. Notably, Squawks were best detected and classified (0.97 open, 0.87 closed) despite low sample size, whereas Whines were the hardest to detect (misdetected rate 0.15 open, 0.13 closed), and Arks were the hardest to classify (0.69 open, 0.73 closed). Overall, these findings underscore the efficacy of transfer learning and transformer-based architectures for detecting and classifying laying hen vocalizations from limited training data, offering a scalable approach to non-invasive welfare monitoring.

Relative changes in feeding behavior as indicators of calf training success on robotic milk feeders

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Robotic milk feeders (RMFs) collect real-time feeding behavior data, offering a potential tool for predicting early training success in calves. The study objective was to determine whether RMF data could assess calf training success on the feeder (day 0). Training success was defined as a calf visiting the feeder >2 times and consuming >6 L of milk in one day by day 4. Calves requiring >4 days to train were classified as unsuccessful. Feeding behaviors collected by RMFs including milk intake, drinking speed, and rewarded visits were analyzed. Day 4 was the 100% reference level for each behavior, with relative change calculated by dividing each calf's daily behavior (day -3 to day 13) minus the day 4 behavior and dividing by day 4 behavior. The dataset included 1,874 Angus × Holstein calves from a calf raiser in England, with an average training of 3.46 ± 3.57 (mean ± SD) days. A subset of 473 calves was analyzed over a training period from the first day on the feeder (day -3) to 17 days on the feeder (day 13). Calves were offered near *ad libitum* milk. Mixed linear regression models were used to evaluate whether RMF success affected average feeding behavior and relative changes in feeding behavior from day -3 to day 13 relative to training success. Models analyzed the day × success interaction, adjusting for day, success status, and pen, with calf as a random effect repeated by day. Successful calves consumed more milk (7.96 ± 0.07 L/day) than unsuccessful calves (6.70 ± 0.11 L/day; $P < 0.01$). A significant milk intake × day interaction was observed from day -2 to 10 and day 13 ($P < 0.01$). Rewarded visits were higher in successful calves (3.75 ± 0.04) compared to unsuccessful calves (3.07 ± 0.06 ; $P < 0.01$). There was no association for drinking speed (0.47 ± 0.01 ; $P = 0.93$). A significant relative change × day interaction was observed for all variables ($P \leq 0.04$). On day -2, successful calves had a higher relative change in milk intake ($13.49 \pm 3.49\%$; $P = 0.04$) and drinking speed ($16.30 \pm 3.08\%$; $P < 0.01$). By days 10-13, unsuccessful calves had $\geq 19.01 \pm 4.36\%$ ($P < 0.01$) more rewarded visits. These findings suggest RMF-collected data, particularly milk intake and drinking speed, can serve as indicators of training success by day 2, while unsuccessful calves show increased feeder visits by day 10.

Identifying tail-biters before damage occurs: A tracking-by-detection approach

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Tail biting is a major animal welfare concern in pigs, which can spread rapidly within groups during an outbreak. Timely interventions may help to limit its spread, however, tail biting is usually only detected at an injury stage. Therefore, there is a need for early indicators to predict outbreaks. While previous studies suggest that pen-level activity increases the days before a tail-biting outbreak, early identification of individual biters and victims could offer valuable insights for more targeted interventions, such as removing the biter or the victim. However, it remains unclear whether biters and victims show change in their activity level on the days preceding the appearance of damage. Detecting these changes requires monitoring individual activity in the long term, achievable only through automated methods. This study, therefore, examined whether changes in activity level obtained by a tracking-by-detection algorithm can be used as a potential predictor of tail biting at the pen and individual level. Nine pens with tail damage (i.e. damage pens) were selected across three batches of growing pigs ($n=30$ pens in total), in which at least one pig had a wound on two consecutive observation days (either D_0 and D_{+3} , or D_0 and D_{+4} , where D_0 refers to the first observation day). Each damage pen was matched with a control pen showing no pigs with tail wounds on the same days. Tail biting, including identities of the biter and victim, was scored from videos of damage pens on D_{-5} , D_{-2} , and D_{+1} . An in-house developed tracking algorithm (mMOTA and mIDF1 metrics reaching 98-99%) was applied on several days around the detected tail damage (D_{-9} , D_{-5} , D_{-2} , and D_{+1}) to calculate the distance moved by each individual. The average daily distance moved in the pen did not affect the probability for a pen to become a damage pen ($p>0.05$). However, in damage pens, positive relationships between the frequency of tail biting and individual activity on the days preceding the damage were found. For example, increased individual distances moved on D_{-9} were associated with higher frequencies of tail biting on D_{-5} ($p<0.001$) and D_{-2} ($p<0.05$). This study suggests that pen-level activity could not predict a tail-biting outbreak, but that individual activity may serve as a potential predictor for identifying biters. In addition, this study highlights the potential of tracking algorithms, provided that individuals can be reliably tracked over time, to automatically detect individual activity changes associated with tail-biting outbreaks.

Dynamics of milking behavior and performance of Holstein cows affected by mastitis in an automatic milking system

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Automatic Milking Systems (AMS) gather large amounts of cow-level data, which can be used to detect changes in cows' behavior in real-time. The objective was to explore the relationship between milking behavior and performance variables and mastitis during the first third of lactation in Holstein cows using an AMS. The study was conducted in a commercial dairy operation in Colorado, USA. The initial data included 5,222 lactations of Holstein cows that calved between January 2023 and April 2024 and were milked using 62 AMS. Milking behavior and performance data included milk yield (kg), milking duration (min), milk flow duration (sec), mean milk flow (kg/min), milking interval (h), and the frequency of teat not found, milking unit kick-off, and incomplete milking events for every AMS visit. Clinical mastitis cases were categorized by DIM at diagnosis into three periods: early (1 to 30 DIM; n=96), which only included multiparous cows; mid (31 to 60 DIM; n=74); and late (61 to 100 DIM; n=93). The mid and late periods included primiparous and multiparous cows. Milking data for the early period covered 1 to 30 DIM, while for the mid and late periods included -14 to 0 days relative to the diagnosis for mastitis. A healthy group was used as a reference for comparisons for each period. Multivariable mixed linear and logistic regression models for repeated measures were fit using milking behavior variables as the responses of interest. Lactation number (continuous) and milk yield (when appropriate) were included as fixed covariates, while cow ID was considered a random effect. During the early period, cows with mastitis had lower milk yield and mean milk flow than healthy controls. They also had longer milking duration, milk flow duration, and milking intervals. Affected cows also showed higher probabilities of incomplete milking and teat not found. Compared with healthy cows, cows with mastitis during the mid and late periods had greater milking duration, milk flow duration, milking intervals, and more frequent incomplete milkings, with a peak at the day of diagnosis. In addition, these cows had a severe drop in milk yield, mean milk flow, and peak milk flow around the day of diagnosis, starting at least two days before mastitis detection. Pain or discomfort associated with mastitis may affect milking behavior and performance during the first third of lactation. The changes in behavior and performance associated with mastitis could be used for early disease detection.

Exploring the use of a computer vision-based mapping technique to estimate laying hen position in cage-free housing environments

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The spatiotemporal activities of laying hens in cage-free housing systems (CFHS) can provide information about the impacts of these housing environments on hen welfare and productivity. Studies investigating spatiotemporal activities of laying hens in CFHS have relied on wearable sensors and machine learning models (MLM) in combination with behavioral recordings. However, wearable sensors constrain researchers to sample units (tagged birds) selected a-priori. Also, MLM require technological know-how that animal scientists may not possess, necessitating the need for user-friendly, non-contact tracking methods that can be applied in complex CFHS. This study evaluated the performance of an adapted mapping program (MP) compared to manual annotation for laying hens' position estimation (PE: x, y coordinates) in a single-tier cage-free room (12.1 m long $\times$ 3.04 m wide) housing 200 commercial hens. We installed a camera on the short end of the room to record the birds' activities continuously over 2 days at both 55 and 85 WOA. We used OpenCV-python and Numpy to divide the camera's view into regions of interest by defining bounding boxes. The coordinates of the bounding boxes, expressed in pixels, were correlated with the room's dimensions, ensuring each pixel coordinate had a corresponding real-world measurement in meters. We collected the ground-truth (GT: x, y coordinates) by superimposing 10 grids on video recordings of predefined areas in the room, segmenting the room into 10 zones (D 1-10) spaced at 1.21 m intervals from the camera to facilitate estimation of the birds' position. We used a linear mixed effect model (R 12.0) to evaluate the effects of position estimation method (PEM: MP vs GT), birds' distance from the camera, and location (litter vs slatted area) on PEM accuracy. For the x-axis, PEM ($F_{1, 18} = 86.18$, $P < 0.001$) affected the x-coordinate estimation, with MP underestimating GT (mean difference 0.26 ± 0.03 m). For the y-axis, models did not differ ($F_{1, 34} = 1.89$, $P = 0.178$). However, the two methods differed in their estimation depending on the distance from the camera ($F_{9, 113} = 2.26$, $P = 0.023$), whereby MP underestimated at two zones (D2 & D5), overestimated at one (D10), and did not differ from GT at the remaining zones. Results indicated that the dimension of the study area (i.e., the shortest vs longest portions of the room) and the placement of the camera impacted accuracy. Therefore, we recommend optimizing camera placement and positioning to minimize estimation errors.

Measurement of dogs' activity pre- & post-adoption

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Numerous environmental stressors that are experienced by shelter-living dogs are often less intense in the home and can lead to changes in adopted dogs' behavior, including nocturnal activity and rest. Given notable differences between these environments, dogs' activity in the shelter may not necessarily correspond to their home activity and may be indicative of the dog's welfare while being sheltered. Our study aimed to examine how dogs' activity changes within and between the shelter and the home environments. Nineteen dogs wore PetPace Health Monitoring collars to measure activity changes across each of their final 20 days in the shelter and their first 20 days post-placement into a home. Dogs' activity was measured each minute using an accelerometer; activity levels were summed for each 24-hour period and categorized from 1-100 as either resting (0-25), low (25-50), medium (50-75), or high (75-100) activity. A generalized linear model with a binomial distribution indicated a significant interaction between the dog's environment and the types of activity they engaged in, $\chi^2(3) = 28.65$, $p < 0.001$. Post hoc contrast comparisons of the interaction revealed a significant difference in the probability of time dogs spent resting (contrast estimate = 0.032, 95% CI [0.029, 0.035], $p < 0.001$) and in high activity (contrast estimate = -0.039, 95% CI [-0.041, -0.037], $p < 0.001$) in a home as compared to the shelter. Using separate generalized linear mixed models with negative binomial distributions, we additionally found significant differences between at home and at shelter in the rate of rest ($\chi^2(3) = 5.31$, $p = 0.021$) and high activity ($\chi^2(3) = 12.39$, $p < 0.001$) across 20 days in each environment. Rate of rest significantly increased only in the home environment by 1.2% each day (IRR = 1.012, 95% CI [1.006, 1.017], $p < 0.001$). Rate of high activity decreased by 5.6% each day in the home (IRR = 0.944, 95% CI [0.931, 0.957], $p < 0.001$) and 3.8% in the shelter (IRR = 0.962, 95% CI [0.941, 0.983], $p < 0.001$). The increase in resting rate and decrease in rate of vigorous activity as dogs transition into and acclimate to a home environment may further considerations for interventions like foster care, particularly for dogs displaying elevated levels of activity and reduced rest in the shelter. Time in foster care may help improve rest, reveal a dog's true activity in a home, and provide critical information for adoption placement efforts.

Connecting ear motions to emotions: the use of computer vision to detect ear postures in dairy cows

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The assessment of animals' affective state is challenging because of its subjective nature and the presence of a communication barrier between humans and animals. Ear posture has been validated as a behavioural indicator of the emotional states of dairy cows. However, manual observation is time-consuming and labourintensive, making it necessary to develop an automatic monitoring system to overcome such limitations. The objective of this pilot study was to develop a computer vision-based system to identify the occurrence of different ear postures in dairy cows. An overhead camera was fixed at the exit of the milking robot in a free-stall barn of a research farm. The camera was used to capture image data of Holstein cows between 0500 to 2100h for 6 days. A total of 330 images from 44 cows were randomly selected to train the computer vision model (YOLO-11 pose). The images were split into training, validation, and testing folders with a ratio of 80:10:10, respectively, on a cow level such that images from the same cow did not appear in multiple folders. Five key points along with a bounding box around the head region were labelled on each image. The key points included one at the tip of each ear, one at the base of each ear, and one at the dorsal midline of the neck near the head base. A transfer learning approach was adopted while training the model to predict the key points within the bounding box. Model training was set to 100 epochs (iterations), but early stopping (patience=10) was used to increase the model's generalization potential. The predicted key point values were utilized to identify ear angles with respect to the head base and categorize ear postures into 4 categories: axial (-8° to 6°), forward (7° to 30°), backward (-9° to -40°) and uncategorized (outside of the categories boundaries). The model training lasted for 71 epochs. It was able to detect the head region of cows and locate the key points with a mAP50_95 (mean average precision) of 0.90 and 0.97, respectively. We found 22, 3, 175, and 130 images with ears in axial, forward, backward, and uncategorized positions, respectively, in our whole dataset. Our results provide a step towards the automation of ear posture detection to allow monitoring frequencies and patterns of postural changes leading to a quantitative assessment of cow affective states.

Multi-camera tracking of Jersey cattle in calving pens

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Accurate multi-camera tracking of individuals is essential to advance precision livestock management and automated behaviour monitoring, yet reliably matching indistinguishable animals such as Jersey cows across different viewpoints remains a challenge. Re-identification approaches often rely on visually distinctive features that Jersey cattle lack, leading to frequent ID mismatches and reduced tracking accuracy. Furthermore, wide side-angled views covering large areas introduce challenges such as occlusion, scale variation, and perspective distortion. This study aimed to develop and validate a multi-camera tracking framework capable of robustly associating Jersey cows across camera views. Two cameras were deployed over a 108 m² calving pen containing nine Jersey cows. We extracted and annotated 1000 frames per camera for our tracking dataset. For each frame, we used YOLOv11-Pose to detect bounding boxes and extract four dorsal keypoints. We utilised ByteTrack over a sliding window of 200 frames to yield tracklets per camera. For cross-camera matching, we computed a cost matrix by measuring the reprojection error from triangulated 3D keypoints back onto each 2D camera plane. The Hungarian algorithm matched tracklets across the two cameras, assigning each cow a consistent global ID regardless of viewpoint. Our framework achieved multi-object tracking accuracies (MOTA) of 92.43% in Camera 1 and 97.02% in Camera 2, illustrating reliable tracking for both cameras. These high accuracies were attained with side-angled views, demonstrating that the keypoint-based triangulation approach effectively accounted for perspective differences. While overhead cameras can simplify cross-camera stitching, angled cameras provide broader coverage of large areas, reducing overall camera requirements. This work establishes a novel baseline approach for multi-camera cattle matching that can be further enhanced in future work. Multi-camera tracking enables automated behavioural monitoring of individual animals in expansive on-farm environments, supporting applications in welfare assessment, health surveillance, and behavioural research. As a proof-of-concept for behavioural applications, we trained a multi-class YOLOv11-Pose model able to extract four dorsal keypoints as well as classify standing and lying postures with a 98.2% accuracy that can be deployed into our model to assess time budgets. This study underscores the viability of a multi-camera, keypoint-driven approach for tracking visually similar animals. Its impact lies in improving distinct identity management for livestock, which can be extended to larger-scale operations where minimising camera infrastructure and reliably tracking highly similar animals are critical necessities.

Using data from automated calf feeders to predict weaning performance of dairy calves

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Automated feeders are often used to provide dairy calves milk and grain, allowing farms to customize feed allowance and monitor feeding behaviors. Weaning from milk is stressful for calves, impacting behaviors and welfare. Calves that eat more solid feed before milk feeding ends tend to be less affected by weaning. Our study aimed to identify differences in pre-weaning feeding behaviors that could predict individual performance over weaning. Specifically, we sought to predict average daily gain (ADG) and solid feed intake during and after weaning using measures of milk intake, grain intake and visits to the grain feeder. We also aimed to identify early indicators of weaning performance that could inform potential intervention points. From the age of 5-51 d, group-housed Holstein heifers calves (n=33) were offered 12 L/d of milk and *ad libitum* grain using an automatic feeder. Starting on day 52, milk allowance was reduced by 1.2L/d until reaching 6 L/d on day 57, and then gradually reduced to 0 from day 72 to 77. Calves were weighed weekly from 1 to 13 weeks. Automated feeders recorded individual milk intake, grain intake, visits, and time spent at the grain feeder. Calf weight at the end of the weaning process (i.e., at 77d) and two weeks after (i.e. at 91d) were positively associated with pre-weaning average milk intakes (respectively: slope=5.56, $R^2=0.30$; slope=6.74, $R^2=0.33$). We found no effect of pre-weaning average milk intake nor cumulative grain intakes on ADG during (from d52 to 77) and after weaning (from d77 to 91). Grain intakes during weaning (from d52 to 77) were positively associated with pre-weaning milk and grain intakes (respective slopes=5.46, 5.07; $R^2=0.55$). Early intervention points were explored by performing a series of linear regressions with pre-weaning average milk intakes, grain intakes, and ADG as response variables, using cumulative milk intakes as predictors. Comparison of variance explained (R^2) by each model suggested that milk consumption during the first week in the group pen could be used as an indicator of later performance: calves with greater milk intakes had higher pre-weaning average milk intakes ($P<0.001$, $R^2=0.42$), and showed greater grain consumption ($P=0.001$, $R^2=0.25$) and ADG ($P=0.047$, $R^2=0.09$) during weaning. These findings illustrate how pre-weaning feeding behaviors can be used to predict weaning performance, allowing the early identification of calves more likely to struggle. Better understanding of individual variability can contribute to developing interventions to mitigate the effect of weaning on calves' welfare.

Milking behaviour dynamics in cows affected by lameness in a multibreed batch milking dairy with automated milking units

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Milking behavioural parameters captured by automated milking systems (AMS) have the potential to assist in the early detection of diseases. Lameness is a common disorder in dairy cows, resulting in discomfort and pain that can affect the milking process. The objective was to compare the dynamics of multiple milking behaviours [milking duration (MD), milk flow duration (MFD), teat not found (TNF), kick-off (KO), and incomplete milking (IM)] within the week before and after lameness diagnosis in cows housed in a multibreed dairy with an AMS in a semi-voluntary batch milking design. This observational study included data from cows calving between May 2023 and January 2025 in an organic-certified dairy (22 AMS) located in TX, USA. Cows were screened daily for lameness using Cow Alert pedometers (IceQube, IceRobotics). Every potential lameness case was confirmed by trimming. Foot lesions were categorized into four groups: sole ulcer (SU), interdigital dermatitis (IDD), white line disease (WLD), and digital dermatitis (DD). Milking behaviours, including MD, MFD, TNF, KO, and IM, were extracted from DelPro, and demographic information was obtained from PCDART software. A healthy control group was created for comparisons using two cows of the same breed, parity, and DIM for each lameness case. In total, 234 cows (SU= 143, IDD= 41, WLD= 24, DD= 26) affected by lameness and 468 controls were included in the analysis. Data were analyzed with R using multivariate mixed linear and logistic regression models to assess differences at days -7, -4, 0 (lameness diagnosis), 4, and 7 between lameness cases and healthy controls by each foot lesion. Predictor variables included lameness, lactation stage, parity, and breed. Cow ID was included as a random effect. Comparisons between cases and controls were completed using Tukey-adjusted pairwise comparisons. Statistical significance was established at $P < 0.05$. After edits, 8,480 milking records were analyzed in 702 cows. The results were variable, depending on the time of diagnosis and lesion. The odds (95% confidence interval) of TNF [d-4: 0.55(0.30-0.98)] and IM [d-4: 0.37(0.17-0.80)] were smaller in cows affected by SU compared to controls. However, KO was more frequent in affected animals [d0: 2.19(1.26-3.79)]. No differences between groups were identified for IDD. Nevertheless, a trend of a higher probability of KO was observed for IDD on days -4 [2.07(0.99-4.33, $P=0.053$)] and 7 [3.44(0.93-12.71, $P=0.064$)]. No differences were observed for WLD and DD. In conclusion, no clear patterns in milking behaviour were detected for lame cows.

Preference in milking robot station throughout the lactation of Holstein, Jersey, and Holstein x Jersey crossbred cows in an automatic batch milking system

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Dairy cows experience multiple repetitive daily procedures that affect their behavior and time budget. As milking is the core of their daily routine, understanding cow preferences during milking is crucial for improving the efficiency of the milking procedure, which could also lead to improved welfare and health. The objective of this study was to analyze the milking robot station selection behavior across the lactation of three genetic groups including Holstein (HO), Jersey (JE), and Holstein × Jersey crossbred (HJ) cows in a multi-breed dairy farm with an automatic batch milking system. The study used data from 1,762,461 milking events in 3,705 HO (n=1,355), JE (1,876), and HJ (475) cows from May 2023 to September 2024 in a commercial organic grass-fed dairy in TX. Cows were moved to the milking center twice per day, where they could select their milking visits among 22 robot units (DeLaval, Sweden). For the analysis, robots were also classified by barn location (East; West) and arm configuration (left; right). Visit information was collected to determine the frequency of specific robot usage per cow during the study period. Subsequently, the frequencies of selection for the top 1 milking robot station, barn location, and arm configuration were calculated for each cow. Preference consistency scores ($PCS = 1.00 \times [\text{actual\_frequency} - (1/\text{number of choices})] / [1 - (1/\text{number of choices})]$) were calculated considering the frequency of access to each milking station barn side and arm configuration in 30-day periods. Least square means (LSM) for PCS were calculated by parity category and genetic group in 30-day periods and compared using ANOVA for repeated measures analysis. Preference consistency scores indicated that choice percentages differed from those expected by random and varied among genetic groups. PCS LSM for robotic milking stations were 0.24 (HO), 0.17 (JE), and 0.19 (HJ) ($P < 0.001$). PCS LSM for barn location were 0.76 (HO), 0.66 (JE), and 0.72 (HJ) ($P < 0.001$) and PCS LSM for arm configuration were 0.35 (HO), 0.23 (JE), and 0.28 (HJ) ($P < 0.001$), demonstrating different levels of cow preference ($PCS > 0$). PCS varied significantly during the lactation, with substantial increases in HO cows. Multiparous and HO cows evidenced greater and more consistent selection preference behaviors. The larger frame of multiparous and Holstein cows could play a role in these findings, facilitating more competitive and dominant behaviors in herds with multiple breeds. Behavioral elements, such as cow preferences, should be considered when managing the milking process in dairy farms.

Evaluating geolocation collar data for monitoring livestock health and parturitions in mountainous areas

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The application of Precision Livestock Farming (PLF) technologies in extensive grazing systems is emerging as a promising strategy for improving animal management and early disease detection, particularly in environments where human-animal interaction is limited. Geolocation collars, provides continuous geolocation data of individual animals, enabling the remote monitoring of their movement, activity patterns and be compared across the herd. However, PLF systems that relay on Global Navigation Satellite System (GNSS) technology have some power and connectivity constraints when are used in mountainous areas. This study aimed to design and evaluate indicators derived from GNSS collar data to detect calving events, health status and potentially identify situations involving predator attacks in the challenging terrain of the Natural Park of Alt Pirineu (80,000 ha), located in Catalonia, Spain. The dataset comprised movement data from 200 cows across five herds and 20 sheep, collected over four grazing seasons. Among these, 17 cows calved, 2 cows suffered from mastitis, and 5 cows and 12 sheep were suspected to have been attacked by predators. Data processing followed a standardized filtering protocol, and statistical analyses were carried out using generalized linear mixed effects models (GLMM). Two approaches were used to calculate the indicators: individual cow-based indicators and herd-based indicators. For mastitis detection, two cases showed a reduction in travel distance (473 ± 347 m vs $1,439 \pm 552$ m) and home range (1.42 ± 1.96 m vs 10.4 ± 15.1 m) compared to the herd before the disease was apparent. For calving, several indicators, showed a decrease after parturition, including daily trajectory length ($2,073 \pm 1,336$ m vs $1,606 \pm 1,174$ m; $P < 0.05$), maximum speed (0.44 ± 0.34 km/h vs 0.35 ± 0.32 km/h; $P < 0.05$) and distance (614.24 ± 546.60 m vs 487.42 ± 493.0 m; $P < 0.05$) and were significantly correlated with daily trajectory length ($R^2 = 0.99, 0.88, 0.87$; $P < 0.05$, respectively). Herd indicators, such as the distance to the herd centroid, were more effective in detecting calving days, as cows exhibited isolation behaviour following calving. Relative indicators comparing one cow to the rest of the herd were less reliable due to high daily variability. In predator attack scenarios, results were inconclusive, as individual situations varied greatly. In conclusion, GNSS collar data showed potential for detecting indicators related to disease and calving in mountainous areas but were not reliable for detecting or confirming predator attacks.

Technology vs. tradition: analyzing foraging enrichment use in laying hens with RFID and video observations

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Radio Frequency Identification (RFID) is an automated sensing-technology used to track location of animals. Often, location is used as a proxy for behaviours including nesting, feeding and drinking. In this study, we attempted to determine use of different foraging enrichments using RFID technology. We compared it to video analysis of pecking behaviour in two strains of laying hens at 30 and 38 weeks of age (woa). Bovans Brown and Dekalb White were housed separately in floor pens (20 hens/pen; N=12), with three different commercially available pecking blocks/pen. The RFID system included antennas underneath each pecking block acting as readers, and a passive integrated transponder (PIT) tag attached to the leg band of each hen acting as transponders. This wearable tag automatically recorded timestamps of each visit to the enrichment. Hens were tracked individually for 24hrs at 30 and 38woa to determine time spent at each enrichment. Hens were individually identified with numbered backpacks, allowing pecking behaviour at each enrichment to be quantified from video observations. Counts of pecks delivered to the enrichments were recorded at 10-minute intervals 3 times/day (between 9:00-11:00, 13:00-15:00, and 16:00-18:00) for each hen during the same week as RFID tracking but on different days due to logistics. The effects of age and strain were examined using SAS GLM in separate analyses for (1) number of pecks/30min from the video and (2) number of min/day from the RFID. Both methods showed that Bovans Brown used the enrichment more than Dekalb White (Bovans 133.9pecks/30min, Dekalb 50.3pecks/30min ($p=0.0318$), Bovans 9.6min/day, Dekalb 5.5min/day ($p=0.0762$)). Pearson correlations were performed on a pen basis for each strain ($n=12$) at both ages for both observation methods. There was no correlation between daily time spent at an enrichment and number of pecks delivered for Bovans Brown (30woa $r=0.0513$, $p=0.9839$ & 38woa $r=0.03691$, $p=0.8844$) and Dekalb White (30woa $r=-0.19220$, $p=0.4448$ & 38woa $r=0.06817$, $p=0.7881$). Although RFID and traditional video observations indicated similar overall trends for enrichment use by strain, the correlations at age points yielded poor results. This suggests time spent at a location may not be a good proxy for pecking behaviour performed at that location or there may be variations in behaviour on different days or across the day. No correlations could also be due to technology not performing as accurately and precisely as anticipated or because methods for video analysis are not ideal. This emphasizes that automated measures require validation throughout experiments.

Accelerometers as a tool for studying aviary style and age effects on laying hen activity

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The laying hen industry is transitioning to cage-free housing, including multi-tiered aviaries, yet research on how aviary configuration influences movement is limited. We examined activity patterns in hens acclimating to two aviary systems, using acceleration as a proxy for movement. We hypothesized that age, time of day (TOD), and system type would all influence activity levels. A total of 2,464 Hy-Line Brown hens were placed in two systems (N60 and STEP) at 16 weeks of age (WOA), each replicated across two rooms with four pens per room (N60: 144 hens/pen × 8 pens; STEP: 164 hens/pen × 8 pens). In N60, litter is accessible only on one side from the bottom tier, and nests are positioned on the upper tier. STEP provides access to litter on both sides from any tier, and nests are on both sides of the middle tier. At 18, 28, and 59 WOA, two focal hens per pen ($n = 32/\text{WOA}$, 16/system) wore triaxial accelerometers for four days (1-day acclimation + 3-day recording). We analyzed activity from four one-hour periods on the first recording day at dawn, noon, afternoon, and dusk. A general linear mixed model in R tested effects of system, age, and TOD, with room and individual hen as random effects. Significant results were further examined with Tukey's HSD. Horizontal activity showed a significant age × TOD × system interaction ($p < 0.0001$), along with all two-way interactions ($p < 0.0001$). Dusk consistently had the highest horizontal activity. Horizontal activity was typically lowest at dawn, except at 18 WOA in N60 and 28 WOA in STEP, where noon was lowest. Main effects of age ($p = 0.0015$) and TOD ($p < 0.0001$) were significant, but not system ($p = 0.7428$). Vertical activity also showed a significant three-way interaction ($p < 0.0001$) and all two-way interactions ($p \leq 0.0022$). Activity peaked at 28 WOA across systems and TOD. It was generally lowest at 18 WOA, except in N60 at dusk, where 59 WOA was lowest. Main effects of age and TOD were significant ($p < 0.0001$); system was not ($p = 0.7166$). In summary, as expected, both horizontal and vertical activity patterns varied with age and TOD. Contrary to our hypothesis, aviary system had no main effect on activity levels, suggesting comparable ease of movement across designs.

Effects of age and diet on calf activity during ferry and road transportation

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Long-distance transportation is known to negatively affect calf health and physiology, and strategies to improve the welfare of young calves during transport are needed. Data on the effects of transport on calf behaviour, especially under commercial conditions and including ferry transport, is scarce. This study aimed to assess how calf age and pre-transport diet affect calves' activity patterns during long-distance transportation via ferry and road. We followed a commercial calf shipment from an assembly centre (AC) in Ireland via road and roll-on-roll-off ferry (duration 24h) to a lairage (LA) in France (13h rest stop) and then via road to a veal farm (VF) in the Netherlands (duration 13.5h). The study design was a 2x2 factorial with factors calf age (2-3 weeks = "young" or 4-5 weeks = "old") and pre-transport diet (receiving 2L or 4L of milk replacer before transport). Using accelerometers, lying time (min/h), lying bouts (n/h), and steps (n/h) were recorded from 45 male Holstein-Friesian calves (10 young_2L, 10 young_4L, 13 old_2L, 12 old_4L) between departure from AC until 12 h after arrival at VF (h0-h62). Data was analysed using generalized linear mixed models with negative binomial distribution and repeated measures. Calves fed 2L spent more time lying than 4L calves overall (30 vs. 25 min/h, $P=0.01$) and for 9 individual hours (h0, h1, h48 during road transport, h21 during ferry transport, h24, h25, h36 at LA, h51, h52 after arrival), but were lying less during h16 (ferry transport). Calves fed 2L also had more lying bouts than 4L calves overall (4.5 vs. 2.1 bouts/h, $P<0.01$) and for 25 individual hours (7 hours during road transport, 7 hours during ferry transport, 5 hours at LA, 6 hours after arrival). Calf age had no overall effect on lying time or lying bouts, but older calves lay down more often than younger calves at h6, h7, h10, and h11 aboard the ferry, and less often at h33 at LA. Hourly step count was not affected by age (old vs. young: 37 vs. 37 steps/h, $P=0.88$) or diet (2L vs. 4L: 34 vs. 40 steps/h, $P=0.14$). These findings suggest that lower milk allowance prior to transport is associated with increased lying time and bouts during all stages of transport (ferry, road, rest stops, immediately post-transport), possibly indicating that calves fed less experience more exhaustion and discomfort during transport. Thus, optimizing pre-transport feeding protocols may improve calf welfare during long-distance transportation.

Can riders identify sleep deprivation in their horses prior to competitions?

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Horse sports are often described as a harmonious relationship between rider and horse. The objective of this study was to determine whether riders can predict if their horses are sleep-deprived before a competition. Nine Lusitano Purebred horses, aged 3 to 7 years, all Dressage athletes, participated in this randomized crossover experiment. REM sleep deprivation was induced by preventing the horses from entering sternal or lateral recumbency for 72 hours. All control horses were allowed to exhibit REM sleep. This study was approved by the Ethics Committee on Animal Use (CEUA/FMVZ), under protocol number 6584300721. A test competition was conducted immediately after each 72-hour session, with performance evaluated qualitatively by the same rider across both sessions using a questionnaire. The test competition was based on the official FEI Dressage Test for 4-year-old horses. Three riders participated in the study. Riders remained consistent for each horse across both conditions and were blinded to experiment condition. All riders were in the professional riding industry for 10 years. Rider 1 rode the second and third horses. Rider 2 was responsible for the fourth, fifth, seventh, and eighth horses. Rider 3 rode the first, sixth and ninth horse. Immediately after the competition, riders were asked to evaluate the horses' performance, with questions focusing on concentration, movement, and attitude. The same evaluator conducted the interviews. Regarding performance, riders of the fourth and fifth horses reported worse performance and decreased concentration when the horses were sleep deprived. Rider 3 observed that the seventh and tenth horses were less focused and appeared more fatigued after the sleep deprivation session compared to the control but noticed no change in the second horse. Rider 1 did not observe any change in the concentration of the third horse but classified it as more "tired". Rider 2 noted an increase in signs of nervousness and anxiety in the sixth horse after sleep deprivation, while the eighth and ninth horses appeared calmer and more focused following the sleep-deprived session. Riders reported no differences in the horses' movements. When comparing performance in both the control and sleep-deprived conditions, riders were unable to reliably detect if the horses were sleep-deprived. It is worth noting that the established duration of sleep deprivation may not have been sufficient for the horses to exhibit noticeable changes, or the horses may have masked the effects. This abstract represents a condensed segment of a larger project, with more variables analyzed.

Impact of rider levels and horse experience on heart rate variability in riding lesson horses

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Riding lesson horses experience certain stressors that are unique compared to those encountered by other horses. These include navigating constantly changing handlers with unpredictable skill levels and a high number of working hours, which have been identified as risk factors for conflict behaviours. Lesson facility operators believe that beginner lessons provide a more relaxed, welfare-friendly workload for lesson horses than advanced lessons. However, little is known about what quantifies an appropriate workload for lesson horses in any capacity. This study sought to investigate the impact of rider level on heart rate variability parameters (RMSSD and LF/HF) in riding lesson horses during regular work. Data was collected from 26 riding lesson horses during 49 hunter/jumper riding lessons at eight Ontario riding lesson facilities. Of these lessons, 23 were “beginner” riders and 26 were “advanced”. Heart rate data were collected for four time periods: 5min of baseline taken at rest (BL), grooming and tacking up (TACK), the first 5min of the ride following mounting (5MINS) and the full duration of the ride (RIDE). Heart rate data were downloaded and RMSSD and LF/HF were extracted in Kubios, normalized using log transformations and analyzed using a Generalized Mixed Model. Multiple comparisons using a Tukey-Kramer adjustment identified differences across rider levels and time periods. Rider level did not affect any heart rate parameters (all $p \geq .6021$). An increase in LF/HF was observed during 5MINS compared to the preceding period of TACK ($p = .0050$) and RMSSD was lower during 5MINS and RIDE than BL and TACK ($p = .0071$), suggesting increased sympathetic nervous system activity. A horse’s years of experience working at the facility in question impacted RMSSD values, with horses with 7+ years of experience exhibiting higher RMSSD than those with <7 yrs ($p = .0170$). While grooming and tacking up had minimal effect on heart rate parameters, horses demonstrated increased activation of the sympathetic nervous system during the mounted portion of the lesson, particularly during the first five minutes of the ride. This may indicate that lesson horses understand that the act of mounting signals that work or stressors are about to begin. These responses were not influenced by treatment, suggesting that contrary to industry belief, rider level may not meaningfully affect the horse’s experience during work. However, long-term experience working at a consistent facility appeared to reduce levels of physiological stress in lesson horses, suggesting a predictable environment may generate physiological or psychological adaptations to potentially stressful lifestyles.

Methods for improving shelter cat welfare during routine nail trims

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Nail trims are a routine procedure required to maintain cat claws and reduce the risk of injuries for the cat (i.e., overgrowth into paw pad, broken nail bed) and caretakers (i.e., scratches). However, cat nail trims often involve restrictive restraint methods which increase the risk of negative responses, and in shelter cats may exacerbate existing stress responses associated with shelter stays (i.e., confinement, exposure to unfamiliar people and conspecifics). Thus, we aimed to develop methods to provide cats with more agency during a nail trim procedure while also increasing the likelihood of a successful nail trim (all 10 front claws clipped). We used behavior modification techniques and cooperative care strategies to develop a nail trim protocol. Cooperative care involved a small floor mat which was used as a visual cue to teach cats that when they had at least two front paws placed on the mat, the researcher (handler) interacted with them. When the cat did not have at least 2 paws on the mat, they were not interacted with and thus they were given a choice to interact with the handler. Sixty adult shelter cats from one animal shelter facility in Northern California, USA were blocked for sex, age, and length of shelter stay to ensure balanced groups, and then were randomly assigned to one of 3 groups: 1) protocol plus cooperative care (n=20), 2) cooperative care only (n=20), or 3) control (n=20; no exposure to the handler prior to the nail trim test). At the end of the study, all cats underwent a nail trim test with the handler. All interactions with cats were video recorded for behavior coding and analyses. Cats exposed to the cooperative care mat were quicker to approach the mat on the second day of exposure compared to the first ($p<.001$), suggesting that cats quickly understood the purpose of the mat as a means of attaining human interaction. A logistic regression model revealed greater odds of completing a cat nail trim (yes/no) during the nail trim test for protocol cats compared to the cooperative care only (OR:7.43, 95%CI:1.78, 31.04, $p=0.002$) and control (OR:10.52, 95%CI:2.27, 48.76, $p=0.006$). This suggests that combining behavior modification techniques with cooperative care may be the most effective strategy for incorporating cat agency during a nail trim and increasing nail trim success in adult shelter cats. For assessing external validity of the results, future work should examine protocol efficacy when conducted by shelter staff.

Effects of maternal rearing on the emotional reactivity of goat kids and their relationship with humans before and after weaning

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Dairy goat kids are generally separated from their mothers for health and economic reasons. However, some farmers chose to leave the kids with their mothers as a way to reduce the load of work and improve animal welfare. Due to reduced contacts with the kids, stronger fearfulness towards humans may rise. This study aimed to investigate the effects of maternal compared to artificial rearing before and after weaning on Alpine kids' reactivity to isolation and human presence. Thirty-seven kids were allocated into two groups based on weight, birth date, and the pairs of twins ($n=3$) were separated: maternally (MR, $n=19$; one kid per goat) and artificially reared (AR, $n=18$) groups. All kids were weaned on the same day at approximately 70 days of age and 19.2 kg on average. The kids' behaviour was assessed through an isolation test followed by a human test, where a person remained immobile. Each test lasted 2 minutes and was conducted before (43.8 days) and after weaning (85.1 days). Linear, beta or negative binomial models were performed according to the variables. When isolated, before weaning, MR kids vocalized ($p<0.01$), moved ($p<0.05$), and tended to wag their tail less than AR kids ($p=0.056$). After weaning, MR kids still moved ($p<0.01$) and wagged their tail less ($p<0.05$), but reared up against the wall more often than AR kids ($p<0.05$). During the human test, before weaning, MR kids vocalized and spent more time in vigilant behaviour when watching the human ($p<0.05$), wagged their tail less ($p<0.01$) and spent less time in the human's zone and in interaction with the person ($p<0.05$). After weaning, MR kids wagged their tail ($p<0.01$) and explored the environment less than AR kids ($p<0.05$), while climbing against the wall more ($p<0.05$). No significant differences were observed for the time spent in the human's zone, the number of vocalizations, and in the time spent interacting with the human. Vigilant behaviour toward the human was rarely observed (6 MR kids and 1 AR kid expressed this behaviour at least once for a total duration lower than 5 seconds). The rearing method influences stress reactivity, with MR kids showing a lower behavioural arousal to isolation compared to AR kids. Maternal rearing impairs the human-kid relationship, but this effect seems to fade after weaning, suggesting that such relationship develops over time.

Is there vertical social transmission of the animal-human relationship in pigs?

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Necessary human-piglet contacts are often negative in nature. Vertical social transmission (VST), i.e. the transmission of information from mother to offspring, may help to efficiently improve the animal-human relationship (AHR) of piglets. We investigated whether VST influences the AHR of pigs, hypothesizing that piglets that experience gentle interactions between a person and their sow subsequently show more approach to and less avoidance of humans than piglets that just experience the person's presence or routine handling. The study involved 215 piglets and 36 sows, in four batches. Piglets were cross-fostered to exclude genetic effects. We applied one of three treatments per litter: OBS, piglets could experience gentle interactions between a person and their sow (stroking/scratching, feeding, gentle talking); PRES, piglets could experience the person's presence and gentle talking; MIN, piglets experienced only routine handling of their sow. From the day after cross-fostering, the first two treatments took place for 3 min/day on 5 days/week until weaning at 4 weeks of age. The weaned pigs were tested in approach and avoidance distance (AD) tests in their home pen after weaning and at 10 weeks of age ($n = 62-67$ per treatment). We calculated (generalized) linear mixed effects models, reporting the results of full-null model comparisons. After weaning, there was no significant effect of treatment on AD ($p = 0.96$; OBS median 0.30 m, PRES 0.30 m, MIN 0.28 m) or approach behaviour summarized by PCA ($p = 0.82$; OBS 0.49, PRES -0.07, MIN 0.12, lower values = more approach). At 10 weeks of age, there was no significant effect of treatment on AD ($p = 0.19$; OBS 0.05 m, PRES 0.1 m, MIN 0.05 m) or approach behaviour ($p = 0.55$; OBS 0.07, PRES 0.17, MIN 0.23). Pigs that had experienced gentle interactions between their foster sow and a person did not show more approach to or less avoidance of a person than pigs that had experienced the person's presence or routine handling. Thus, we did not find evidence for VST of the AHR in pigs, although it does exist in other species. Possibly, 60 min of treatment were not sufficient to detect VST of the AHR, although previously, shorter direct contact was effective at improving the AHR of piglets. Direct contact might be more effective in pigs, or the sow-human interaction setting might not have been optimal for VST of the AHR. Additionally, all pigs had a relatively good AHR.

Integrating temperament and physiology: A strategic approach to white-lipped peccary (*Tayassu pecari*) conservation

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Pre-release training and post-release monitoring can benefit from the inclusion of temperament evaluation and physiological markers. This can be a valuable tool in deciding, for instance, which individuals would use radio-collar and how to provide individualized training before release. Thus, our goal was to examine the association between temperament and physiological markers (faecal glucocorticoid metabolites (FGM), neutrophil- to-lymphocyte ratio (NLR), blood cell count, body mass, and age) in 16 captive white-lipped peccaries (*Tayassu pecari*, WLP), candidates for reintroduction. We tested the hypothesis that there is an individual physiological profile associated with individual behavioural traits (temperament). The individual's temperament traits were assessed during 20 non-consecutive days, through the conventional ethological approach (behavioural coding), totalling 30 focal/animal (5 minutes/focal), considering the time spent in the following behavioural categories: exploration, sociability, and aggressiveness. After a seven-day interval following the end of behavioural observations, we collected blood samples to evaluate NLR and blood cells count of individuals. Faecal samples were collected during the observation days to determine the concentration of FGM. Principal component analysis (PCA) of the temperament and physiological markers yielded four significant principal components (PCs; eigenvalues>1.0), which together account for about 81% of the total variance in the data set. The first principal component (PC1) (eigenvalue: 3.63, 31.1% of the variability in the data set) showed positive loadings for total neutrophils (0.46), NLR (0.44), and age (0.42) variables. The PC2 (eigenvalue: 2.30, 20.9% of the variability in the data set) showed positive loadings for body mass (0.50), red blood cells (0.43), and aggressiveness (0.41) variables. The PC3 (eigenvalue: 1.61, 14.6% of the variability in the data set) showed positive loadings for leukocytes (0.64) and exploration (0.43) variables. The PC4 (eigenvalue: 1.38, 12.5% of the variability in the data set) showed positive loading for FGM (0.48) and negative loading for sociability (−0.66) variables. Thus, our hypothesis was partially confirmed, as the older the animals, the higher the total neutrophil count ($p<0.05$); the heavier the individuals, the more aggressive they were ($p<0.05$), the more exploratory they were, the higher the leukocyte counts; the less sociable the individuals, the higher the FGM concentrations. These initial assessments of the animals' profiles can predict difficulties regarding each individual's capacity for independent exploration behaviour and its degree of stress, for example. This information can be useful for refining pre-release training and post-release monitoring of WLP, helping to tailor approaches for improving survival and its adaptation in the wild.

Bark to the future: a mixed-method investigation of dog owners' views on dog monitoring technologies

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Dog monitoring devices (e.g. smart collars, cameras, smart feeders, tags) are increasingly integrated into dog owners' routines, yet the perceived impacts of these technologies on dogs and their owners remain underexplored. This study investigated the perceptions of dog owners (n=86) regarding the use and impacts of these technologies. A mixed-methods questionnaire was developed on Qualtrics. Qualitative content analysis was used to identify owners' reasons for using dog monitoring technologies and their perceived impacts on their dogs and on themselves. Content analysis was led by two researchers, who generated a mutually agreed set of themes and later refined with the full author team. Quantitative data were summarized, and associations of perceived impacts with owner demographics, dog characteristics, technology characteristics and scores on the Monash Dog Owner Relationship Scale (MDORS) were assessed using mixed-effect logistic regressions. Final models were built after manual backwards elimination and controlling for potential confounding effects. Most participants adopted technologies to assess dog safety (e.g. when the dog is alone at home or during walks) and track dog behaviour (e.g. activity levels, behaviour issues, and aid with training). Other themes included monitoring dog health and owner-related factors (e.g. using technology to feel reassured about their dog's wellbeing or to increase their exercise). Perceived positive impacts on dogs included improved care and increased off-leash opportunities, while negative impacts involved low trust in the technology's reliability and concerns about dog behavioural issues and discomfort. A negative impact of technology on dog behaviour was increased attention towards automatic feeders. Most owners identified positive impacts on themselves, including reduced anxiety and enhanced self-assessed pet parenting. Stress and financial concerns were mentioned as negative effects. While some owners shared that being able to monitor their dogs reduced their anxiety, for others this led to increased stress by prompting them to check on their dogs constantly. The MDORS subscale regarding perceived costs of the relationship between dog and owner was associated with a more positive impact of monitoring technologies on dog owners (OR: 1.09; 95% CI: 1.01, 1.17; p=0.02). Thus, owners who viewed their relationship with their dog as less costly perceived more positive impacts. No other associations between any other quantitative variables and perceived impacts on dogs or owners were found. Our findings underscore the importance of considering benefits and potential drawbacks of technologies to ensure their ethical and effective integration into the lives of dogs and the humans who care for them.

Behavior and personality of Holstein dairy and dairy × beef crossbred calves

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The rising adoption of crossbreeding in the dairy industry has created a need for investigation into the behavior and personality of dairy × beef crossbred calves to inform management practices. The objective of this pilot study was to identify differences in home pen behavior and behavioral responses to standardized personality tests between purebred dairy and dairy × beef crossbred calves. We hypothesized crossbred calves would be more active in the home pen and reactive to novel experiences. Sixteen bull calves (n=8 Holstein [PB] and 8 Angus × Holstein crossbreds [CB]) were housed individually and fed 2.8 L of milk replacer at 0600 and 1600 h with *ad libitum* access to texturized starter. Behavior in the home pen was video recorded and sampled continuously once weekly from 2-4 wk of age from 1 h prior to 3 h after the 1600 h feeding. Behaviors of interest included locomotor play, inactivity, grooming, environmental exploration, non-nutritive sucking, and walking. At 25.9±1.3 d of age (51.7±5.6 kg), calves were subjected to 3 consecutive tests: 1) novel environment (10 min); 2) novel person (10 min); and 3) novel object/startle (umbrella opened when touched or after 5 min, with test ending 5 min thereafter). Home pen behavior was analyzed using PROC MIXED in SAS 9.4 with calf as the experimental unit; models included the fixed effects of breed, week, and their interaction. A principal component analysis was performed on personality test data, with 3 factors explaining 75.4% of the variance. Inactivity, latency to approach and reapproach object, time spent touching object, and attentiveness to object from afar loaded highly on factor 1, interpreted as a “fearful” trait. Environmental exploration, play with person, and attentiveness to person from afar loaded highly on factor 2, interpreted as an “explorative” trait. Grooming and time spent touching person loaded highly on factor 3, interpreted as an “attentive” trait. There was no significant effect of breed on the expression of these three traits. Age was negatively associated with “explorative” trait ($P=0.047$). As time of testing approached the 1600 h feeding, calves interacted less with the person ($P=0.04$). There was no significant effect of breed or breed × week on home pen behavior. These results suggest CB and PB calves may express similar behavior and responses to novel experiences in early life. Future studies should consider how other husbandry practices for CB calves (e.g., social housing, milk allowance) affect behavior and personality.

Using the Behaviour Change Wheel to understand practice change in the Australian sheep industry

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Human behaviour change programs have been used in agricultural settings globally to modify practices, improve animal health, and increase production efficiency and sustainability. Extension programs in the Australian sheep industry provide many examples of strategies that have aimed to and resulted in change. With few outlining their conceptual or theoretical frameworks that guided how they planned to or did achieve change, there is little consistency, rendering evaluation, replication, and expansion challenging. To better understand the theoretical underpinnings of these programs, this study reviewed published extension programs using one model, the Behaviour Change Wheel (BCW). The BCW is a cross-disciplinary model that comprehensively incorporates 19 frameworks of behaviour change and was developed to design and understand behaviour change programs. The BCW provides concise terminology of internal and external factors that contribute to behaviour, centring the COM-B model (capability – psychological, physical; opportunity – social, physical; and motivation – reflective, automatic), and intervention functions and policy categories to address these specific factors. We reviewed practice change programs in the Australian sheep industry through the lens of the BCW, and identified the behaviours, behaviour change techniques and intervention functions used. A narrative review was conducted of relevant grey and peer-reviewed literature. Deductive thematic analysis was performed in NVivo15® using the BCW components as codes. To date, sheep extension programs in Australia have usually involved local groups with a facilitator and, often, topic experts. These programs aimed to address grazing and ewe management, flock health, and included a range of behaviours and practices. Common targets of the programs were knowledge (psychological capability), skills transfer and advancement (physical capability), demonstrations (social opportunity), and increasing awareness and altering attitudes (reflective motivation). The most common intervention functions in these programs were education, training, modelling, and persuasion. Programs that reported change used one or all of three strategies. 1. Modifying attitudes and beliefs relating to the proposed behaviours/practices, increasing reflective motivation. 2. Increasing skills during workshops and demonstrations, increasing physical capability and reflective motivation. 3. Conducting programs in group contexts, allowing for social interaction, learning, and comparison, increasing social opportunity. To work towards improved welfare and a “good life” for all sheep, understanding how we can support better practices and change human behaviour is key. Using one comprehensive model with consistent terminology to assess the underpinnings of successful extension strategies helps us understand not only why they were effective, but also how they can be integrated in future programs.

Snack-based administration of Neem Cake in calves: a strategy to reduce physical restraint

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Physical restraint for oral medication in calves is time-consuming, can impact development. Different delivery vehicles are used worldwide. Snacks are common for companion animals, but not for ruminants. Neem (*Azadirachta indica*) cake, with anthelmintic and anti-inflammatory properties, has a bitter taste and strong odor that limits oral use in ruminants. To address this, 1 g of Neem cake was combined with carboxymethyl cellulose and compressed into a snack. Lucta[®] flavor was added for palatability. A modified two-bottle test was conducted with six Holstein calves (51 ± 12 days) to assess intake and preference. The test included two sessions: one in individual housing (TBI) and another in an open field (TBO). Video analysis recorded interaction time, latency to ingest, acceptability (>80% ingestion), and post-ingestion behavior. Based upon Open Field and Novel Object tests, calves were categorized by behavioral traits as calmer (CC) or more reactive (RC). The experiment followed a Latin square design with nine five-minute sessions per calf, three per day to mitigate potential Neem toxicity. Each session compared control (S) and Neem-containing snacks (SN). Three variations were tested: unflavored (S, SN), Lucta[®] flavor 1 (S1, SN1), and Lucta[®] flavor 2 (S2, SN2). Results were analyzed using Students *t*-test. In the first TBI session, S was the only snack ingested, but 4 of the calves first approached SN, indicating its lower palatability. SN1 and SN2 were approached initially more often (30:48) but not always resulting in ingestion (24:30). Compared to SN, SN2 showed the highest intake ($p = 0.007$), followed by S2 and SN3 ($p = 0.019$), while S3 approached significance ($p = 0.088$), confirming that the flavor additive effectively masked the Neem odor. Overall, flavored Neem snacks were more ingested ($p = 0.003$). S1 and S2 preferred over SN1 ($p = 0.013$), confirming the additive's positive effect. In TBI, no significant difference in interaction time was observed between CC (39.3 ± 52.2 s) and RC (109.6 ± 73.3 s; $p = 0.120$), but CC had a higher ingestion rate ($p = 0.046$). In TBO, CC interacted more quickly (11.8 ± 12.9 s vs. 80.9 ± 74.8 s; $p = 0.002$), spent more time interacting ($p = 0.0102$), and ingested more ($p = 0.063$), suggesting greater acceptance of the snack. RC calves, particularly in novel environments, took longer to interact and ingested less. All calves that accepted snacks in TBI also ingested at least one in TBO.

Feline stakeholder attitudes and opinions on community cat welfare (Part II)

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Of the approximately 800 million cats living globally, 60% of them are free roaming. Free-roaming cats, or “community cats” as they’re often referred to, include both stray (pets abandoned or lost) and feral cats (unsocialized domestic cats). Community cats experience different welfare challenges than owned cats, such as exposure to extreme temperatures, potentially unstable social groups, and nutritional uncertainty, among others. Assessing and monitoring the well-being of community cats is vital to ensuring their overall welfare, but accessible and validated tools are lacking, and the few available focus only on animal health. The ultimate aim of our study is to create a valid and reliable tool to assess welfare in community cats, however, understanding how welfare is currently being measured in the field is an important first step in the development of a more robust tool. Therefore, the objectives of the current study are: 1) identify currently utilized methods for assessing community cat welfare, and 2) evaluate demographic characteristics of participants that might influence stakeholders’ perceptions. Through targeted snowball sampling methods, we conducted two rounds of surveys using the Delphi technique, a widely used method to investigate agreement among experts. The first survey received 596 full responses which were analyzed using qualitative content analysis. Results revealed five common themes: presence of supportive caregivers, resource availability and quality (e.g., shelter, safety, food, and water condition), health (e.g., access to vet care), ability to perform feline natural behaviors, and management of cat colony population (e.g., Trap-Neuter-Return (TNR) or Trap-Neuter-Vaccinate-Return (TNVR)). Findings from the first round were summarized into 45 statements and sent back to participants for comments on importance and relative weight for community cat welfare. A total of 269 participants completed the second survey for a 45% response rate. Surprisingly, 74% of respondents agreed that stray and feral cats have different welfare criteria, despite the challenges in distinguishing between these groups. The linear mix models (ANOVA) and Bonferroni revealed significant differences in welfare perceptions based on respondents’ professional backgrounds. For example, shelter staff and veterinarians often differed from caregivers in their views on welfare for stray and feral cats, emphasizing different priorities and concerns related to outdoor living, access to care, and nutrition. These findings suggest some challenges related to agreement of key welfare concerns among stakeholders. Regardless, results from this study will aid in developing an assessment tool that reflects all stakeholders’ concerns to effectively evaluate community cat welfare.

Do topical gels containing oleic acid and fish oil reduce the piglet pain response following surgical castration?

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The objective of this preliminary study was to evaluate the use of topical gels containing oleic acid or fish oil for reducing pain in piglets following surgical castration. Twenty-five piglets (3-7 d of age) were randomly assigned to 1 of 5 treatment groups: T1 (sham castration, n=5); T2 (surgical castration, n=5); T3 (surgical castration + 33% oleic acid gel, n=5); T4 (surgical castration + 25% oleic acid gel, n=5); or T5 (surgical castration + 16.5% oleic acid and 16.5% fish oil gel, n=5). The gel was applied directly to the incision site immediately after surgical castration. Behavioral responses were monitored over 5 d (from d -1 to d 3, d 0 = day of castration) for 1 h between 0800 and 1100 h for each piglet. Pain-related behaviors (nursing, hind leg lifting, scratching, and prostration) were collected continuously. Posture changes (lying, sitting, and standing) were recorded instantaneously using 5-min intervals. Instantaneous behaviors were analyzed using the GLIMMIX procedure in SAS, while continuous behaviors were assessed using the MIXED procedure. There was no difference in nursing duration across treatments and days ($P>0.05$). Hind leg lifting and scratching occurred at too low of a duration to be analyzed as a continuous variable. However, of the 44 hind leg lifting occurrences observed post-castration, T2 piglets performed 54.5%, while T1, T3, T4, and T5 piglets performed 4.5%, 11.4%, 25%, and 4.5%, respectively. There tended to be a treatment by day interaction for prostration, but no clear treatment patterns were observed throughout the experiment. Standing did not differ between treatments ($P>0.05$). Piglets, regardless of treatment, stood more on d -1 ($P<0.01$) and less on d 3 ($P<0.04$) than any other day, with no differences between d 0, 1, and 2. Sitting was consistent across treatments and days ($P>0.05$). For lying postures, T4 piglets decreased time lying sternally from d -1 to d 3, while T3 pigs exhibited reduced sternal lying on d 0 compared to all other days ($P<0.08$). Piglets in T4 increased time lying laterally from d -1 to d 3, while T1 piglets spent more time lying laterally on d 3 compared to all other days ($P<0.05$). These preliminary findings show no clear effect of gel treatment on pain-related behaviors in piglets following surgical castration. This study will move forward with an increased number of pigs per treatment and longer observation hours per day, resulting in more power to detect differences between treatments.

Getting close up: the influence of dominance, sex and kinship on physical contact in pigs

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Physical contact is a key aspect of social relationships, but the importance of it is still largely unexplored in farm animals. Social nosing in pigs serves multiple functions related to bonding, communication, and cohesion. The aim of this study was to explore subtle differences in recognition and affiliative behaviours in pigs, analyzing differences in the frequencies between snout contact and snout proximity. Additionally, we wanted to assess the influence of dominance rank, sex and kinship (littermates status) on the expression of these behaviours. Based on literature, we hypothesized that higher ranking pigs, males and non-kin would give less contact. Seven-week-old pigs ($n=212$), females and entire males, were observed over 15 days (15h/pig) through live and video recordings. Pigs were housed in single sex groups ($n=16$ groups) in indoor pens (6.9m×2.1m) with deep-straw bedding. We recorded agonistic interactions and social behaviours. The non-invasive behavioural study was authorised by the UK Home Office (license P3850A80D/PP1403242). Dominance ranks were determined using Glicko ratings from agonistic interactions. A subset of six pigs per group, two each of high, mid and low rank, were selected for further behavioural observations. Data were analyzed using mixed models, with values reported as means with SD. Preliminary results showed that pigs performed more contact than proximity and snout-snout over snout-head interactions. The most frequent interaction was snout-snout contact (2.5 ± 1.2 times/h), followed by snout-head contact (1.7 ± 0.9), snout-snout proximity (0.65 ± 0.28) and snout-head proximity (0.25 ± 0.16 ; $P < 0.05$). This suggests that pigs prioritize physical contact over proximity, as contact likely holds a stronger affiliative significance, while proximity may be more related to individual recognition. The dominance rank was linear, with a clearly dominant individual per group, but did not influence any of the behaviours. This may be due to the young age of the pigs, suggesting that social strategies related to dominance develop later in life. However, snout-head proximity was more common between males than females ($p=0.005$). Since adult males tend to be more solitary, this preference for proximity over direct contact may indicate an early-stage transition toward a more independent social structure. Kinship had no significant effect on contact, likely because the time since group formation was enough for complete social integration, thereby diminishing the influence of kinship ties. These results provide insights into how social structures and developmental stages shape social interactions. Although insufficiently studied, the results also highlight how common gentle social contact is in the social lives of managed animals.

Improving laboratory pig welfare in high-impact infectious disease studies

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Pigs are an increasingly utilised laboratory animal, due in part to their anatomical similarities to humans and significance as an agricultural species. Advancing best-practice welfare methods is necessary for research Institutions to maintain a social licence to use animals for scientific purposes when required. Positive reinforcement training (PRT) can facilitate conscious sample collection in laboratory pigs, with the potential to decrease negative, and increase positive, experiences. However, due to the unique safety and equipment restrictions of working with pigs at high containment, a PRT regimen tailored to pigs in infectious disease studies was lacking. At the Australian Centre for Disease Preparedness, a rapid three-phase PRT regimen was developed to facilitate the conscious collection of swabs and rectal temperatures from pigs voluntarily. This training regimen was combined with the surgical implantation and use of subcutaneous vascular access ports (VAPs) for conscious, voluntary blood collection (n=4). In phase 1 of PRT, pigs were trained to touch a paddle with their snout; in phase 2, pigs were trained to enter a designated sample collection area using the paddle as a lure; and in phase 3, pigs were trained to remain stationary for sample collection using the paddle as a positioning tool. Time to complete each phase of training, behaviours assessed via a human approach test and behavioural ethogram, salivary corticosterone, and heart rate variability were assessed daily. The rapid PRT regimen successfully facilitated minimally-invasive sample collection from group housed pigs within 6 days. Pigs sampled conscious using PRT and VAPs displayed increasing positive behaviours, no or very few negative behaviours, corticosterone levels within normal limits (<2000pg/ml), and steady heart rate variability (11.5- 11.8 VVTI), indicating a welfare-positive state. After these initial validations were complete, the three-phase PRT regimen and VAPs were utilised in a study of highly pathogenic African swine fever. Compared to pigs repeatedly anaesthetised for sample collections (n=3), pigs sampled conscious via PRT and VAPs (n=3) displayed significantly improved thermoregulation (p=0.0001), pulse rate maintenance (p=0.02) and heart rate variability (p=0.0001) during a sample collection event. Additionally, while all pigs anaesthetised for sample collections displayed instances of hindlimb lameness in mid to late-stage African swine fever disease, pigs sampled conscious via training and VAPs did not display lameness throughout the study. These results offer initial proof-of-concept for the use of this PRT regimen and VAPs as welfare-positive methods of pig sample collection, including under the restrictions of high containment infectious disease research.

Evaluating the impact of age and diurnal rhythm on the development of the behavioral repertoire of broiler chicks

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Poultry behavior serves as an indicator of welfare and is an important component of facilitating management practices that allow birds to thrive. Therefore, understanding normal behavioral development is vital for promoting positive bird welfare. Currently, scientific knowledge regarding the early ontogeny of broiler behavior remains limited. This study aimed to improve understanding of the normal behavioral development of broiler chicks by assessing age, diurnal, and sequential patterns. Seventy-five broiler chicks (Ross 308, mixed-sex) were randomly placed (25 birds/pen). Three chicks from each pen were selected as focal subjects (n=9). Behavior was recorded from D 1 to 7 of age and assessed by 24-hour continuous sampling. Behavioral durations were analyzed by age and time-of-day, and included locomotive, standing, sitting, sleeping, comfort, nutritive, explorative, social, individual play, and social play behaviors. Diversity of behavior was assessed using the Shannon diversity index. A sequence probability matrix was used to evaluate the probability of a target behavior (TB) occurring after an antecedent behavior (AB) across five lag-states. For sequence analysis, some behaviors were categorized as resting (sleeping+sitting) and play (individual+social). An ANOVA was conducted to assess duration, diversity, and sequence with means comparison via Tukey-Kramers. The proportion of time spent performing locomotive, comfort, nutritive, individual play, and social play behaviors ($P<0.01$; individual play-linear, remaining-quadratic) increased as chicks aged. The time birds spent sleeping, standing, and exhibiting social and explorative behaviors decreased with age ($P<0.01$; sleeping-linear, remaining-quadratic). Time-of-day impacted the performance of all behaviors ($P<0.01$). Chicks spent the greatest proportion of time performing locomotive, standing, nutritive, and individual play behaviors during the morning period (2.19%; 1.58%; 3.53%; 0.23%, respectively). The time birds allotted towards sitting, comfort, and social behaviors was greatest during the mid-day period (4.05%; 1.80%; 0.15%, respectively). Chicks slept the most during the dark period (13.66%). Explorative behaviors were exhibited for the greatest proportion of time during the pre-dark period (1.11%). Chicks engaged in social play behaviors more during the mid-day (0.21%), afternoon (0.19%), and evening period (0.21%) than the dark period (0.00%). Behavioral diversity increased ($P<0.01$) as chicks aged. Regardless of AB ($P<0.01$), the most probable TB for chicks to perform were locomotive and resting behaviors. Overall, the decrease in sleeping combined with the increase in locomotive, comfort, nutritive, and play behaviors resulted in greater behavioral diversity as chicks aged. Furthermore, these findings highlight the importance of both locomotive and resting behaviors for broilers during early-life.

Effect of plumage colour on fear behaviour in intensively raised guinea fowl keets

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Guinea fowl are valued for their high-protein meat, resilient nature, and adaptability to various environments. However, their production faces challenges, including high keet mortality and behavioural traits such as fear responses, which may impact welfare and productivity. Plumage colour in birds has been linked to visibility to predators, thermoregulation, and potential health or genetic factors, suggesting it may also influence behavioural traits such as fear responses. This study investigated whether plumage colour (brown, lavender, and pearl) affects fear responses in intensively raised guinea fowl keets on deep litter. Based on potential colour-related differences in survival and behaviour observed in other avian species, we hypothesised that plumage colour might influence fear behaviour. Thirty keets per age group (one, two, and three weeks old) from each plumage colour were subjected to tonic immobility (TI) and emergence tests. The TI test measured duration of immobility and number of induction attempts, while the emergence test recorded latency to exit a dark box. Data were analysed using the Kruskal-Wallis test in SPSS. Results showed no significant effect of plumage colour on TI duration ($p > 0.05$), number of induction attempts ($p > 0.05$), or emergence latency ($p > 0.05$) across all age groups. While plumage colour did not significantly influence fear behaviour in this study, the findings suggest that behavioural responses may be shaped more by environmental, genetic, or individual temperament factors than by plumage alone. Further research into the genetic basis of plumage colour and its potential link to behavioural traits may offer deeper insights. These results contribute to the understanding of guinea fowl behaviour and inform welfare management strategies in intensive production systems.

Associating behavioral and physiological biomarkers with judgment bias test outcomes in weaned pigs

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Assessing positive emotions in animal welfare research remains challenging. One method, the judgment bias task (JBT), evaluates animals' responses to ambiguous cues as indicators of optimism or pessimism. While previous studies have examined the influence of environmental factors like enrichment on JBT outcomes, the relationship between JBT responses and animal-based behavioral and physiological indicators of emotion remains unclear. This study investigated how biomarkers of emotion relate to JBT outcomes in pigs. Thirty-six pigs were tested in a go/no-go JBT between 37–75 days of age, using five chocolate candies as a positive reinforcer and a waved plastic bag as a negative one. Pigs were tested at three ambiguous locations—near-positive (nS+), middle (M), and near-negative (nS–). To induce variation in emotional states, selected pigs were housed in either enriched (EH; larger pens, daily straw provision, toys; n=18) or conventional (CH; minimal standards; n=18) environments, in a total of 12 pens. Behavioral observations and physiological samples (blood, hair) were collected. We hypothesized that more positive behaviors and biomarkers linked to positive affect would associate with optimistic JBT responses. Overall, associations between physiological biomarkers and JBT outcomes were limited. Elevated levels of keyhole limpet hemocyanin (KLH)-binding immunoglobulin (Ig) M were linked to greater optimism at all locations, reaching significance at M (est.: 0.44, 95% CI: 0.21–0.93) and nS– (est.: 0.37, 95% CI: 0.18–0.77). Conversely, higher KLH-IgG levels were associated with increased pessimism, only reaching significance at M (est.: 2.95, 95% CI: 1.50–5.82). Elevated hair cortisol was consistently linked to more optimistic responses, contrary to predictions (nS+: est.: 0.97, 95% CI: 0.95–0.99; M: est.: 0.95, 95% CI: 0.92–0.98, nS–: 0.99, 95% CI: 0.96–1.02). Other physiological markers—including serotonin, acute phase proteins, and neutrophil-to-lymphocyte ratio—showed no or inconsistent associations. Similarly, behavioral biomarkers showed no support for our hypothesis. Unexpectedly, certain social behaviors were significantly associated with pessimism across all locations, with the following significant effects: social nosing-nS+ (est.: 1.07, 95% CI: 1.02–1.13), play barks/grunts-M (est.: 1.03, 95% CI: 1.01–1.05), and play fighting-nS– (est.: 1.09, 95% CI: 1.03–1.15), suggesting that social isolation may influence JBT responses. In conclusion, only KLH-IgM levels aligned with the hypothesized JBT outcomes. All other biomarkers showed inconsistent or opposite patterns. These findings indicate that factors such as social isolation and other unaccounted variables likely influence JBT responses. To improve the reliability and efficiency of assessing animal emotion, direct measurement of animal-based emotional indicators and exploration of their interrelations are recommended.

Assessing ewe welfare: ewe-lamb distance measured by Bluetooth Low Energy data

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Ewe-lamb distance (ELD) is a measure of maternal relationship dynamics, which impact lamb survival and health. This study tested whether collar-mounted Bluetooth Low Energy (BLE) beacons monitoring ELD could act as a potential indicator of ewe and lamb welfare during outdoor lambing in extensive systems. Ethical approval was obtained from SRUC's AEC (#SHE AE 10-2022). Before lambing, 9 Scottish Blackface and 14 Lleyn ewes were fitted with collars containing BLE beacons and receivers communicating with a LoRaWAN gateway and then to an ArcGIS database. Lambs were fitted with collars containing BLE beacons within 24 hours of birth. The Received Signal Strength Indicator (RSSI) of the 16 nearest beacons for each receiver on ewe collars was recorded every 5 minutes for 6 weeks from lamb birth. Welfare assessments were conducted weekly through live observation where every sheep was assigned a faecal soiling score (0-no soiling to 4-wide area of soiling), fleece score (0-even fleece cover/1-loose fleece and shed areas) and lameness score (0-sound to 3-recumbent or reluctant to move), based on the AWIN scales. RSSI were converted to distance in metres using the equation from previous static BLE studies and interpreted as the ELD. Generalised Linear Mixed Models were used to examine the effect of day of observation, ewe breed, ewe and lamb lameness, faecal soiling and fleece score on ELD. Fifteen ewes were affected by the welfare concerns studied, but there was too little variation in the lamb welfare scores to model their relationship with ELD, which ranged from 0 to 50m, with a median of 5m (IQR=11m) and a mean (SD) of 9m (8.6m). Ewe faecal soiling score ($X_2=0.42$, $p=0.519$) and breed ($X_2=0.06$, $p=0.799$) had no effect on ELD. Mean ELD was shorter in week 1 of lambs' lives (7.22 ± 2.95 m) compared to all subsequent weeks ($p<0.001$), although there was no further variation in the spatial relationship between ewes and lambs over time. Ewes with no fleece loss (score 0) had a higher mean ELD ($8.73\text{m}\pm1.05$) than ewes with fleece loss (score 1) ($7.03\text{m}\pm1.07$) ($p<0.001$). Non-lame ewes had a higher mean ELD ($8.73\text{m}\pm1.05$) than lame ewes ($7.03\text{m}\pm1.04$) ($p<0.001$). These findings suggest that ELD may be sensitive to changes in ewe welfare since fleece loss and lameness can reflect changes across multiple welfare domains. Thus, it could act as a ewe welfare indicator in extensive lambing conditions. This study also shows the welfare monitoring potential of PLF technology for complementing inperson supervision.

Automated video-based recognition of tail and ear biting in pigs

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Damaging behaviours, such as tail and ear biting, significantly compromise both animal welfare and farm productivity. Farmers typically notice tail or ear biting in a pen only after visible damage appears on affected pigs. However, by this stage, the welfare of the pigs has already deteriorated and intervention may be too late to prevent the escalation of these behaviours within the group. Therefore, continuous monitoring of damaging behaviours is essential to enable early intervention and improve animal health and welfare. Also, pig breeding organizations are increasingly interested in monitoring damaging behaviours to be able to select pigs with a low genetic propensity to develop such behaviours. Manual observations are impractical due to the substantial laborious efforts, particularly in large-scale commercial farms, and the irregular occurrences of ear and tail biting. To address this challenge, we propose a video-based behaviour recognition system that facilitates the automated monitoring of individual pigs. In this study, we investigated two state-of-the-art video-based methods: SlowFast and Improved Multiscale Vision Transformers (MViTv2), for recognizing tail and ear biting in pigs, exploiting the spatiotemporal domain features. The models are capable of recognizing if an individual pig is displaying biting behaviours in a short video sequence (approx. 7 seconds). All experimental datasets for this study were collected on a growing-finishing commercial farm in Germany. In total, 532 tail-biting and 750 ear-biting events were annotated across seven pens of tail-docked pigs by three observers with high inter-observer reliabilities (Cohen's kappa > 0.75 after training). Tail and ear biting were defined as a pig nibbling, sucking, chewing, or biting the tail or the ear of a pen mate and could occur during any posture (lying, sitting, kneeling, standing) of both performer and victim. The best-performing method was based on the MViTv2 model, which allowed for efficient spatiotemporal modeling. The obtained detection accuracies on the testing dataset for the tail-biting and ear-biting behaviours were 72.22% and 72.37%, respectively. The conducted experiments demonstrate the feasibility of automated monitoring systems for the recognition of tail-biting and ear-biting behaviour in commercial pig farms. This study is a crucial step towards the development of an automated early-warning system, thereby enabling timely interventions to mitigate the damaging impacts of tail and ear biting on pig welfare. Additionally, automated detection of damaging behaviours at the individual level will facilitate genetic selection to reduce tail and ear biting.

Validation of a 3D camera system to monitor pig behaviour in response to vaccines and other challenging events

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Precision Livestock Farming sensors can provide real time information to improve animal management and welfare, but new systems require validation. A prototype machine vision system using 3D cameras to monitor pig behaviour (movement tracks, feeder and drinker visits) was used for 6 groups of 8 weaner pigs (28 - 71 days old). Pigs were given two vaccines (against Circovirus and Lawsonia) to induce mild 'sickness' behaviour and control saline injection in a random order over 3 weeks, and six further challenges in a random order over 3 weeks lasting 8 hours (feed or water removal, social mixing) or 24 hours (bedding removal, adding enrichment, +3°C temperature). For validation, scan samples of behaviour at the group level were performed by a human observer at 20 min intervals during the day (0700-1800h) or hourly at night (1900-0600h) during the 24hrs before, during and after each vaccine or challenge day. For analysis 3D camera data and human observer data were summarised by hour and correlations used to compare them. The effects of each challenge on observed and 3D behaviours were analysed with General Linear Models including pen (as a block), day, time of day (before, during, after challenge) and their interaction. Correlations between 3D and observed behaviours were moderate for activity (3D pig movement tracks vs standing $r=0.44$, vs rooting 0.42), while feeder ($r=0.20$) and drinker ($r=0.17$) visits correlated weakly. Time of day effects were present for most observed and 3D recorded behaviours. Large differences between the pens were evident in the 3D data. For observed behaviours, the three vaccines, social mixing, feed deprivation, bedding removal and enrichment had significant effects. The clearest differences in overall activity were evident over the 24hr cycle; in sickness behaviour from Circovirus vaccine (mean proportion observed standing days pre-vaccine, vaccine given and post-vaccine 0.18, 0.11, 0.18; $p<0.001$); and social mixing (locomotion 0.021, 0.046, 0.023; $p<0.001$). These changes were also reflected in 3D activity (Circovirus 3D tracks/hr 7.3, 3.7, 7.7; $p<0.001$; Mixing 3.6, 5.2, 3.0; $p=0.003$). Feed removal produced the expected drop in observed feeder visits, with a rebound increase after, but this pattern was not found in the 3D data. Water removal and temperature increases had little effect on either observed or 3D behaviour, surprisingly not even on drinker visits. We conclude that the 3D camera system shows some promise for detecting changes from a typical daily pattern of activity but still needs refinement.

Development and computer-assisted validation of an RFID system for monitoring night-time perching behaviour in chickens

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Night-time perching is a critical welfare-relevant behaviour in chickens, reflecting natural instincts and providing valuable insights into social hierarchy, resting needs, fear levels, health status, and the tendency to lay floor eggs. However, traditional manual observation methods (e.g., direct human monitoring or onscreen video review) are labourintensive and impractical for tracking individual chickens, thus necessitating automated solutions. In this study, we developed an RFID system for the automated, noninvasive monitoring of chicken perching and perchleaving events, with a focus on nighttime roosting. The system integrated standard hardware with a custom software solution called “Tag’n’Track” for data storage, visualisation, and export. We validated the RFID system against an automated 3D ArUcobased video annotation system with the goal of identifying thresholds achieving at least 80% precision and sensitivity while maintaining an acceptable temporal margin of deviation relative to the video benchmark. Using a mobile barn setup with 21 laying hens, each fitted with an RFID tag on a leg band, we monitored a single metal perch equipped with an ultrahighfrequency cablelike antenna over a 5day period. The hens also wore vests with 3D ArUco markers, enabling automated video annotation of perch interactions. Both systems independently recorded timestamps for evening perch access and morning perchleaving events. To assess agreement between the systems, the absolute time difference between corresponding timestamps for each event and each ID was evaluated using dynamic thresholds, beginning at 0 with increments of 1 second. A match was considered valid when the time difference fell within the specified threshold. Based on this, events were classified as true positives (when the time difference $\leq$ threshold), false positives (when an RFID detection occurred without a corresponding ArUco match) or false negatives (when an ArUco detection occurred without a corresponding RFID match). Precision and sensitivity were calculated for each threshold. Despite a higher temporal deviation during evening perch entries (125.32 ± 410.40 s) compared to morning exits (25.61 ± 37.18 s), no significant difference was observed (Wilcoxon signedrank test, $p = 0.56$, $N = 86$). Threshold analysis showed that evening entries achieved the targeted performance (at least 80% precision and sensitivity) with a temporal error threshold of 1.70 minutes, whereas a stricter threshold of 0.82 minutes was necessary for morning exits. This study demonstrates the reliability of the RFID system for noninvasive, continuous monitoring of nighttime perch use, thereby supporting poultry behaviour and welfare research.

Do not disturb: Daily handling prolongs development, reduces survival, and decreases body size in farmed adult black soldier flies (*Hermetia illucens*; Diptera: Stratiomyidae)

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The effects of handling stress have been reported in many different livestock species; however, there is a dearth of information on how handling may affect the productivity or welfare of the black soldier fly (BSF). BSF are a novel mini-livestock species farmed for waste management, animal feed, organic fertilizer and biodiesel production. Estimates suggest 1.7 – 2.5 trillion BSF will be farmed this year. Our study assessed the effect of daily handling of BSF prepupae ($n = 2160$) for 30 days on survival, eclosion time (e.g., emergence as adults), and adult mass and morphology. We assessed these variables in both ‘disturbed’ and ‘not disturbed’ conditions using six different pupation substrates at three different moisture levels (36 treatments, 3 replicates, $n = 20/\text{rep}$). Prepupae in the disturbed group were sieved out of their substrate once daily and then returned to the surface of the substrate immediately after sieving; not disturbed prepupae were left in their substrates without handling. Each replicate was checked once every 24 hours for adult fly emergence. Adult flies were removed and anesthetized with isoflurane, emergence date was recorded, and wet adult mass, head width, and thorax length were recorded. Handling was found to delay adult emergence by an average of 3.19 days ($W_s = 763918.0$, $z = 24.21$, $p < 0.0001$), reduce survival to adulthood by 28.81% ($W_s = 1654.0$, $z = -7.95$, $p < 0.0001$), reduce wet adult mass by 2.7% ($W_s = 515668.0$, $z = -2.59$, $p = 0.0095$), and reduce head widths by 1.1% ($W_s = 506271.5$, $z = -3.60$, $p = 0.0003$). These results suggest daily handling stress, even of a short duration, has a negative impact on the productivity and welfare of BSF. Further studies on the duration, intensity, and frequency of handling will be important to understanding best practices for handling BSF. However, our results suggest that good handling is an essential welfare-friendly practice to be included in BSF farming.

High rank, low stress – hierarchy-dependent behavior of dogs in the Strange Situation Test

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For family dogs, the even distribution of resources is controlled by the owner. Still, hierarchies have been described and there are rank-related differences in certain behaviours even in noncompetitive situations. For companion dogs, the owner can also be considered as a limited resource, but this assumption needs further behavioural testing. We hypothesized that the position of cohabitant companion dogs in the hierarchy could show association with their attachment to the owner. Our aim was to examine if there is a connection between certain elements of the attachment complex ('attachment'; 'anxiety'; 'acceptance of a stranger') and dogs' rank in the household hierarchy. During our research we used the well-established Strange Situation Test (SST) adapted for dogs. This test consists of six 2 minute long episodes, which are intended to exert mildly increasing stress onto the subjects while 38 behavioural markers are scored e.g. proximity, gazing and vocalisation. The dogs were tested one by one in a room at the Department of Ethology. Across the episodes, the dogs were encountered by an unknown (friendly) experimenter, at first in the presence of their owner, then in the absence of the owner, finally they were left alone in the room. All subjects (N=62) lived together at least with one more dog in the owner's home, and we tested two adult (at least 1 year old) dogs from each household. The rank score of subjects was determined based on the 8 questions of the validated DRA-Q instrument. We used Generalized Linear Models to analyse the associations between the behavioural responses and fixed factors (dogs' demographic data and rank score). The results showed that dogs with higher rank scores showed fewer signs of stress in the SST ($p=0.045$), but they were also less friendly towards the stranger ($p = 0.019$). Older dogs also presented fewer stress behaviours ($p = 0.021$), however they were friendlier with the stranger ($p = 0.038$). This is the first study when dogs' hierarchy was taken into consideration regarding dog-owner attachment. We conclude that dogs' rank influences their acceptance of strangers and anxiety in novel situations, and as these results were prevalent only in the presence of the owner, they also indicate the owner's role as a regulator in their dogs' hierarchy-related behaviours. In the future, we would like to investigate further entangling and functional analysis of these behavioural differences.

Can a novel on-site behavioral test identify new personality traits for weaned piglets?

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This study aimed to evaluate piglet personality traits using a novel in-pen behavior test that reduces environmental and handling biases, compared with existing standardized individual behavior tests for piglets (e.g. open field (OF); novel object (NO)). A total of 120 weaned piglets were tested thrice at 34, 54, and 65 d of age in the novel “laser test” (LT); a red laser light was projected on the home pen floor 10 cm from the piglet’s snout for 10 s, followed by a 20-s observation period after the light was turned off. Observed behaviors included attention to laser during the 10 s that the laser was on, and 10 behaviors during the 20-s period after the laser was off: exploring, walking, eating, drinking, urinating, defecating, attention to others (e.g. pen grids), vigilance, interaction with pen-mate, and interaction with enrichment item (plastic bottle). The OF and NO tests were conducted at 60 and 61 d of age, one test per day. Observed behaviors of the LT, OF and NO tests were scaled and centered. Personality traits extracted through Principal Component Analysis (PCA) using the following behaviors from all 3 rounds of LT: duration and frequency of touches in the NO; number of quadrants explored, exploration time, and number of vocalizations in the OF; attention to the laser, exploration and walking after the laser in the LT. Three principal components accounting for 62.4% of behavioral variance were identified. The first factor (23.7%) reflected interest in both the laser (attention to laser [loading = 0.67]) and the novel object (duration and frequency of touches [0.75 and 0.73, respectively]), interpreted as animals with a “bold” personality. The second factor (22.1%) reflected the number of explored quadrants [0.83] and number of vocalizations [0.82] in the OF, corresponding to a “exploratory” personality. Lastly, the third factor (17.6%) captured LT-specific responses, with walking after the laser was off [-0.83] and exploring after the laser was off [0.68] having higher loadings, characterizing a “cautious” personality. Our results reveal that behavioral responses to an in-pen laser test relates to some measures of a traditional individual NO test, suggesting that the laser test could possibly serve as a substitute for evaluating ‘bold’ personality traits of pigs in their home pen. There was also a personality trait identified from measures exclusively from the laser test, highlighting its novelty in behavioral observation and contributing to a deeper understanding of piglet behavior.

What can rats teach us about positive animal welfare?

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This presentation aims to illustrate how rats can be advantageously used to study the biology of positive animal welfare with relevance to improving the welfare of rats themselves and as a model for other species. Positive animal welfare can be seen as animals living good lives through them experiencing predominantly positive mental states, leading to beneficial outcomes such as improved resilience to challenges. Positive welfare therefore raises important scientific challenges over how to induce and assess positive mental states in animals and how to link positive experiences to outcomes such as resilience. The concept of positive welfare is a highly relevant one for laboratory rats. They are widely used as a laboratory animal and there is concern over their welfare. Rats are often housed in environments that constrain their behaviour, conditions that have been linked to higher morbidity and raise concerns over reproducibility of findings. Rats have also evolved complex social behaviour including the use of ultrasonic vocalisations (USVs) for social communication. Rat USVs have received much attention since they were first identified in the 1950s with increasing empirical support for these calls being reflective of rats' affective state. Of particular interest in the context of positive welfare is the substantial evidence that 50-kHz USVs (peak frequency between 30 and 80 kHz) are reliable indicators of positive affective state in rats. This talk will use recent work from our international collaboration on refining rat tickling to illustrate the use of USVs in the context of positive animal welfare. Rat tickling (or heterospecific play) has been proposed as a practical approach to improving welfare of laboratory rats and we have used 50-kHz calls to assess rats' preferences for different forms of tickling. Using results from this work, the presentation will cover: (a) sex and individual differences in 50-kHz USV responses to a positive stimulus (tickling); (b) validation of 50-kHz USVs using independent testing of affective state; (c) relationships between positive affective state, as assessed by 50-kHz USVs, and physiological indicators of resilience; (d) practical implications for improving rat welfare. The presentation will also include some of the opportunities and challenges in using 50-kHz USVs as indicators of rats' affective state including study of underlying neural mechanisms, analysis of different sub-types of 50-kHz USVs and their affective significance including use of playback of USVs, and the analysis of 50-kHz USVs emitted in complex enriched environments.

Giraffe networking: how do changes in group composition affect social networks amongst male bachelor groups?

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The population of giraffes (*Giraffa camelopardalis* spp.) in captivity is steadily rising due to increased breeding success. Accordingly, a surplus of male individuals arises. Following recommendations by EAZA, males are housed in all-male bachelor groups. While this husbandry approach may be a viable alternative to culling surplus animals, consequences for behaviour and welfare remain understudied. In the wild, males form bachelor groups during adolescence, but leave these groups to live a more solitary life once sexually mature. Therefore, all-male groups may pose challenges for captive individuals to cope and adapt socially. This study aimed to determine whether male giraffes in captivity form stable social bonds and to assess how social networks respond to interventions such as the addition or removal of individuals. We expected to find distinct social preferences and predicted that interventions would lead to lasting disruptions in network structure. Over two years, we observed two captive bachelor herds (MM: N = 9, SG: N = 8) housed in two outdoor enclosures (6ha, 4ha) in a Dutch safari park. We examined the social network dynamics within these herds and how the event of change in group composition affected these. In the MM group, one animal was added, and two were relocated to another zoo in the context of the breeding program; in the SG group, one animal passed away. Networks were constructed based on social proximity noted during focal observations (20 min, 30 sec intervals, N observations: $\sum$ MM 1342, $\sum$ SG 1193). Changes in network structure before and after events were visualized using sociograms. To statistically assess changes, we conducted Quadratic Assignment Procedure (QAP) analyses, testing the null hypothesis that network structure was not stable. A significant p-value ($p < 0.05$) allowed rejection of this hypothesis, indicating stability. QAP results showed temporary instability following all events ($N = 4$, $p > 0.05$), but overall stability across the two-year period ($p < 0.05$). Sociograms confirmed that bond structures remained intact, with no new or lost connections. Both sociograms and QAP analyses suggest a ~three-month period of instability post-events, but overall network stability. This study is the first to investigate social network dynamics of captive male giraffes housed in bachelor groups. While social bonding was previously thought to occur mostly among females, we show that males also form stable bonds. This information is useful to guide management practices, e.g. when relocating individuals, taking individual social preferences into account.

Insights on key actions to reduce lameness in dairy cattle: perspectives across Canada's dairy industry

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Although lameness is considered a significant animal welfare problem, implementing changes to improve lameness in dairy herds appears difficult. Therefore, we aimed to 1) understand perceptions of various dairy industry actors on barriers, motivators, and key actions needed to reduce lameness and 2) utilize these views to inform the development of extension strategies for lameness reduction in Canada. The University of British Columbia's Behavioral Research Ethics Board (H22-02998) approved this study. Homogeneous (n=8; all participants with the same professional background) and heterogeneous (n=3; participants from a mix of professional backgrounds) focus groups were conducted from November 2022 to January 2024, involving 81 participants across 9 Canadian provinces. These focus groups comprised 4 sessions with farmers (n=27), 3 with hooftrimmers (n=20) and veterinarians (n=9), 1 with dairy advisors (e.g. nutritionists, dairy consultants, n = 8), 2 with policymakers (n=13) and 1 with dairy processors (n=4). Preliminary thematic analysis revealed perceived barriers and motivators for lameness reduction, and potential solutions for better adoption of lameness reduction strategies. Various actors prioritized different barriers and motivators. Overall, barriers to lameness reduction included constraints related to time, finances, shortages of available hoof trimmers and knowledgeable lameness advisors, a lack of designated hoof trimming areas on-farm, challenges with early lameness detection, challenges understanding hoof lesion-specific pathogenesis and control. Farmers' mental health, the roles of other industry professionals involved in sales or construction, the perceived value of economic assessment and benchmarking tools, and the absence of punitive measures of high lameness prevalence were also mentioned. Motivators included improving animal welfare and reducing veterinary and hoof trimming costs by lowering lameness prevalence. Regarding lameness reduction adoption strategies, participants emphasized an integrated approach combining technology, support services, monitoring, and decision-making tools. These included: 1) implementation of automated lameness and hoof lesion detection methods, and 2) provision of support to farmers in the design and use of improved handling systems and equipment, facilitating proper cattle handling and in-house hoof trimming. These findings provide a basis for tailoring extension strategies suitable for the Canadian context to improve lameness management on dairy farms.

Errorless learning in the laboratory: teaching rhesus macaques in brain-computer interfacing studies

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In the laboratory environment, rhesus macaques (*Macaca mulatta*) are utilized for functionality neuroscience studies, which often require animals to learn complex cognitive tasks. Animals are typically taught utilizing a trial-and-error method, originally detailed by Edward Lee Thorndike, in which problem-solving is achieved through repeated, varied attempts until success is reached. However, because frustration has been found to be associated with negative welfare outcomes (Ziegler Hill and Shackelford 2017), errorless learning, a teaching method in which learners are provided prompts and cues to maximize success, is instead often implemented in clinical settings to prevent incorrect responses. In more recent publications, errorless learning has been shown to significantly lower frustration related responses in dogs learning a stimulus discrimination task (Handley et al., 2020). It was hypothesized that by implementing an errorless learning teaching strategy for macaques in a neuroscience lab to acquire mastery of behavioral tasks, animals would learn with higher levels of engagement (ex: higher duration of attending to task, lower frequency of looking away or leaving task area, lower latency to begin task, and lower rate of opting out of training session by not approaching training space) and would display significantly fewer frustration-related behaviors (ex: lower frequency of shaking or attempting to destroy task equipment). To evaluate this, one cohort (n=4) of macaques were taught a simple stimulus response task utilizing an errorless learning framework tailored to the individual learner. The task required that the animal hold their hand down on a vibration pad until a vibration was felt, at which point they were required to lift their hand within 1 second upon feeling the vibration. A second cohort (n=4) used a software criterion-led model in which animals learned the same game in stages and progressed through approximations upon obtaining mastery at the previous stage. The third cohort (n=4) was exposed to the final task criteria of the same game through trial-and-error. We found on average macaques displayed fewer frustration-related behaviors and had higher levels of engagement in the errorless learning condition. Based on this pilot work, we anticipate that additional animals who learn with errorless learning will engage longer and become proficient at complex cognitive tasks more quickly than those who learn by way of trial and error. It is also expected that animals learning errorlessly will have reduced frustration and therefore may require less restraint and restriction, which will improve welfare overall.

Daily life animal behavior and human affect: insights from experience sampling

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The ways in which pet owners perceive and interpret companion animal behavior play an important role in human-animal interactions. While research on the benefits of companion animals for human well-being has yielded mixed results, these inconsistencies suggest that simply comparing pet owners to non-owners is insufficient, and that a more detailed approach is needed. This study aims to document owner-reported companion animal behavior in daily life and examine how these behavioral variations are associated with owners' momentary positive affect (PA) and negative affect (NA). For five consecutive days, 184 dog and cat owners completed brief smartphone surveys ten times per day at random intervals. They rated seven statements about their pet's behavior on a 7-point Likert scale. These statements were phrased as: "At this moment, my pet is behaving..." followed by "playfully," "nervously/anxiously," "relaxed," "angrily/aggressively," "enthusiastically," "disobediently," and "affectionately." Momentary affect was measured using adjectives from the Positive and Negative Affect Schedule (PANAS). PA was assessed using the mean score of the items: cheerful, satisfied, happy, and enthusiastic. NA was assessed using the mean score of the items: insecure, lonely, anxious, irritated, sad, and guilty. Relaxed behavior was most common (Mean = 6, SD = 1.39), while aggression was least prevalent (Mean = 1.06, SD = 0.36). Playful (Mean = 3.23, SD = 2.11), enthusiastic (Mean = 4.05, SD = 2.13), and affectionate (Mean = 4.46, SD = 2.11) behaviors showed a relatively even distribution. Aggressive, anxious, and disobedient behaviors were right-skewed. Factor analysis identified two behavioral categories: approach/engagement (enthusiasm, playfulness, affection) and avoidance/defense-related behavior (anxiety, relaxation [negative loading], disobedience, aggression). Multilevel regression models tested associations between behavior and affect. Approach/engagement behavior was linked to increased PA ($B = 0.10, p < .001$) and decreased NA ($B = -0.02, p = .001$) in both species. Avoidant/defensive behavior was associated with lower PA ($B = -0.10, p = .005$). However, its association with NA differed by species: in dogs, avoidant/defensive behavior was associated with increased NA ($B = 0.10, p = .003$), while no relationship was found for cats. These findings provide insight into how animal behavior is perceived and reported by owners in daily life, and show that real-time variations in owner-reported animal behavior are associated with momentary changes in affect in the owner. Such emotional responses may, in turn, shape the human-animal relationship, with potential consequences for the well-being of both owner and animal.

The welfare potential of cage-free farming systems

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The welfare potential of a farming system refers to its capacity to meet the three core aspects of animal welfare: physical wellbeing, behavioural opportunities, and emotional wellbeing. A system with high welfare potential is one that ensures good health, enables the expression of highly motivated species-specific behavioural needs, and promotes positive experiences while minimising negative ones. Such a system offers the foundation for a good life for farm animals, provided it is well managed. In contrast, systems with low welfare potential, such as caged systems, are inherently limited in one or more of these areas, preventing them from achieving good welfare, regardless of management quality. Cages (e.g. barren and enriched cages for laying hens and rabbits, and sow stalls/farrowing crates for sows) restrict even basic movement; hens have limited space to perform wing flapping, sows cannot turn, while rabbits have insufficient space to rest and hop. Additionally, caged-systems provide limited opportunities to perform highly motivated behaviours; hens cannot adequately perform nesting behaviour or forage, sows cannot nest-build, rabbits cannot hide, while breeding does lack adult social contact. These deprivations can lead to chronic stress, frustration, boredom, and abnormal behaviours. While a range of cage-free housing systems exists, the level of welfare that can be achieved is contingent on the system design and the genetics of the animals used. Higher welfare cage-free systems must provide sufficient space for resting and activity, as well as opportunities to express highly motivated behaviours, while minimising any risk of illness or injury. For example, keel bone fractures in laying hens in cage-free systems can be reduced through selection for bone health, and good housing design for pullets and layers, while piglet mortality in free farrowing systems can be reduced by selection for maternal behaviour and lower litter sizes, as well as key features such as sufficient space for the sow, an attractive creep, and anti-crushing features in the pen. The welfare potential of cage-free systems can be further increased by offering the animals choice over their environment, such as opportunity to go outside. While caged systems have a low welfare potential by design, welfare challenges can occur in any systems but can be more easily mitigated in fit-for-purpose, well-managed cage-free systems.

Feeling good? Positively-valenced behavior of fast- and slow-growing broilers in low- or high-complexity environments

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Fast-growing broilers may experience restricted behavioral expression due to barren housing conditions and physical constraints associated with rapid weight gain. Access to a complex environment, or the consideration of slow-growing strains may solve this. The objective was to assess the expression of positively-valenced natural behavior in fast and slow-growing broiler chickens raised in standard or high-complexity pens. This study was performed following ISAE ethical guidelines. In a 2×2 factorial, 300 Ross 708 (fast-growing) and 300 Hubbard Redbro broilers (slow-growing) were raised in 12 pens (50 birds/pen) with low complexity (standard) or high complexity (permanent and temporary enrichments), with 3 replicates per treatment. Focusing on behavior with positive valence (play, allogrooming, foraging, exploration, stretching, preening), 4 birds/pen (unmarked) were recorded at 07:00h and 20:00h on d16, 27, and 37 using 5-min continuous focal sampling. Binarized behavior (observed yes/no) was analyzed through (mixed) logistic regression models in Stata 18, with strain, complexity, and age as predictors. BirdID was included as a random factor for all but play, which had pen as a random factor. Data (at $P < 0.05$) are presented as Odds Ratios (OR) and probability to be observed (% and 95% Confidence Interval (CI)). Play (probability=13.2%, CI=7.4-18.9%, OR=3.084; $P=0.039$) and allogrooming (probability=6.9%, CI=2.8-11.0%, OR=5.410; $P=0.032$) were more likely observed in Redbros compared to Ross birds (play: probability=5.6%, CI=1.7-9.5%; allogrooming: probability=1.4%, CI=0-3.3%). Stretching was more likely observed in Redbros in simple environments (probability=30.6%, CI=17.8-43.3%, OR=5.559; $P=0.026$) compared to Redbros in complex environments (15.3%, CI=5.8-24.7%) and Ross birds in standard environments (probability=15.3%, CI=5.8-24.7%). Stretching tended to have greater odds for Redbros at d37 compared to Redbros at d27 (OR=5.123; $P=0.053$). Birds were more likely to be observed exploring in complex (probability=16.0%, CI=9.3-22.7%) compared to standard environments (probability= 4.9%, CI=0.6-9.1%, OR=0.237; $P=0.034$). Complexity did not impact other behaviors. Play was less likely observed with age (day 27: probability=2.1%, CI=0-5.0%, OR=0.056, d37: probability=1.0%, CI=0-3.1%, OR=0.028 compared to d16: probability=25.0%, CI=15.6-34.5%; $P \leq 0.001$). Foraging (d37 vs d16 OR=0.587; $P=0.076$) and exploration (d37 vs d16 OR=0.374; $P=0.080$) tended to be less likely with age. Preening was not impacted by any factors ($P > 0.33$). The slow-growing strain was more likely to show positively-valenced behaviors, although not all behaviors differed between strains. Results suggest that Redbros may be more appropriate for animal-welfare centric farming systems. Complexity only stimulated exploring, suggesting other designs need to be considered. The negative impact of age suggests this as a risk for animal welfare in either strain.

Impact of calf creep area position on lying behavior and hair cortisol level in Swiss suckler cow systems

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Suckler cow systems are a popular housing system for beef production in Switzerland. In these systems, suckler cows and their calves are kept in groups allowing a close mother-calf bond. Swiss suckler cow systems typically feature cubicle barns with calf creep areas (CCA) as key elements, which can be located in various parts of the barn. This study aimed to investigate how the position of the CCA (in front of the cow's cubicles vs. separate) affects the lying behavior of cows and calves. The study was conducted on 14 cow farms with freestall systems, with seven farms having a CCA in front of the cow's cubicles and seven farms with a separate CCA (matched pairs). Each farm was visited twice and six cows and their calves (calf age mean $\pm$ SD: 97.5 ± 65.3 days) were selected as focus animals on each farm. Hair samples were taken from each cow to analyze hair cortisol levels. Triaxial accelerometers were attached to the left metatarsus of the cows and calves to record data on the number and duration of lying bouts over five successive days. The lying location of the calves was assessed twice per farm for three hours through direct observations. Data were analyzed using linear mixed effect models in R. Hair cortisol levels (in pg/mg) of the cows were similar in both systems (CCA in front of cubicles: 5.8 ± 1.5 , CCA separate: 6.2 ± 2.2 , $p = 0.64$). No effect of the CCA was found on the number of lying bouts per day (in front: 9.2 ± 0.4 , separate: 8.5 ± 0.4 , $p = 0.42$) or the average duration of lying bouts (in front: 73.7 ± 2.3 , separate: 80.2 ± 2.6 min, $p = 0.20$) of cows. With increasing age of the calves, cows lay less often ($p = 0.03$) but for longer durations per bout ($p = 0.02$). Calves in systems with a CCA in front of the cubicles spent less time lying in the cubicles of cows (3.5 ± 0.56 %) compared to calves with a separate CCA (36.5 ± 6.2 %). In conclusion, cows and calves exhibited similar lying patterns in both systems, but calves preferred to lie close to the cows. If calves choose to lie in the cubicles of the cows, this would reduce the lying space for cows and would also increase the soiling of the cubicles.

Welfare-relevant indicators of ear disease in a pedigree rabbit population

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Rabbits often resist ear examination, but whether this behaviour predicts ear disease severity is unknown. Also, although commonly identified during routine ear examination, excess cerumen and ear canal stenosis are of uncertain welfare relevance. Establishing reliable internal and external indicators of otitis externa in rabbits is essential for accurate diagnosis and treatment, reducing pain, pruritus, and hearing impairment. We hypothesised that, if behavioural reactivity, excess cerumen, and stenosis are valid indicators of otitis externa, then they would positively associate with ear canal erythema or scabs that signify ear disease and self-trauma. Pedigree rabbits (n=435) of 49 distinct breeds with lop and erect ear conformation received otoscopic ear examination at British Rabbit Council shows and studs. Binary logistic regression was used to analyse reactive behaviours as predictors of welfare-relevant outcomes (ear canal erythema or scabs). Associations were also analysed between stenosis or measures of excess cerumen as predictors versus these welfare-relevant outcomes and reactive behaviour. Rabbits who reared up during examination had higher odds of scabs in the diverticula (odds ratio [OR]: 3.342, P=0.004), ear canal erythema (OR: 4.053, P=0.015), and scabs/red discharge in the upper canal (OR: 3.260, P=0.036). Rabbits also had higher odds of exhibiting scabs/red discharge in the upper canal if they displayed any reactivity to examination (OR: 2.870, P=0.003), shook their head briefly (OR: 1.771, P=0.037), or moved their body (OR: 2.754, P=0.003). Rabbits with increased ear canal stenosis and measures of excess cerumen had consistently higher odds of having scabs in the diverticula, ear canal erythema, and scabs/red discharge in the upper canal. Measures of excess cerumen were associated with almost all measures of behavioural reactivity to ear examination tested, except freezing, while increased ear canal stenosis was associated with most reactivity measures, except head movement or brief shaking. Anyone examining rabbit ears should consider otitis externa in rabbits who are very reactive during ear examination, particularly those who rear up and those not normally reactive to handling. Reactivity to ear examination may have been influenced by examination location and rabbit temperament, so further research is warranted. Ear canal stenosis and excess cerumen are associated with welfare-relevant ear abnormalities, so should be used as indicators of potential otitis externa. Many ear conditions are hidden diseases that are painful, pruritic, can impair hearing, and/or can affect balance, so these findings are important in validating indicators to identify rabbits who need appropriate veterinary treatment for ear disease.

Will you trust me? Behaviour of calves towards their caretakers and vice versa in cow-calf contact rearing systems with pasture

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Cow-calf contact (CCC) rearing of dairy calves in pasture-based systems can offer a high level of welfare and advantages for ecological sustainability. However, some farmers reported that calves got 'wild' and shy to humans in this rearing system. We therefore investigated, (i) how many farms report than calves get shyer when practicing CCC rearing with pasture and (ii) how reported frequency of human-calf contact is related to reports about 'shyer calves' and to the animals' reactions to their caretaker. In a larger questionnaire on CCC rearing, questions on human-animal relationships were included. One multiple-choice question asked farmers if they faced problems with the calves or the nursing cows. One of the preformulated responses was 'calves are shyer, less approachable'. Furthermore, we asked farmers about the behaviour of calves and cows when they entered the herd (single choice, avoidance score: 1, they come and can be stroked to 4, they keep larger distance and withdraw when being approached). Farmers were asked about the frequency of their contact to calves and cows, i.e. how often they talk to and stroke the calves in four age classes (on the first day of life, in the first week, in the second week until separation, and after separation (6-point scale: 0, never to 6, several times a day); mean contact frequency across ages was calculated. These scales were previously validated and found to correlate with observed behavioural reactions of cows towards a test person. A total of 71 farmers practicing CCC responded to the questionnaire but the sample size for individual questions varies due to non-obligatory questions. Contact intensity (talking/ stroking) with calves varied largely from never to several times a day. 37% of 43 farmers indicated that calves are shyer in CCC with pasture. This statement tended to be associated, in a binary logistic regression, with lower contact frequency at the first day of life ($p=0.063$) and after weaning ($p=0.058$, $N=30$, Nagelkerke $R^2=0.446$). The avoidance score of calves and cows was lower with higher mean contact frequency ($N=65$, $r_s=-0.57$, $p<0.001$). While the risk for lower quality animal-human relationship (shyer calves) seems to be higher in CCC systems with pasture, the results, though only based on reported behaviours, are in line with previous research on the importance of human interaction on calf behaviour. This points at the need for education of farmers about how to avoid problems with shy calves. Funded by BMLRT EIP-AGRI PastureInnovation.

The effect of unpredictable chronic mild stress on the neurogenesis of laying hens

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Unpredictable chronic mild stress (UCMS) is considered a robust model of depression-like states accompanied by anhedonia in laboratory rodents. Hence the idea of using it to test indicators of negative welfare. The aim of this work was to test the hypothesis that UCMS leads to reduced neurogenesis in the hippocampus of laying hens. Dominant Leghorn hens were divided into 2 groups, both kept in a deep litter pens with perches and nest boxes. The control group (n=6) was kept under standard conditions, and the experimental group (n=8) was exposed to UCMS for 9 weeks. The UCMS protocol consisted of stressors including mixing social groups, placing groups of animals in a crate, thwarting access to water or food, removing perches or nest boxes, applied 5 days per week in random order. Neurogenesis was measured as the number of new 5-ethynyl-2'-deoxyuridine (EdU)-labelled cells in the ventricular zone and the number of new 5-bromo-2'-deoxyuridine (BrdU)-labelled cells and neuronal marker (Fox 3) neurons incorporated into the hippocampus. Obtained data were statistically evaluated using SAS software (GLIMMIX procedure). We found a trend towards a decrease in the number of EdU+ cells in the ventricular zone adjacent to the hippocampus ($F_{1,121} = 3.20$; $P = 0.076$) and the pallium ($F_{1,121} = 3.20$; $P = 0.076$). The number of BrdU+ cells in the hippocampus was unaffected by UCMS induction ($F_{1,123} = 0.32$; $P = 0.57$). Similarly, the number of BrdU+/Fox3+ neurons was not statistically significantly affected in hens from the experimental group ($F_{1,123} = 0.78$; $P = 0.378$). Thus, in contrast to our hypothesis and the findings of other laboratories, we showed no difference in the proliferation rate and incorporation of new cells between the stressed and control groups. That is on the other side consistent with our previous results, using the same animals (Kostal et al., ISAE 2023), that did not find the effect of UCMS on judgment bias and plasma corticosterone. There are several possible explanations. Meta-analyses addressing the reproducibility of results from experiments using UCMS in laboratory rodents concluded that differences in protocols or the existence of susceptible and resistant phenotypes with different responses to UCMS are behind the possible heterogeneity or negative results. That applies also to poultry, where there are only few studies and the UCMS protocol is not well established. Another possibility is the resistance of hens to chronic stress. Supported by grant VEGA 2/0129/23.

Comparing physiological responses and behaviour of exercising horses in the automated horse walker and on the lunge

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Automatic horse walkers (AHWs) effectively facilitate training and recovery in horses. AHWs help manage energy levels and reduce the intensity of locomotor activities, contributing positively to horse welfare and training efficiency. This study investigated changes in horses' muscle activity patterns and behaviour in an AHW compared to the lunge. Nine adult Warmblood horses freely walked and trotted for 20 minutes at their optimal speed in the AHW and on the lunge on alternative weeks. Surface electromyography (sEMG) sensors (Delsys Inc., Natick, MA, USA) were placed over eight surface muscles, and horses were equipped with heart rate monitors (Polar Inc., USA). A Qualitative Behaviour Assessment (QBA) was carried out based on 11 descriptors to evaluate horses' emotional states by observing and scoring their behaviours based on the recorded videos. The following descriptors: aggressive, alarmed, annoyed, apathetic, at ease, curious, fearful, happy, relaxed, pushy and uneasy were used for the visual scoring (minimum score: 1 and maximum score: 110). Median and interquartile range values were calculated, and correlations were run between the two training methods, heart rates, and QBA scores. When comparing exercising methods, the results showed that heart rate and muscle activity differed ($P < 0.01$) between AHW and lunge. Horses moved differently ($P < 0.05$), and the heart rates significantly varied in the walker (median: 56, IQR: 47-83) compared with the lunge (median: 72, IQR: 60-93) ($P < 0.01$). The highest QBA descriptor was 'uneasy' (median: 20, IQR: 15.3-31.2), and the lowest QBA was 'happy' (median: 4.7, IQR: 3.7-5.9) in the AHW. The exercising horses exhibited increased physiological arousal, indicated by elevated heart rate with variations in autonomic response depending on the type of exercise (AHW vs. lunge). Additionally, the QBA descriptor 'happy' was negatively correlated with heart rate ($P < 0.01$) and the QBA descriptor 'relaxed' was positively correlated ($P < 0.01$) in the AHW. Muscle activities were positively correlated with the QBA descriptor 'alarmed' ($p < 0.05$) in the AHW. In conclusion, preliminary results show that exercise modality influenced horses' muscle activity, heart rate, and behaviour, resulting in higher arousal and less positive emotional states in the AHW. These findings may support the development of more adaptive training approaches to enhance performance while ensuring equine welfare. Regular use of automated horse walkers can be a valuable component of a horse's exercise regimen and standardised training.

Two restraining devices in connection to surgical castration with or without local anesthesia: effects on piglet stress

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Surgical castration causes piglets severe pain. Piglets also experience stress from handling during the procedure and must be restrained twice when receiving local anesthesia before castration. We assessed the effect of different restraining devices and local anesthesia on piglet stress during surgical castration. We randomized 179 male piglets (3-4 days old) with a 2x2 factorial design to be restrained with either a commonly used commercial tubular bench with a dorsal restraining posture or a custom-made castration rack with a vertical restraining posture. Piglets received local anesthetic or sham injections (timepoint LA) 10 minutes before castration (timepoint CAST). We then compared the effect of the devices on piglets' mean behavioral reactions, scored subjectively by three observers on a scale from 0 (no reaction) to 10 (the worst reaction imaginable) at the following four times: when restrained for the first time, during LA, during the second time restrained, and during CAST. Vocalizations and body temperatures were measured at LA and CAST. Data was analyzed with general linear mixed models. Piglets were given higher reaction scores when restrained for the first time in the tubular bench than the castration rack (EM: 4.5 vs. 2.6, $p < 0.001$). Piglets showed differing vocalization patterns in the two devices, with longer duration of grunts per second (0.17 vs. 0.12, $p = 0.002$) and screams (0.27 vs. 0.12, $p < 0.001$) in the castration rack and more squeals (0.39 vs. 0.24, $p < 0.001$) in the tubular bench during castration. Local anesthetic injections resulted in higher mean reaction scores (5.3 vs. 3.6, $p < 0.001$) and more vocalizations (0.58 vs. 0.48, $p = 0.006$) than sham injections during LA, but reduced these measures during CAST (4.8 vs. 8.0 and 0.57 vs. 0.74 respectively, $p < 0.001$ for both). After castration, the skin temperature was higher in sham-injected piglets than in piglets castrated with local anesthesia (38.6°C vs. 38.5°C, $p = 0.05$), irrespective of the restraining device used. Local anesthesia increased reaction scores and vocalizations during LA, but decreased these during CAST. Based on piglet behavior, restraining in a tubular bench was more aversive than in the castration rack. However, the devices affected the proportions of the different vocalizations in a manner we cannot fully explain. As the restraining method affects piglets' behavior, it may influence pain assessment during local anesthetic injections and evaluation of local anesthesia efficacy during castration. Less stressful methods to handle piglets are needed.

Towards a threshold for the ammonia concentration in pig barns

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Council Directive 98/58/EC prescribes that the concentration of pollutant gases should not be harmful to the pigs. A desk study was conducted to (try to) close this open norm (principle-based standard) for ammonia (NH₃) in pig barns, where esp. in winter time fairly high concentrations (above 20 ppm) may be recorded. An inventory was made of publications reporting effects of air quality on pig health and welfare using the semantic modelling methodology to assess the harmful effects of increased NH₃ concentrations in pigs, based primarily on a weighted count of the significant effects and trends reported in the publications (and mostly taking for granted the effects that were not significant). The effects on human health were also included, based on the reciprocity of the view that pigs have been used as a model for human health on this issue too. In total 158 publications were found to report relevant effects. Below 5 ppm human COPD patients may experience dyspnoea and headaches, and (well) below 15 ppm various effects have been reported in pigs including a reduced growth rate (e.g. at 5 ppm), increased tail biting, turbinate atrophy, aversion (e.g. at 10 ppm) and altered immune function and cell mobility. In fact, the adverse effects of increased NH₃ concentration seemed to increase almost linearly from very low concentrations as of 0 ppm up to at least 40 ppm. In other words, harmful effects are already quite likely well below the conventional norm of 20 ppm (i.e. even at 5 ppm). Given this finding and given the current formulation of the law, it seems necessary to reduce the level of NH₃ in modern pig production to well below 20 ppm if all harmful effects of NH₃ on pigs must be eliminated. Perhaps, higher NH₃ levels (up to 20 ppm) can be accepted in exceptional cases, e.g. in high-health (SPF) herds, using no/very little antibiotics, with intact tails (with hair plume), no tail biting, a good production performance, very low lung-lesion scores, no pen soiling, no tear staining, no conjunctivitis, etc.. In conclusion, the conventional norm of 20 ppm NH₃ seems outdated and may have to be replaced by a (considerably) lower threshold if the open norm in the law, which says that gas concentrations should not be harmful to the animals, were to be closed, i.e. if the law were to be implemented.

Effect of equine-assisted therapy sessions on horse stress parameters

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Equine-assisted therapy (EAT) is a therapeutic intervention that employs horses to assist patients with motor or mental disorders. This study aimed to determine the impact of EAT for autistic children (AC) on the horse's well-being. We hypothesised that the atypical behaviour of AC during EAT sessions would be more detrimental to the well-being of the horses than riding sessions led by experienced riders. The trial was conducted at two equestrian centres in Algiers, and involved eight healthy horses, ranged in age from 6 to 23 years. The objective was to compare the change in horse stress parameters during sessions with horses ridden by AC compared to the same horses ridden by experienced riders (HR). The two riding sessions were identical in terms of physical effort required by the horse. During the EAT sessions, the horses were guided by qualified instructors using reins. Serum cortisol levels, rectal temperature, heart and respiratory rates were measured before and after EAT, and finally, before and after HR. The horses' physiological parameters increased more during HR than during EAT (+33.5% vs 25.5% for heart rate after HR and EAT respectively; +71.5% vs 45.5% for respiratory rate after HR and EAT respectively). Variation in rectal temperature was only significant after HR (37.3 ± 0.1 vs 37.7 ± 0.3 °C, respectively before and after HR, $p < 0.05$). Serum cortisol levels increased after HR (88.00 ± 5.51 vs 127.17 ± 14.6 nm/L, respectively before and after HR, $P < 0.05$), but did not vary after the EAT (100.96 ± 3.86 vs 107.30 ± 9.93 nm/L, respectively before and after EAT, $P > 0.05$). In summary, EAT session for autistic children seems to be a less stressful experience for the horses compared to riding sessions with experienced rider. During the equine therapy sessions, the horses probably felt more reassured by the kind attention of the instructors, which helped to reduce their stress levels. Given the proven benefits of EAT in the treatment of autistic children, there appears to be no contraindication to this practice from the point of view of the horse's well-being.

Voluntary toilet training of dairy heifers

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Successful toilet training in cattle has the potential to improve cow comfort, hygiene, and manure management. Previous research has yielded promising results, with a primary focus on urination. Our pilot study tested a non-invasive and voluntary training protocol aimed to encourage dairy heifers to urinate and defecate in a designated toilet area. Six five-month-old, loose-housed dairy heifers were provided with free access to a latrine (a wooden frame filled with peat) located in their home pen over a 17-day period. All heifers had access to the latrine at all times. Elimination in the latrine was reinforced through training sessions (60-335 minutes/day) over 12 training days. Each training session began with visual and auditory signals at the latrine. The training involved two levels; (Level A) a high-value food reward was given when heifers urinated or defecated in the latrine (training days 1-5 and 11-12), and (Level B) the same as Level A, but an additional low-value food reward and an individual sound cue was given when heifers entered the latrine (training days 6-10). The value of different food rewards for each individual was established by preference tests before and in the middle of the training period. Training and observations were conducted simultaneously over 41 hours during the 17-day period. During this time, the six heifers eliminated a total of 376 times (197 urinations and 179 defecations). Despite considerable individual variation in training success (i.e., the proportion of eliminations in the latrine, ranging from 0.4 to 0.8 overall), the heifers increased their eliminations in the latrine over time. The highest proportions of eliminations in the latrine occurred in Level B, when both low- and high-value rewards were used (No training: 0.19 ± 0.08 ; Level A: 0.51 ± 0.07 ; Level B: 0.76 ± 0.05 ; $\chi^2 = 44.27$, $P < 0.001$). The proportion of urinations in the latrine tended to be higher than the proportion of defecations in the latrine during training (Urinations: 0.68 ± 0.06 ; Defecations: 0.57 ± 0.07 ; $\chi^2 = 3.65$, $P = 0.06$). These results demonstrate that positive reinforcement of eliminations in a designated area can significantly increase the likelihood of eliminations occurring in this location. However, further research is needed to assess how well heifers retain this behaviour and how it can be promoted in a commercial setting. Overall, toilet training in cattle remains a promising area for further research, with the goal of identifying an optimal training protocol.

Animal welfare challenges and solutions in agroecology

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Agroecology systems integrate social and ecological principles into agricultural practices. Integrating good livestock management into these systems remains challenging and complex. Agroecology assessment tools overlook many aspects of animal welfare. This study proposes a new tool that improves upon current agroecology assessment schemes by incorporating animal welfare criteria. Based on the review of the available landscape of assessment tools in both agroecology and animal welfare we excluded all the agroecology tool that do not consider livestock or considered only livestock health aspects. The tools we included enabled broad study screening, provided an evaluation framework, and facilitated on-farm data collection and interpretation. Three agroecology assessment tools were chosen as the foundation for the integration: the F-ACT, the B-ACT, developed by Biovision and the TAPE developed by Food and Agriculture Organisation. We introduced questions to examine animal welfare criteria based on the Five Domains. We developed for these new criteria the existing method for evaluating agroecological principles, assigning score from 1 to 3. Through a cross-sectional survey of 14 case studies, we examine how animal welfare is integrated into agroecological systems. Trained surveyors gathered data from farms in Kenya (10), Thailand (1), Italy (1), Vietnam (1), and Mexico (1). All smallholder farms practice some agroecological methods and are mixed-species farms. Given the long-standing implementation of agroecological principles in Kenya, we collected a larger number of cases there. In contrast, we anticipated fewer agroecological principles in Thailand and Vietnam, as these farms are participating in animal welfare programs. Mexico and Italy were chosen to represent traditional farming methods that align with agroecological principles and often embody high animal welfare. Our findings indicate that agroecological systems employ certain management practices detrimental to animal welfare, including painful beak trimming and transport handling that causes stress. These results underscore the necessity of refining agroecological assessment methods to incorporate animal welfare metrics, thereby influencing systematic changes to the food system which lead to enhanced health outcomes, mitigated disease risks, and ultimately improve animals' ecological services and social benefits. The paper concludes that interventions to improve animal welfare can have long-term benefits holistically. Policy and investments are paramount to improve the condition of animals and therefore farmer in agroecological system. The integrated tool has potential application by researchers and farmer organizations to improve animal welfare in agroecological farms in different contexts. Improving animal welfare have implications for scaling out and scaling up integration of livestock in agroecology.

Can strategic collaboration make 'A Good Life' possible for chickens on a global scale?

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1. The Humane League

There is widespread consensus among animal welfare scientists and behaviourists that caged egg production significantly compromises the well-being of laying hens. In contrast, cage-free systems offer far superior — potentially even acceptable — welfare outcomes. The strength of scientific evidence has been instrumental in driving the European Union toward a cage-free future. Yet, despite extensive research on the housing, management, and welfare needs of laying hens, barren battery cages remain the predominant system for commercial egg production worldwide. To address this global disparity, The Humane League established The Open Wing Alliance (OWA), a coalition of over 90 animal protection organisations worldwide, united in their mission to end all forms of caged egg production. The OWA focuses on driving demand for cage-free eggs by supporting corporations to adopt and fulfil cage-free commitments, particularly targeting global corporations whose influence can be leveraged to generate demand and momentum in emerging markets. Uniquely, the OWA brings together organisations with diverse approaches — spanning animal rights, animal welfare, and Effective Altruism — working collaboratively to maximise impact. While there are promising signs of progress, regional disparities persist. Worldwide, around 75% of global companies are based in the West; in established cage-free markets, those with cage-free policies are reporting strong implementation (around 70%). However, in emerging cage-free markets, most of these same companies have achieved less than 10% implementation. The challenge is even greater in Asia. Among global corporations headquartered here (around 20%) cage-free commitments and implementation remain virtually nonexistent. In this presentation, we will share regional progress, identify key challenges, and highlight the barriers to transitioning toward cage-free systems, including the perceived lack of regionally relevant scientific evidence in certain parts of the world. We will also make the case for expanding the collaborative network of cage-free stakeholders, emphasising how diverse expertise and strategic partnerships can accelerate global progress. By strengthening collaboration across disciplines and geographies, we can overcome barriers to progress and drive meaningful change for laying hens worldwide.

The effects of mare-foal attachment, parity, and foal sex on mare welfare at weaning

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In nature, mares remain with their foals, particularly fillies, past the point of weaning and form long-lasting attachments in stable social groups. In contrast, under human management, mares experience multiple artificial weanings (i.e. abrupt, earlier than natural maternal-offspring separation) over their lifetime. This can lead to cumulative stress and affect their long-term health and welfare, yet it remains relatively understudied. In addition, due to individual variation in behavioural and physiological responses to weaning, mares' ability to adapt to artificial weaning may be unique to each individual. Here, we tested the following hypotheses: 1) mare-foal attachment is influenced by mare parity, number of previous foals, and foal sex, and 2) mare-foal attachment and/or other recorded factors influence mares' behavioural responses during artificial weaning. The behaviour of 30 Thoroughbred mares and their foals from two UK studs was recorded via CCTV (postpartum) and live observations (pre- and post-weaning). Maternal foal-directed licking, sniffing, and nose-to-nose contact were continuously recorded during the first hour postpartum. When foals were 3-5 months old at pasture with their dams, maternal reaction towards foals initiating non-nutritive (e.g. play) and nutritive (e.g. cancellations of nursing or nursing attempt refusal) contact, nose-to-nose contact, allogrooming and agonistic behaviour initiations, and mare-foal proximity were live recorded for 4h (continuous recording for twenty 10 min intervals for three days). Mares' responses to abrupt weaning (removal of two mares at a time) ('agitation': number of vocalisations, pacing, and agonistic behaviour events towards other mares per hour were recorded for 16 individual mares for four hours immediately following dam-offspring separation). Mare parity, previous number of foals, and foal sex were obtained from stud records. Principal component analyses (PCA) were used to calculate a mare-foal attachment index, combining postpartum and pre-weaning maternal behaviours. PCA identified three components explaining 54.65% of the variance, although neither mare parity, number of previous foals, nor foal sex were associated with them. At weaning, mares spent $31.4 \text{ counts/h} \pm 4.6$ (mean $\pm$ SEM) exhibiting agitation behaviours. While no single attachment index, nor parity, did affect mares' responses at weaning, mares with fillies tended to display more agitation at weaning in all models ($F_{1,11}=4.124-3.386, p=0.067-0.093$). Our results highlight the effects of artificial weaning on mare behaviour and tentatively suggest that the welfare of mares with fillies might be more at risk during weaning. Mare-foal attachment and mare welfare at weaning may be influenced by additional factors (e.g. in utero effects, personality, weaning method) and require further investigation.

The use of anti-sucking rings in cattle: assessments at the slaughterhouse

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Anti-sucking rings are a commonly used tool to prevent intersucking in calves and heifers or to aid weaning in suckler cow housing. Rings cause lesions (decubiti, ulcerations) on the nasal septum within a few days, thus they should only be used short-term and must be removed before transport to reduce risk of injury. However, the frequent arrival of animals at slaughterhouses still wearing these rings suggests that farmers use them longterm. This study included both retrospective and prospective components. In the retrospective study, 84 cases of animals arriving at the slaughterhouse with anti-sucking rings were evaluated to design a scoring system for lesions caused by the rings. In the prospective study, the nasal septums of 1000 animals (730 adult cattle, 270 calves) were examined at the slaughter line to determine the prevalence of lesions possibly caused by previous use of anti-sucking rings using the previously developed scoring system. Tissue samples from animals with lesions were also harvested for histological analysis to refine the scoring system. The retrospective study revealed a wide range of severe nasal septum lesions, including ulceration, scarring, indentations, pouches, tissue growth, bruising, squashing, complete septum perforation, or combinations of these. In the prospective study, the prevalence of nasal septum lesions potentially due to previous ring use (i.e., round lesions at identical location on both sides of the septum) was 4.3 % in adult cattle and 1.8 % in calves. Histological analyses revealed signs of hypertrophic epithelium, ulceration, inflammation in the lamina propria, haemorrhage, formation of granulation tissue, and fibrosis, indicating that lesions found in the prospective study were associated with pain. Given that cases of animals still wearing rings at slaughter and thus, showing chronic and severe lesions were used to develop the scoring system, the system will need to be adapted to score acute or less severe lesions. Although we did not confirm that lesions in the prospective study were caused by anti-sucking rings, histological analysis suggested that these lesions were associated with pain. Furthermore, the retrospective study demonstrated that anti-sucking rings are utilized for durations exceeding recommendation, causing major injury to the nasal septum and thus, raising severe animal welfare concerns. Future studies should investigate how these injuries develop over time and explore ways to use and design anti-sucking rings to prevent intersucking without compromising animal welfare.

Sternal evaluation by palpation as an animal-based indicator of comfort around resting

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Comfort around resting should be considered when assessing animal welfare in sheep farms. In order to assess it, bed quality, and thus its quality and dryness should be measured. Fleece cleanliness has been proposed as a valid animal-based indicator (Goddard, 2011), but there are some limitations to its use, such as shearing, wool extension and wool colour. The sternum is a part of the body that remains in full contact with the ground when animals are lying down, and it becomes soiled depending on bed condition. Therefore, sternum evaluation by palpation could be an animal-based indicator to assess dryness and hygiene condition of bed. In the present study, sternal evaluation by palpation has been tested as an indicator of bed quality. Seventy-six meat-purpose commercial sheep farms in Spain from semiextensive (31 farms), semiintensive (41 farms) and intensive systems (4 farms), and from different breeds were visited. Each farm was classified according to bed quality as follows: “A” farms (dry and without organic remains, 19 farms), “B” farms (dry with presence of organic remains, 26 farms), “C” farms (wet, 17 farms) and “D” farms (wet and dirty, 14 farms). In each farm, 30 post-partum ewes up to one month after lambing were randomly selected and individual sternum evaluation by palpation was performed according to the following individual score: “clean” (hair appears soft at palpation and no dirt is detected), “partly dirty” (hair appears hard at palpation but no dirt is detected) and “dirty” (remains of dirt or mud are palpated). Data were analyzed using frequencies with a chi-squared test. The percentage of animals scored as ‘clean’, ‘partly dirty’ and ‘dirty’ on each farm was significantly different depending on bed quality classification ($P < 0.05$). The percentage of animals with score “clean” was progressively lower as bed quality decreased (68% on “A” farms, 51% on “B” farms, 37% on “C” farms, 24% on “D” farms) while the prevalence of animals with score “dirty” was progressively higher (9% on “A” farms, 11% on “B” farms, 24% on “C” farms, 42% on “D” farms). According to the results, sternum evaluation by palpation might be a valid welfare indicator for measuring comfort around resting. It is a precise animal-based indicator to assess bed condition, because it can be used regardless of wool cover and colour and, thus, in any breed type, even after shearing.

Analysis of IACUC rejections of animal experiment in Korea (2019-2023) with a focus on animal welfare

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In Korea, the use of experimental animals and the status of animal experiments are annually collected and reported in accordance with Article 94 of the Animal Protection Act. This study analyzed the reasons for protocol rejections by Institutional Animal Care and Use Committees (IACUCs) over the past five years, aiming to identify key factors that hinder animal welfare in laboratory settings. Approximately 4% (ranging from 2.9% to 5.4%) of experimental protocols were either rejected or required revisions and resubmission each year. Between 2019 and 2023, a total of 7,262 protocols were rejected after review, with universities (65.5%) showing the highest rejection rate, followed by public institutions (29.7%), hospitals (24.3%), and industries (16.4%). IACUCs reported rejection reasons based on 13 distinct criteria, with some protocols having more than one rejection reason. The most common rejection reasons were unreasonable animal numbers (20.6%) and unproven experimental methods (17.4%). In contrast, reasons related to researcher safety, education, and alternative experimental methods were reported less frequently. However, the category of 'other' rejection reasons has been increasing, highlighting the need for further refinement of the rejection criteria. Additionally, refinement-related issues—such as humane endpoints, pain and stress management, and environmental enrichment—were frequently emphasized during protocol reviews. These findings underscore the importance of prioritizing refinement within the 3Rs framework, as addressing these concerns is essential for both enhancing animal welfare and ensuring scientific accuracy. Therefore, developing practical refinement guidelines and strengthening education on ethical research practices and scientific methodology are crucial steps toward improving laboratory animal welfare.

Impact of aviary enclosure on wing flapping in cage-free laying hens

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The transition towards cage-free laying hen housing systems aims to ensure enhanced bird welfare. However, an increase in floor-eggs can occur when litter access is provided. The partial enclosure of birds during the morning hours when most egg laying occurs could reduce this issue in aviary systems; however, performance of space-intensive comfort behaviors, such as wing flapping (WF), could be impaired, jeopardizing animal welfare. We hypothesized that enclosed (ENC) and control (CON) aviary-housed hens would show different WF patterns as a consequence of physical restriction. Moreover, we wanted to assess whether WF has a daily pattern, and if the total number of birds on litter (TBL) impacts WF performance. A total of 1152 Hy-Line Brown pullets were placed at 16 weeks of age (WOA) in 2 aviary rooms (4 units each, 144 birds/unit). One room was allocated to the ENC birds, in which access to litter was provided daily from 12.00pm until 01.00am from 17 to 32WOA included, while the other room was assigned to CON hens, which had free litter access. At 17, 32, and 44WOA, 30-minute videos were collected at 0600 ([A], CON birds' litter access); 0900 (B); 1200 ([C], ENC birds' litter access); 1500 (D); and 1800 (E). Continuous observations were performed, and WF and TBL counts were summed for every 3-minute interval. The sum of WF events per segment, week, and treatment were compared using a GLIMMIX. A Spearman correlation was run between the total number of WF and the TBL for C-ENC and C-CON groups. The WF instances were significantly greater in C-ENC than A-CON at 32 and 44WOA ($P < 0.001$), indicating a rebound effect of morning restraint. Moreover, a higher number of WF in C-CON than the other CON-segments was observed at the same ages ($P < 0.05$). A similar result was recorded comparing C-ENC to A,B,D-ENC ($P < 0.010$) and E-CON ($P = 0.0833$) at 44WOA. Although daily pattern may be attributed to the fresh-feed distribution, thus lower bird density on the litter, it underlines hens' urgency to wing flap when sufficient space is available. Finally, WF was negatively correlated with TBL in C-CON at 32 ($r = -0.651$; $P < 0.001$) and 44WOA ($r = -0.739$; $P < 0.001$) and in C-ENC at 44WOA ($r = -0.630$; $P < 0.001$) probably due to social crowding. In conclusion, these findings provide evidence that WF activity of birds can be disrupted when enclosed in the aviary and that a daily WF pattern may be influenced by environmental factors such as litter density and birds' management.

Intramuscular temperature and behaviour change as an early indicator of heat stress in operational police dogs in Queensland, Australia

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Heat stroke can be fatal in operational police dogs during strenuous exercise especially if combined with hot and humid environmental conditions. A police dog's intensity and drive to fulfil their task can result in continued exercise to a point detrimental to their health. The study aimed to find a practical method of detecting early heat stress that may allow working dog handlers to implement early cooling strategies to ensure canine welfare and optimise operational capabilities. Twelve healthy operational police dogs had temperature-sensing microchips implanted in the superficial pectoral muscle to allow manual collection of intramuscular temperature (T_{IM}). Core temperature (T_C) was recorded to a data logger from ingestible temperature-sensing capsules. Ball chasing and retrieval exercise (BC) involved two consecutive five minutes periods of strenuous exercise (Ex1 and Ex2) with a minimum recovery period of ten minutes between and after exercise. Dogs recovered in shade under veterinary supervision, with water made available if appropriate temperature fall was not observed. Dog behaviour during exercise was assessed on-site and videoed for later review. Behaviour changes were reported in order of appearance. Exercise was stopped if dogs refused to return to handlers or were exhibiting signs of significant heat stress e.g, uncontrolled panting, drooling, weak or unsteady gait. Six patrol dogs (five German Shepherds, one Belgian Malinois) and six detection dogs (Labrador Retrievers) were enrolled, completing a total of 45 Ex1 and 39 Ex2. In all dogs, T_{IM} peak was higher than expected (av. $42.6^\circ\text{C} \pm 0.5^\circ\text{C}$) and occurred at the end of BC activity, while peak T_C occurred an average of 7.7 ± 3.0 minutes after BC exercise stopped (av. $41.4^\circ\text{C} \pm 0.6^\circ\text{C}$). Intramuscular temperature at behaviour change was also consistently higher than T_C ($42.3^\circ\text{C} \pm 0.5^\circ\text{C}$ vs. $40.3^\circ\text{C} \pm 0.8^\circ\text{C}$). Behaviour changes were observed prior to stopping BC in 92% of exercise periods. Reluctance to ball chase was not observed. Behaviours commonly occurred in combination and varied with individual dogs. Overall, behaviours were shade seeking (52/193), "returning wide" (42/193), "stopping away" (29/193) and "strategic pee" (17/193) and were often associated with progressive reduced responsiveness to handler command (53/193). Dogs performing strenuous exercise display predictable behavioural changes as T_{IM} increases. Behaviour change coincides with peaking T_{IM} not with peak T_C . Behaviour pattern changes observed during BC exercises, especially if combined with a progressive reduced responsiveness to command, can be used by handlers in an operational environment as early indicators of heat stress.

Decoding behavioral and physiological cow variability through precision dairy technologies: a comprehensive analysis

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Understanding individual cow variations in behavioral and physiological patterns can help farmers make more informed decisions and promote better health and welfare at the individual level. Therefore, our study aimed to investigate individual variations in rumination, locomotion and feeding activity, inactivity, and panting time (hours per day, h/d) in dairy cows, utilizing a dataset from 298 Brazilian dairy farms. Data were collected from 12,851 dairy cows ($n = 3,902,551$ records) using behavior-monitoring collars over the years 2018 to 2023. Farms included in this study were managed under 90.0% intensive (i.e., free-stalls and compost-barns) and 10.0% extensive production systems (i.e., pastures). To assess animal variability across lactation, we applied the Wood model to each cow's time series data for each behavior. The Wood model is a non-linear mathematical function commonly used to describe lactation curves, defined as: $Y(t) = a \times t^b \times e^{(-c \times t)}$, where $Y(t)$ is the value of the response variable (e.g., rumination, activity) at time t (days in milk), a is a scale parameter related to the initial level, b controls the rate of increase after calving, and c determines the rate of decline after the peak. This model allowed us to model the general pattern of each behavior over time and extract the residual standard deviation as a measure of individual variability. The average rumination time variability was 0.766 h/d (min = 0.199, first quartile (Q1) = 0.658; third quartile (Q3) = 0.845; max = 1.763). The average locomotion and feeding activity time variability was 0.827 h/d (min = 0.172, Q1 = 0.677; Q3 = 0.933; max = 2.648). The average inactivity time variability was 0.935 h/d (min = 0.063, Q1 = 0.789; Q3 = 1.040; max = 2.479). The average panting time variability was 0.326 h/d (min = 0.128, Q1 = 0.275; Q3 = 0.358; max = 0.754). Our results highlight substantial individual variability in dairy cow behaviors and physiological parameters, offering insights that can support early, cow-level interventions for improved animal health, welfare, and farm management.

Gaushalas (cow shelters) in India - Current scenario and future perspectives

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Cow shelters (Gaushalas) are unique traditional institutions in India, where aged, infertile, diseased, rescued and abandoned cows are sheltered for rest of their life, until they die of natural causes. A cross-sectional study was conducted to assess the welfare of cows in these shelters. A total of 54 cow shelters in 6 states of India were studied and 1620 animals were clinically examined, based on 37 health, welfare and behavior parameters, thirty resources provided to the cows were also measured. Descriptive statistics and multivariate analysis were used to identify welfare issues in these shelters and risk factors associated with these issues. The major issues found in these shelters were low space allowance per cow, poor quality of the floors, little freedom of movement, and lack of pasture grazing. Some shelters also had compromised bio-security and risk of zoonoses. The frictional characteristics of floors were measured by a novel technique that was developed and was least for concrete and greatest for earth floors. The proportion of cows with dirty hind limbs declined with increasing friction of the floor. The overall lameness prevalence was 4.2% and it was positively correlated with udder dirtiness, ulceration of the hock joint, carpal joint injuries and claw overgrowth. Lameness was associated with a low body condition score (BCS). Addressing the principal risk factors identified for lameness in the sheltered cows may help to reduce this serious animal welfare problem. The avoidance distance provided a measure of cows' nervousness of people, which increased with a number of health problems- the proportion of cows with dirty hind limbs, hock joint swellings, and hair loss. There was also evidence of reduced avoidance distances in cows with moving difficulties, those with high levels of body condition score (BCS), dirty flanks, joint ulceration, carpal joint injuries, diarrhoea, hampered respiration, lesions on the body due to traumatic injuries, and body coat condition. Cows aggregated stress levels were measured as hair cortisol concentration, which was increased if there was dung accumulated in the lying area of the cowshed, also if the location was in a cold place and if the cows had little access to yards, dirty flanks, hock joint ulceration, carpal joint injuries, body lesions, dehydration, an empty rumen or were old aged. The welfare assessment protocol has identified the key welfare issues in the shelters, which can be used when providing feedback for improvement to the shelter managers and to the government.

Bovine appeasing substance minimally impacts behavioral and physiological indicators of welfare in beef calves purchased at auction

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Cattle purchased at auction are exposed to stressors associated with the auction process, which can reduce their immunocompetence and increase their risk of contracting Bovine Respiratory Disease (BRD). One strategy to mitigate these additive stressors is the application of synthetic analogs of appeasing pheromones. The objective of this study was to determine the efficacy of a maternal bovine appeasing substance (BAS) on the behavioral and physiological responses of beef calves at high risk for BRD. Male beef calves (n=80) of varying weaning ages and breeds were purchased at auction and transported to the research facility. Upon arrival at the facility on day (d) 0, bulls (n=48) were castrated, and calves were assigned to 8 pens (n=10 calves/pen; 6 bulls and 4 steers/pen). Calves in 4 pens were treated once with BAS on the nuchal skin (n=40), and calves in the other 4 pens were not treated and served as controls (CON, n = 40) on d0. A patch of hair above the tail was collected from 40 calves (n=5 calves/pen) on d0 and 42, and cortisol was measured using radioimmunoassay. Tri-axial accelerometers were attached to the left pastern of 16 calves (n=1 steer and 1 bull per pen) for d0-8, and the mean number of bouts and time spent lying with leg out, lying on the sternum, and standing were analyzed. Hair cortisol was log-transformed to improve normality and model fit. Linear mixed effects models in R were used to analyze data for the effects of treatment, sex (on d0), and day, with pen as a random effect. The Cox Hazard Ratio (HR) determined the probability of antibiotic treatment for BRD. Throughout the 42d trial, 38% of calves showed clinical signs of BRD and were administered an antibiotic. Bulls given BAS were less likely to receive antibiotic treatment for BRD than CON bulls (HR=0.10, p=0.05), but not steers. Baseline (d0) concentrations of hair cortisol were greater ($\chi^2=5.99$, p=0.01) for BAS calves (2.72pg/mg) than CON (1.50pg/mg), and this was also the case on day 42 ($\chi^2=3.85$, p=0.05, BAS=2.18pg/mg, CON=1.21pg/mg). There was a tendency ($\chi^2\leq 3.39$, p ≤ 0.09) for BAS calves to have fewer standing bouts (1.2) and spend a greater proportion of time lying with their leg out (39%) than CON (1.4 and 28%, respectively). These results highlight the potential of BAS to mitigate stress and improve health outcomes in beef calves, particularly in bulls purchased at auction.

Smoothing the way forward: a new approach to broiler mobility analysis

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Non-invasive methods to quantify broiler welfare and leg health are of increasing interest due to gait score subjectivity. We observed that broilers' waddling gait patterns create a zigzag pathway in automated software when tracking the center of mass (CoM). The aim of this research was to identify "steps" by quantifying the deviation between smoothed and zigzag pathways and correlate with body weight (BW). We expected that heavier broilers would take less steps and have greater CoM deviation. Mixed-sex broilers (N=46), aged 28 days, were recorded in an open field (244x366cm) for 180s, then weighed (1375-1981g). No broilers showed gait abnormalities. Automated tracking coordinate data were generated (EthoVision®) and plotted (RStudio). Zigzag pathways were identified for 22 birds and pathways were smoothed using moving average smoothing. Euclidean Distance (ED, cm) were calculated for each coordinate to quantify the deviation between the zigzagged and smoothed pathways. Steps were identified by analyzing ED variation over time to calculate CoM deviation (cm) and speed (cm/s). Step number, average and maximum CoM deviation, and speed were calculated per test. Step count reliability was assessed by comparing the calculated step number with the actual steps observed in the video. Correlations were computed in RStudio using the "scatterplot" function with a t-test and Pearson correlation coefficients for BW and all calculated variables, count step with distance and average CoM deviation, and average CoM deviation with speed. There was a strong positive correlation between counted and actual steps ($t=14.50$, $p<0.001$, $r=0.96$), although counted steps were underpredicted by $23.49\pm2.53\%$. Using a smoothed pathway decreased the calculated distance travelled by $57.04\pm2.32\%$ ($t=12.64$, $p<0.001$, $r=0.94$) and average speed by $57.13\pm2.33\%$ ($t=12.48$, $p<0.001$, $r=0.94$) compared with zigzagged pathways. No correlation was found between BW and step count ($t=0.17$, $p=0.87$, $r=0.04$), average CoM deviation ($t=0.20$, $p=0.84$, $r=0.05$), maximum CoM deviation ($t=-0.35$, $p=0.73$, $r=-0.08$), average step speed ($t=0.31$, $p=0.76$, $r=0.07$), total distance ($t=0.94$, $p=0.36$, $r=0.21$), or total speed ($t=0.94$, $p=0.36$, $r=0.21$). A weak positive correlation was found between the number of steps and average CoM deviation ($t=-1.71$, $p=0.10$, $r=0.36$), and a moderate positive correlation between average CoM deviation and average speed ($t=4.97$, $p<0.001$, $r=0.74$). As expected for younger broilers, we found little effect of BW on calculated measures. This research is the first phase in validating a non-invasive method for assessing broiler walking ability. The next phase will test this methodology with heavier broilers and those with gait abnormalities.

Semi-open water sources minimally affect positive behaviors, but may influence negative behaviors in Pekin ducks depending upon the number of ducks per source

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Environmental enrichment plays an important role in shaping welfare, behavior and health of commercially raised Pekin ducks. Specifically, open-water sources as environmental enrichment for ducks have been shown to promote positive behaviors. We set out to investigate whether preening cups and Pekinos, 2 forms of semi- open water sources used for commercial Pekin ducks, would promote natural behaviors (preening, dunking head) and reduce unwanted behaviors (feather pecking). Our first experiment used control pens (CON, N=6, 65 ducks/pen) which had only water lines (8 ducks/nipple) and experimental pens (N = 6, 65 ducks/pen) had the same water line plus one preening cup (PC). Behavior data was collected using scan sampling with video being recorded for 72 continuous hours at 4 different ages: 25 d, 30 d, 36 d, and 40 d. The first 15 min/hr in each pen for AM (3:30, 4:30, and 5:30) and PM (14:30, 15:30, 16:30) were analyzed. Behavior was analyzed using GLIMMIX procedure (SAS 9.4) to examine treatment differences in the proportion of ducks performing dry preening, wet preening, feather picking and feather pecking. More ducks housed with the PC performed wet preening behaviors compared to the control ducks (at 25 days of age: $P=0.0143$; and also at 30,36 and 40 days of age, $P<0.0001$). Though not significant, we saw an increase in feather pecking within PC pens. Our second experiment included the CON and PC treatment groups adapted from the first experiment, with the addition of a Pekino (PEK) group (water line plus 2 PEK per pen). Final N=4 pens/treatment with 30 ducks/pen. Behavior data was collected and analyzed the same as experiment 1, using the same interval and times, but for 3 weeks after enrichment placement. There were no significant differences found among groups for wet preening, but more ducks in the PEK group dry preened than ducks in the CON group ($P=0.0005$). There were also no significant differences found among groups for feather pecking. The results of these two experiments suggest that semi-open water sources do promote natural behaviors, but it is still unclear if it decreases unwanted behaviors like feather pecking. It is unclear if semi-open water sources provide an outlet for positive behaviors and reduce unwanted behaviors. More research is needed to determine the appropriate ratio of ducks to enrichment devices as there may be an optimal balance.

Effects of farrowing crate enrichment placement on the behavior and welfare of suckling and post-weaned piglets

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Environmental enrichment may improve piglet welfare; however, options in farrowing crate systems remain understudied. Therefore, this study investigated the effects of farrowing crate enrichment placement on piglet behavior, skin lesions, and stress during lactation and nursery phases. We hypothesized that shared sow-piglet enrichment would enhance piglet interaction and welfare relative to piglet-only enrichment. Piglets ($n=148$) from 37 litters were balanced by parity and genetics, and litters randomly assigned to: 1) enrichments accessible to both sows and piglets (SPE; $n=12$); 2) enrichments accessible only to piglets (PE; $n=12$); and 3) no enrichments (CON; $n=13$). After weaning, piglets (18.7 ± 0.22 d of age) were relocated and mixed into nursery pens (4 piglets/pen) within treatment groups with similar group sizes. SPE and PE received the same type of enrichments as during lactation. Video recordings were analyzed using 5-min scan sampling at 0800–1000h, 1200–1400h and 1600–1800h to determine the activity budget (rest, nursing, enrichment interaction, pen-directed, pig-directed, agonistic, social, locomotor play, and walking) of suckling (1, 4, 7, 14 d of age) and nursery (0, 1, 7, 14 d post-weaning) piglets. Skin lesion scores were assessed using a modified version of the Welfare Quality Assessment Protocol® and tear stain area from the piglet's left eye (a potential stress indicator) was assessed at the same ages that video data were collected. Behavior and tear stain data were analyzed using PROC GLIMMIX, and skin lesions were analyzed using PROC LOGSTIC (SAS 9.4). In the lactation phase, the proportion of time piglets interacted with enrichment was higher for SPE ($0.50 \pm 0.06\%$) than PE ($0.15 \pm 0.06\%$; $P < 0.0001$), while the proportion of time piglets spent engaged in pig-directed behavior was lower for SPE ($0.22 \pm 0.05\%$) than CON ($0.59 \pm 0.05\%$; $P < 0.0001$) and PE ($0.42 \pm 0.05\%$; $P = 0.02$). CON ($0.78 \pm 0.06\%$) engaged in more agonistic behaviors than PE ($0.51 \pm 0.06\%$; $P < 0.01$) and SPE ($0.34 \pm 0.06\%$; $P < 0.0001$). CON ($4.6 \pm 1.0 \text{ mm}^2$) had a larger tear stain area than PE ($3.4 \pm 1.0 \text{ mm}^2$) and SPE ($3.7 \pm 1.0 \text{ mm}^2$; $P < 0.001$). Skin lesion scores were higher for CON compared to SPE and PE for ears ($P < 0.001$), front region ($P < 0.01$), and overall score ($P < 0.001$). In the nursery phase, SPE ($1.84 \pm 0.09\%$) spent more time walking than CON ($1.51 \pm 0.08\%$; $P = 0.03$). Post-weaning tear stains remained larger for CON ($5.6 \pm 0.4 \text{ mm}^2$) than PE ($3.7 \pm 0.3 \text{ mm}^2$) and SPE ($3.9 \pm 0.3 \text{ cm}^2$; $P = 0.001$). Environmental enrichment improved suckling piglet welfare by reducing tear stains, skin lesions, and agonistic and pig-directed behaviors, with sow and piglet-accessible enrichments yielding the greatest benefits. Nursery effects were less pronounced but suggest lasting welfare benefits.

The use of firocoxib and bupivacaine liposome injectable suspension to reduce pain in piglets surgically castrated and tail docked using a CO2 surgical laser

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CO2 surgical lasers are used widely in veterinary medicine, for their ability to reduce post-surgical pain and inflammation. Firocoxib, a nonsteroidal anti-inflammatory drug, is able to cross the blood-milk barrier and transfer from the sow to her nursing piglets (transmammary delivery). Refinements to surgical husbandry procedures in piglets, plus multimodal pain management, may greatly improve on-farm piglet welfare. This pilot study had two objectives: to evaluate the utility of a CO2 surgical laser and to determine the efficacy of firocoxib in combination with bupivacaine (BUP) to reduce pain associated with surgical castration and tail docking in piglets. Three sows and thirty piglets (3±1 day old) were enrolled in this study (10 piglets/sow). Sows were randomly allocated to one of two treatment groups: oral firocoxib (3mg/kg; FIRO) or oral placebo (CON), which was administered 12h prior to processing piglets. All piglets were administered BUP into the spermatic cords and/or as a ring block around the tail 30min prior to processing. Additionally, piglets with CON sows were either provided a placebo or oral firocoxib (3mg/kg), creating the following treatment groups: FIRO sow + placebo piglet (FIROSOW), CON sow + FIRO piglet (FIROPIG), CON sow + placebo (PLBO). Lastly, piglets were randomly allocated to one of three processing treatments: surgical laser, conventional (scalpel and side pliers), or sham. The outcome measures assessed were: vocalization, digital and infrared thermography images of the tail and scrotum, facial grimacing, gait analysis, behaviour, plasma cortisol and blood-drug concentrations. Piglets in all processed treatment groups elicited calls of higher energy compared to the sham group ($P<0.05$). Males produced calls of significantly higher energy and peak amplitude compared to females ($P<0.0001$). Immediately post-procedure, conventionally tail docked piglets had higher wound scores than laser tail docked piglets ($P<0.0001$); however, laser tail docked piglets had higher tail tip temperatures compared to piglets who had conventionally docked tails ($P<0.0001$). Weight was more evenly distributed across front and hind limbs for FIROPIG piglets compared to FIROSOW and PLBO piglets ($P<0.05$). Piglets in the FIROPIG group grimaced more than piglets in the FIROSOW and PLBO groups ($P=0.0002$). Piglets in the FIROPIG group also had greater firocoxib concentrations and lower cortisol concentrations than piglets in the FIROSOW group ($P<0.05$). These results suggest that there was no benefit to processing piglets with the CO2 surgical laser; however, multimodal pain management when firocoxib is administered directly to piglets, may reduce stress and pain.

Description of toe-pecking behaviour in laying hens

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Toe-pecking (TP), an understudied injurious behaviour in laying hens, can cause toe injuries, pain, and even mortality. Our project aims to describe TP behaviour and its behavioural context. For this, we used preidentified TP behaviours from another project which included hourly observations (16:00 – 17:00) per week from 23 to 29 weeks of age. The observations were from five pens (225 birds/pen) of a quasi-commercial barn that housed Lohmann Selected Leghorn layers in a multi-tier aviary. Of 254 TP instances (240 allo-pecking, 14 self-pecking), we tracked the behaviour of initiator and recipient of TP (both are the same bird for self-pecking) for three minutes post-event (or until disappearance) and two minutes pre-event (or from first appearance). The behaviours were recorded as point events in order of their occurrence from the start of the observation time for both post and pre-TP event. We also classified the allo-pecking TP into three different categories: (i) gentle - gentle peck to which the recipient does not pull leg away, (ii) intermediate – forceful peck to which the recipient pulls leg away slightly, and (iii) severe – forceful peck or grab of the toe to which the recipient pulls leg away strongly or struggle to pull leg away. We had more recipients ($n = 350$) than initiators ($n = 240$) and multiple instances of TP between the same initiator and recipient/s during the observation period of each TP event. We classified 149 as gentle, 231 as intermediate, and 89 as severe toe-pecks. Initiators showed an increase in aggressive behaviours in the post-period compared to pre-TP events (0.10 ± 0.09 vs. 0.05 ± 0.07 behaviours/second), unlike recipients (0.02 ± 0.04 vs. 0.02 ± 0.07 behaviours/second). The most frequent post-TP behaviour in initiators was re-pecking the same bird (51.10%, 33.18%, and 22.44% for the first three post-TP behaviours) in the toes, while recipients commonly walked away (64.79%). Before the TP event, initiators were most often standing (38.60%), ground-pecking (32.63%), or walking (18.22%), while recipients were typically walking by the initiator (32.20%), ground-pecking (27.24%), or moving to the initiator's tier within the aviary (14.24%). Our findings suggest that allo-pecking toe-pecking (TP) occurs on a severity continuum within an aggressive context. This context often involves a recipient moving into proximity with the initiator and ending with displacement of recipient/s. However, further research is needed to determine the specific context and distinct functions of each TP type.

Natural weaning in extensively managed suckler beef herds: effects on next year's calf

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Suckler beef cows and their calves are commonly separated when calves are between four and ten months old. This is earlier than would happen naturally and causes stress in dams and calves, reduces feed intake and immunocompetence, and thus introduces calf performance and health problems. To address these concerns, weaning by separation was gradually phased out on a large extensive suckler beef farm based on chalk downland in southern England. Over a period of seven years, the farm's breeding herds were gradually converted to natural weaning. This meant yearling calves stayed with their dams until weaned off naturally and beyond the subsequent calving season. To examine the effects of yearlings being left with their dam, data were collected on the subsequent calves' survival to one year old ('raising success'). The dams thus had their previous calf either still at foot as a yearling (YP) when the new calf arrived, or had had their previous calf removed at eight months old, so it was absent (YA). Data were retrospectively analysed on 1820 calves born to 663 dams in total over the seven years. Raising success (R) overall was high at 96% for YP calves, and 95% for YA. The low numbers of calves not raised to their first birthday (NR) meant 2x2 Chi-squared Tests of Independence by year were only possible for two years. Analyses found no association between yearling presence and calf raising success in one year (N=256; of which YPR=99, YPNR=6; YAR=141, YANR=10) but an association with greater raising success for YP calves in the other (N=401; YPR=258, YPNR=10; YAR=118, YANR=15; $p=0.004$). Analysis of only one calf per cow across all seven years confirmed that raising success was independent of yearling presence (N=663; YPR=360, YPNR=259; YAR=22, YANR=22). A separate trial compared serum total protein levels of 81 YP and 12 YA 1–10-day old calves as measures of colostrum antibody intake. Mann-Whitney-U testing showed an insignificant trend towards higher intake in YA calves ($p<0.1$). However, over 86 % of calves in both groups had 'excellent' total protein values as per standard classification (>6.2 g/dl). The findings show that under conditions studied here, beef calves can be left with their dams without detriment to the subsequent calf. No negative effects were found on raising success and colostrum intakes. Allowing cows to wean their calves naturally could thus be a management option for similar beef suckler herds including those used in rewilding/regeneration projects.

Weighing of mastitis and bluetongue welfare impairments in dairy cows using the Five Domains Model

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According to the Five Domains Model, the welfare of animals can be assessed based on the domains nutrition, environment, health, and behaviour of the animal. These four domains affect the last domain, emotional state. It is widely acknowledged that animal diseases affect the welfare of animals in each of those domains. Besides the clear impact on animal health due to clinical signs, animal diseases may also result in reduced feed or water intake, changes in their housing (e.g., isolation in a sick pen), and less engagement with other animals. The animal welfare impact of animal diseases is thus multifaceted. However, the relationship between animal health and animal welfare is scarcely quantified. Animal health decision makers therefore miss quantitative insights to use the welfare impact of disease in their decision making regarding animal diseases. The aim of this study is to weigh the various welfare impairments of two dairy cattle diseases according to the Five Domains Model. Mastitis and bluetongue were chosen to reflect an endemic, multifactorial disease, as well as an epidemic, infectious disease. Welfare impairment weighing will be done in two steps. First, animal welfare indicators that are indicative for the effects of mastitis or bluetongue on the four domains of nutrition, environment, health, and behaviour will be identified using an expert elicitation and a literature review. Thereafter, participants of the 2025 Congress of the International Society for Applied Ethology will be requested to fill out one of two randomly assigned online surveys before the conference. The surveys will be closed 3 weeks before the conference. Using conjoint analysis, a statistical technique originating from marketing research, welfare impairment weights of mastitis and bluetongue on all of the Five Domains will be determined. The results will be presented during the meeting. The weights determined from this study will provide quantitative insights into how animal welfare experts weight the multifaceted animal welfare burden due to mastitis and bluetongue in dairy cattle. This study allows further investigations to quantify the welfare burden of these two animal diseases.

Assessing heat stress in dairy cows by using three thermal comfort indices

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The THI has been the gold standard worldwide to assess the risk of heat stress in livestock. The study's goal was to compare three comfort indices to assess heat stress in dairy cows. A total of 60 cows from two dairies (Casablanca = CF and Mallarauco = MF), 30 each, were randomly selected. Cows were housed in pens with access to shade, water, and fed with TMR. Three thermal indices (THI, adjusted THI (THIa), and the Comprehensive climate index (CCI)) were estimated from hourly data collected at each farm. Heat stress was estimated by respiratory rates (RR) and panting scores (PS) at different times of the day (8, 15, and 18 h). Milk yield was obtained from the herd management system at each farm. Days were classified as stressful or normal based on the threshold values (68 for THI and THIa, and 25°C for CCI) and cows as primiparous and multiparous. Data were analyzed in a factorial structure for milk yield (farm, parity, and day's condition) and farm & month for comfort thermal indices. All thermal indices were higher ($P < 0.01$) in CF compared to MF which was only 41.7 km apart. February was the riskier month independent of the thermal index when using THI and THIa (65.9 and 70.6) followed by January (64.7 and 69.8). Meanwhile, CCI indicated similar risk for January and February (24.9 and 25.6). RR was dependent on the hour of the day and farm location ($P < 0.01$). Cows at Cdf had the lower RR at 8 AM (49.1 bpm) followed by 6 PM at CF and MF (59.8 and 71.2 bpm). The higher RR was observed at MF at 3 PM (82.2 bpm), followed by MF at 8 AM and CF at 3 PM (76.9 and 76.64 bpm). Higher PS was observed at 3 PM with >57% of cattle having PS>1 in CF whereas in MF it was over 86%. There were only double interactions ($P < 0.05$) and main effects of parity and condition day ($P < 0.01$) but not a triple interaction ($P = 0.20$) for milk yield and there was a trend for farm effect ($P = 0.06$). Milk yield decreased by 1.8 L/cow/d on heat-stressed days. After regression analysis, the threshold for CCI was 23.25 instead of 25. In conclusion, the CCI is a reliable predictor of heat stress risk, comparable to the THI and THIa, highlighting its value as an index to assess and manage thermal welfare in dairy cattle.

Can social behaviours of piglets inform us on their affective state? An experimental approach under contrasted housing conditions

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Investigating the social interactions between pigs seems to be a promising approach to characterise their affective state. Affiliative interactions in particular have been suggested to promote positive social dynamics and group stability. However, some social interactions such as nosing behaviours can have different functions, making it ambivalent to determine the affective state behind it. They could serve a social function (affiliation, recognition) or they could be a redirection of unfulfilled exploratory needs. A total of 114 piglets, divided in three replicates, were used to investigate the influence of housing conditions on the expression of exploratory and social behaviours in pigs. The piglets were assigned to two contrasted housing conditions (two pens per condition and per replicate): minimal (MIN) versus enriched (ENR), intended to elicit different welfare experiences and corresponding affective states. ENR pigs were born in free-farrowing system with early sociabilisation and had access to a variety of enrichments from birth onwards: extra space, rooting materials, play objects in regular rotation, feeding toys, music and daily petting. MIN pigs were born in conventional farrowing systems equipped with a single rope and a plastic chewing ball. We studied indirect measurements of agonistic interactions through skin lesions the day before weaning (D-1) and 24 hours post-weaning (D1). The social behaviours of the pigs were individually recorded using top-view video cameras during two weekend days (D9 after weaning, and D37). We applied continuous focal animal sampling on four samples of 20 minutes per day corresponding to four periods of time (8:30-11:00, 11:00-13:30, 13:30-16:00, and 16:00-18:30). Within each period, we selected the first 20-min sequence where at least half of the pigs were active in order to capture exploratory behaviours and social interactions. For exploration-related behaviour, we distinguished exploration towards pen features from interactions with enrichment materials. As potentially affiliative behaviours, we extracted nosing behaviours (nose, head, body, ano-genital, belly-nosing) and play occurrences (play-fight, locomotor play). Behavioural data is currently being analysed and will aim at evaluating the following assumptions: Piglets in the enriched group had improved welfare and therefore i) exhibited more exploratory behaviours, especially towards enrichment materials ii) had lower skin lesion scores iii) had a higher expression of certain types of nosing interactions (nose, head, and body). This study will provide new insights into the affective state behind social behaviours and help us determine whether they should be interpreted as positive affiliative behaviours or potential signs of redirected exploratory needs.

Cow-calf contact and parity may affect the behaviour of cows as measured with Nedap activity sensors

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Many cow-calf contact (CCC) studies have focused on the calf, or the weaning and separation phase, perhaps because it is difficult to set-up control situations for the cow. The aim of this study was to compare the behaviour of Norwegian Red cows, managed either with or without calf contact, in the first 2 wk after calving using Nedap activity sensors (on the leg and neck collar). We predicted that cows with calves (CCC; $n = 24$) would spend less time lying and take more steps, but perform similar durations of rumination and eating compared to cows without calves (control; $n = 24$). Our controlled clinical trial included 2 treatments: CCC (access to their calf except during milking; 13 primiparous cows), and control (calf removed at birth; 10 primiparous cows). Each treatment included 4 groups of 6 animals (filled to minimize calf age differences) managed for 3 d in a single calving pen (9m²) before moving to the same freestall area (133 m²) with an automatic milking system (AMS). Data were averaged into means for each cow across 3-d periods. Models (SAS mixed model procedure) of each behaviour were run with parity, period, treatment, and interactions (treatment*parity, treatment*period). Results are presented as LS means $\pm$ SE. All cows had the greatest duration of lying time ($P < 0.05$), and least steps ($P < 0.005$) during the last 3 d of data collection, otherwise, period was not significant. Primiparous cows, regardless of treatment, stood up more (16 ± 1 times; $P < 0.001$) than multiparous cows (10 ± 1 times). Perhaps the primiparous cows were more unsettled or had greater discomfort post-calving. Primiparous CCC cows spent less time lying (487 ± 26 min/d; $P < 0.005$), and took more steps (4620 ± 237 steps/d; $P = 0.02$) than multiparous CCC (613 ± 26 min/d lying; 3755 ± 215 steps/d) or control cows (both parities: 606 ± 22 min/d lying; 4056 ± 204 steps/d). The primiparous CCC cows may have been following their young calves around the pen. There were no differences in time spent eating (primiparous CCC: 395 ± 31 min/d; control: 378 ± 33 min/d; multiparous CCC: 408 ± 28 min/d; control: 398 ± 27 min/d; $P = 0.9$) or ruminating (primiparous: CCC: 537 ± 19 min/d; control: 572 ± 20.3 min/d; multiparous CCC: 575 ± 17 min/d; control: 585 ± 16 min/d $P = 0.3$). All cows performed similar durations of feeding and ruminating, but primiparous cows appear to be more active, especially when managed with their calves. Perhaps primiparous cows in CCC systems need additional attention and space in the weeks following calving.

Excess deaths during global avian conservation translocations: estimating the extent of welfare compromise and identifying risk factors

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Conservation translocations involve moving animals and releasing them into new sites (e.g., to augment freeliving populations). However, pre-release practices may be stressful, and post-release mortality rates high: problematic for welfare. Using Lincoln Park Zoo's Avian Reintroduction and Translocation Database, we examined 892 past translocation events (1931-2010), involving 15,103 birds across 124 species and 37 countries. Using data on deaths at 1-week, 1-month and 1-year post-release, we assessed when post-release mortality is highest, and compared these to species-typical death rates in non-translocated birds. Using practitioner-reported main causes of death, we also estimated the likely suffering involved. Currently, we are investigating two broad hypothesised risk factors: that pre-release stress increases mortality (via e.g., immunosuppression or capture myopathy); and that animals are poorly prepared for post-release life, due to characteristics of the release site and/or their behavioural naivety or inflexibility. Analyses revealed that 70% of deaths occurred by one week post-release. During this time, mortality was 24%: significantly higher than the two later time periods (5 and 22%; $\chi^2=10\ 567$, $df=2$, $p<0.0001$), and than species-typical weekly death rates in non-translocated conspecifics ($V=10$, $n=15$ species, $p<0.01$). In approximately 9% of attempts, deaths involved prolonged suffering (e.g., starvation); another 35% involved briefer suffering (e.g., predation). Thus, translocated birds are most vulnerable to suffering and death the first week post-release. To assess what helps or hinders during this critical time, we are currently testing hypothesised risk factors using Bayesian phylogenetic mixed effects models - these will be presented. If pre-release stress is important, then experiencing a greater number of stressors (such as long travel times and procedures involving handling by humans, e.g., vaccinations) should be influential, especially for naturally fearful species. If mismatches between release sites and species' evolved biology are important, then local thermal conditions (i.e., whether or not beyond species-typical thresholds) and being released outside the native range should be influential, especially for species lacking behavioural flexibility (e.g., specialists or those small-brained). And if being poorly-prepared plays a role, then whether or not birds are captive-bred should be influential, especially if human-reared or from species reliant on hunting. We will use risk factor findings to make recommendations to practitioners worldwide on i) which types of species are best or worst-suited to translocation, and ii) protocols supporting birds through the period immediately post-release. We hope this helps global conservation goals, reduces wasted resources incurred when translocation attempts fail, and improves wild animal welfare.

Major changes required to improve welfare of veal calves in the Netherlands: a risk assessment

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The Netherlands are the largest producer of veal in Europe, fattening approximately one million white veal and rosé veal calves annually. BuRO performed a welfare risk assessment for veal calves to provide risk-based advice for supervision by a Competent Authority. The results of this assessment can help to provide focus for scientific research. The risk assessment is based on EFSA's methodology: hazard identification (threats to animal welfare), hazard characterization (effect on animal welfare, i.e. the welfare consequence), exposure to hazards (likelihood of threats) and risk characterization (overall assessment based on effect and chance). A literature review was performed to identify hazards, the relevant welfare consequences, and the exposure to these hazards; BuRO conducted this review using sources such as Scopus, PubMed, and Google Scholar with search terms including 'animal welfare' and 'veal calves', as well as well-established publications and reference books on the topic available within BuRO. The impact (severity x duration) and prevalence of the welfare consequences were estimated using expert knowledge elicitation. Nineteen welfare consequences were identified for both white veal and rosé calves. Of these, fourteen had a high impact on welfare, with half showing both a high prevalence and substantial exposure to multiple identified hazards. The welfare consequences thirst, insufficient lying comfort, abomasum lesions, and limitation of natural behaviour were found as most prevalent welfare risks. Respiratory problems also showed high prevalence and exposure to hazards, but a varying impact. Risks were similar for white veal and rosé calves. Those risks are inherent to the current veal calf husbandry system and were already identified in a previous risk assessment performed by BuRO in 2015. Reducing these risks requires major changes, including minimising transport, improving housing, and changing feed composition and regimes.

Agrivoltaics in dairy farming: Conflicting concerns between animals' quality of life, and electricity generation

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Using solar panels on pasture areas creates a conflicting concern between generating clean energy and ensuring animal welfare, as livestock farmers may choose to confine animals to free up pasture areas to introduce solar panels. Thus, we explored public perceptions of the conflict between animal welfare and electricity generation. We recruited a convenience sample of Brazilian citizens through email lists and social media to participate in an online survey (SurveyMonkey®). Participants were required to be at least 18 years old to voluntarily consent to answer a survey about photovoltaic panels in dairy farming. Participants were randomly assigned to one of four scenarios, each accompanied by a brief explanatory text and image: (1) Silvopastoral system (SpS, n=199): Cows on pasture with natural shade from trees, while photovoltaic panels were installed on barn roofs; (2) Agrivoltaics System (AgS, n=200): Cows on pasture gained with shade from photovoltaic panels installed over pasture area; (3) Photovoltaic System (PvS, n=264): Cows confined to a barn with fans, while photovoltaic panels were installed on pasture for electricity generation; and (4) Integrated Crop System (IcS, n=220): Cows confined to a barn with fans, with corn crops replacing pasture and photovoltaic panels on barn roofs. The survey included demographic questions, and attitudes toward the scenarios and their effects on animal welfare were measured using a five-point Likert scale (results expressed as mean $\pm$ SE). Data were analyzed using Kruskal-Wallis and Bonferroni tests for post-hoc analysis. Participants were balanced for gender (52% women and 48% men) and aged 18–35 (56%). Attitudes differed across scenarios ($p < 0.001$). Participants were most positive toward SpS (4.51 ± 0.06) compared to other scenarios (AgS: 3.84 ± 0.08 ; PvS: 2.84 ± 0.08 ; IcS: 3.25 ± 0.08). They also perceived high quality of life in SpS (4.26 ± 0.05) relative to other scenarios (AgS: 3.84 ± 0.06 ; PvS: 2.89 ± 0.08 ; IcS: 3.40 ± 0.07). Participants believed cows on pasture were more likely ($p < 0.001$) to feel positive experiences (e.g., satisfaction: SpS: 4.14 ± 0.06 ; AgS: 3.57 ± 0.07 ; PvS: 2.83 ± 0.08 ; IcS: 3.22 ± 0.08) and less likely to experience negative emotions (e.g., anxiety: SpS: 2.40 ± 0.06 ; AgS: 2.86 ± 0.07 ; PvS: 3.74 ± 0.07 ; IcS: 3.47 ± 0.07). In conclusion, Brazilian participants favoured the natural scenario, where cows grazed in the shaded pasture, while viewing confinement systems coupled with land use for energy generation most negatively.

Gilts are motivated to exit a stall

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Stalls (or crates) are still a common type of housing in the swine industry, despite public concern and regional legislation restricting their use. In this study, we examined the motivation of gilts to exit a stall. Sixteen stallnaïve gilts (Large White x Landrace) were locked for 60min in a gestation crate that had been mounted with a novel apparatus allowing continuous monitoring of the force applied to its back gate by the animal. An electromagnetic lock (V2M1200 Maglocks, Securitron) was used to hold the stall closed when activated. A load cell (RAS1 S-Beam, LoadStar) was placed in line with the electromagnetic lock to measure the forces generated by the gilt as she was trying to leave the stall. Force data from the load cell was sampled at a 2 Hz rate via a digital interface module (DI-100U, Loadstar). Raw force measurements were low-pass filtered (Butterworth low-pass with a 0.1Hz threshold, identified visually via spectral density) and discrete pushing events identified via local maxima (recorded force value superior to the previous and following six measures, with one difference of at least 10 N). All gilts displayed some level of motivation to exit the crate, ranging from 41 to 173 in the number of pushing events, as well as exerting a maximum force applied from 124 N to 645 N. A hierarchical cluster analysis applied to the median and interquartile range (IQR) of force generated during individual pushing events yielded two behavioural profiles ('Low' and 'High' groups). The "High" group exhibited a greater number of pushes (104.4 ± 42.7 vs. 61.3 ± 16.9), recorded a higher maximum force (394.6 ± 134.7 N vs. 201.3 ± 84.6 N), median force (136.6 ± 29.1 N vs. 66.1 ± 10.4 N) and greater IQR (106.8 ± 32.4 N vs. 43.2 ± 7.3 N), as well as a shorter time interval between two pushes (34.9 ± 15.1 s vs. 53.0 ± 14.8 s) (all t-tests $P < 0.05$). While all these naïve animals worked to leave the stall, gilts displayed different motivation profiles in trying to exit the stall consistent with a reactive/proactive framework. Taken together these findings provide further evidence to support stall confinement as aversive to swine but highlight the complexities in understanding and improving pig welfare by considering individual behavioural profiles.

What are we talking about when we talk about animal welfare in sustainable livestock systems?

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Life Cycle Assessment (LCA) approaches are widely used to assess the impacts of production, identify hot spots, and analyse the consequences of change for a product or system. The use of LCA has broadened over time, from an initial focus on quantifying environmental impacts to the exploration of social impacts via Social LCA, the analysis of economic costs through Life Cycle Cost Assessment, and the development of integrated Life Cycle Sustainability Assessment. To quantify the sustainability for livestock systems, LCA provides an integrated approach, which encompasses environmental, economic, and social dimensions, and recognise animal welfare as a key social component. However, the integration of animal welfare within LCA remains underdeveloped, with no consensus on suitable indicators for assessment. Advancements in animal behaviour and welfare science, particularly the shift towards positive animal welfare (as highlighted by the LIFT project), offer opportunities for refining LCA methodologies. Incorporating indicators that capture welfare at both individual and group levels could enhance the comprehensiveness of sustainability assessments for livestock systems. In an on-going project we aim to suggest a conceptual framework for incorporating animal welfare into LCA of livestock systems, and then collect the feedback from a workshop. The workshop aims to bridge the knowledge gap between applied ethology and LCA by engaging with experts, particularly from the ISAE and LIFT communities. Key objectives include: (1) introducing LCA as a holistic assessment tool that incorporates animal welfare, (2) identifying relevant welfare indicators that can be integrated into LCA, and (3) fostering interdisciplinary collaboration to improve the robustness of sustainability assessments. The workshop will begin with a short presentation on the principle of LCA, and the current state of animal welfare assessment in LCA, and our proposed criteria for including animal welfare indicators into LCA. This will be followed by discussion groups focused on identifying practical welfare indicators suitable for on-farm application and evaluating the criteria for their inclusion in LCA. Additionally, a survey will be conducted to gather participants' perspectives on the role of animal welfare in sustainability assessments. By synthesizing expert input, this workshop seeks to advance the incorporation of animal welfare into LCA, ensuring more holistic evaluations of livestock systems.

Happy farmers and happy cows: the relationship between positive animal welfare, farmer's attitudes and the economic potential of the farm

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To date, there are no validated protocols that can assess positive welfare on dairy farms. The first aim of this study was to compare a novel positive welfare (POS) protocol to the Welfare Quality (WQ) protocol. Furthermore, we considered the potential relationships between welfare, farm economic potential, caretaker empathy, attitudes, and job satisfaction. The hypothesis was that there would be positive associations between these variables. Thirty-one Swedish dairy farms were visited by trained assessors and the variables collected were grouped into different 'areas' for analysis. Welfare was assessed according to the WQ (WQ area) and the POS (POS area) protocols. The POS protocol contained animal-based measures that were selected based on previous experimental studies, including body postures, synchronisation, exploration, (allo)grooming, brushing, and playing. Data on economic potential were collected from an industry database (Economy area) and farmer's attitudes, job satisfaction and empathy from questionnaires (People area). Composite indicators were generated using the R package COINr for each area (WQ, POS, People and Economy) in order to rank and compare farms according to the different areas (Pearson correlation coefficient, Holm-adjusted for multiple comparisons). The aggregated dataset was subjected to a Hierarchical Clustering on Principal Components procedure ("HCPC" package). There were no correlations between the four areas. However, we identified three distinct clusters. Cluster 1 was characterized by relatively low economic resources (Economy area), low housing conditions (WQ area), and low ear and eye scores (POS area). Cluster 2 consisted of farms with a high score for ear postures (POS area) and by farm staff that indicated a high importance of welfare (People area), but relatively low scores for feeding and behaviour (WQ areas). Cluster 3 was characterized by high scores for economic resources (Economy area), high levels of behavioural synchronization (POS area), and high levels of positive behaviours (POS area) but relatively low scores for work situation (People area) and low economic management (Economy area). Because there was no clear relationship between POS and WQ, it seems that these protocols measured different aspects of welfare and may be used complementary. A main cluster emerged that seemed to associate farms with poor economic resources, poor housing conditions and low scores on positive body language. However, better welfare was not clearly linked to better economy or farmer's attitudes. Interestingly, the POS area was important in all three clusters (either low or high), suggesting that the POS protocol may be further developed and validated.

Human behavior change and animal welfare: large scale low stress handling implementation for mice and rats

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1. Charles River

There is over a decade of empirical evidence that tail handling is aversive to mice and rats. Tunnel and body/cup handling are preferred methods, resulting in less anxiety and depressive-like states, and improved behavioral and physiological parameters. However, tail handling is still common in research institutes. Given the evidence, there is an ethical imperative to change the culture around handling mice and rats in research. With this in mind, Charles River implemented a low stress handling (LSH) initiative in 2022, aiming to use change management strategies to facilitate long-term human behavior change towards low stress handling. The first step was to obtain high level support which involved identifying key stakeholders, sharing the evidence, and remaining flexible in approach. The second step was to engage and train. Personnel at various levels of the company were involved in LSH discussions and targeted trainings were provided to different groups, including technicians, leadership, and client services. The third step was to implement LSH by using a staggered roll out plan and clear communication. The final step was to evaluate the process by asking for feedback and collecting observations and reflections. Surveys were used to assess the state of handling methods and employee attitudes towards LSH in 2022, 2023, and again in 2025. Surveys primarily included multiple choice questions with opportunities for open ended responses. In 2022, a company-wide survey assessed current handling methods, showing that about 92% of sites were using tail handling as a primary handling method for mice, and that 79% of sites were using tail handling to some extent for rats. The primary perceived challenge to implementing LSH was a concern that it would take more time to perform job functions. Through this careful process of change management, as of April 2025, the company has achieved 90% compliance with LSH, with 61 of 68 sites having transitioned to using LSH for mice and rats, with the remaining sites actively working towards achieving this goal. Site-level surveys reported that while LSH initially took more time, once employees were trained on using LSH, there was no increase in time to perform job functions and employees reported more positive interactions with the animals compared to using tail handling. This presentation will focus on the change management process of promoting refinements in a large-scale organization, while presenting survey data collected throughout the process.

Enhancing owner understanding and treatment success: the role of advanced imaging in canine behavioral and neurological disorders

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Caring for a dog with long-term behavioral disorders can be emotionally and financially challenging, often leading to frustration, guilt, and reduced adherence to treatment. A key factor in treatment success is owner understanding, particularly when behavioral issues stem from underlying neurological conditions. Advanced imaging techniques, like MRI and CT scans, play a crucial role not only in identifying these neurological disorders but also in fostering caregiver understanding and engagement in the treatment process. This descriptive case series shares clinical experiences from two patients to illustrate how neuroimaging can impact owner perception and care. This case series presents two dogs – Fons, a French Bulldog diagnosed with porencephaly, and Tygo, a Pomeranian with Chiari-like malformation and syringomyelia. Both dogs were presented with mainly behavioral problems, such as aggression, compulsivity, and hyper-reactivity, and proved to be difficult to treat with environmental management, behavioral modification, and psychopharmaceuticals. Through advanced imaging, definitive diagnoses were established, allowing owners to understand their dogs' behaviour. This shift in perception led to improved emotional acceptance, better compliance with management recommendations, and reduced frustration. Caregiver burden—the psychosocial, physical, emotional, and financial strain of caring for a pet with a behavioral issue—can be substantial. Providing a clear medical explanation for problematic behaviours not only improves owner compliance with a treatment strategy but also reduces frustration and guilt, creating a more empathetic and constructive owner-pet relationship. Ultimately, a multidisciplinary approach that integrates medical, behavioral, and environmental factors is key to optimizing patient outcomes. Sustainable treatment success relies not only on advanced imaging techniques in veterinary medicine but also on actively involving owners in the management process.

Effects of reward type and previous social experience on cognitive testing outcomes of weaned dairy calves

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Animal cognitive and behavioral testing often requires a reward to motivate task acquisition, yet reward perception may depend on reward type and previous experience. We first assessed the effects of different reward types on initial discrimination and reversal learning ability in weaned Holstein female dairy calves, with calves tested in a T-maze containing either a food, social, or exit reward (n=10 calves/reward) located in one arm of the maze. Calves received 5 testing sessions/d. The number of sessions required to pass each stage (direct movement to rewarded arm for 3 consecutive sessions) and the pass rate (number of calves to meet passing criteria in ≤ 18 sessions) for each reward type were recorded. Cox proportional hazards (time-to-event) models were fitted to the data to quantify the effect of reward type on the number of sessions required (latency) to reach the passing criterion (event) for each stage. During the initial discrimination stage, calves provided the social reward were 5 times more likely to succeed than calves provided the food reward ($\chi^2=7.3$; $P=0.007$), whereas success in the reversal stage was 4 times greater when calves were provided the exit reward rather than the social reward ($\chi^2=4.1$; $P=0.04$). Using the same methodology, we also assessed effects of social experience in calves previously housed individually or in pairs (from birth through weaning) tested with either a social or exit reward (n=10 calves/reward/treatment). Housing treatment, reward type, and their interaction were fitted as explanatory variables in Cox proportional hazards models. Interactive effects of previous housing and reward type were evident during the initial discrimination stage of testing ($\chi^2=4.7$; $P=0.03$), with previously pair housed calves twice as likely to succeed if given the exit reward rather than the social reward, and individually housed calves twice as likely to succeed if given the social reward rather than the exit reward. Reward type also affected success during the reversal learning stage ($\chi^2=6.0$; $P=0.01$), with calves provided the exit reward 4 times more likely to succeed than those provided the social reward. This effect was particularly pronounced in previously individually housed calves, who were 6 times more likely to succeed during this stage if given the exit reward rather than the social reward. These results suggest that previous social experience can affect the subjective perception of different reward types, and that the subjective valuation of an exit reward may uniquely increase with repeated testing.

Who's hogging the brush? Exploring pig brushing behaviour in a commercial environment

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Scratching and rubbing behaviour are observed in pigs in natural and commercial environments. Pigs rub against trees, fences, and pen fixtures, but research on the purpose and welfare implications of this behaviour remains limited. While studies have examined human-applied scratching of pigs, little is known about pigs' self-scratching behaviour. Brush behaviour is well-studied in cattle, and brushes are thought to improve cow welfare by facilitating self-scratching behaviour. However, research on brushing behaviour in pigs is, to the best of our knowledge, absent. This study aimed to assess if brush behaviour occurred in group-housed gestation sows provided access to a mechanical brush. Secondary aims were to assess where on the body pigs brushed, if all individuals used the brush and which parts of the day brushing behaviour was most prevalent. A loosehoused group of 29 individually marked sows of commercial breeds was housed with access to an automatic feeder and deep straw bedding. One mechanical brush (designed for pigs) was installed in the pen, along with two cameras covering the brush area. Ethograms were based on those previously used in cattle and on pilot observations of pig brushing. Brushing and brushed body regions (front (head/neck), front-middle (in between front and middle), middle (back and sides), middle-back (between middle and back), or back (hind)) was extracted using behaviour sampling and continuous observation across the observation period (two continuous weeks in February 2025). Preliminary results from 20% of the full period (72h, three continuous days) show that pigs brushed in total 156 times, on average 15 seconds (Max: 76; Min: 2) per time. Two sows never brushed over the observation period, and 14 sows brushed more than 5 times. The summarised distribution of areas brushed was; front 16.5%; front-middle: 23.8%; middle: 29.3%; middle-back: 21.3%; back: 9.2%. The distribution of brushing events varied over the day, with most events occurring between 8.00-9.00 a.m. (14.1%) and 7.00-8.00 a.m. (11.5%) and the least between 2.00-3.00 p.m. (0.6%) and 7.00-8.00 p.m. (0.6%). These first preliminary results indicate that pigs engage voluntarily in brushing, and although the behaviour in pigs varies from the behaviour in cattle, both species may perceive a brush as enriching. More long-term studies of brushing behaviour in pigs related to production parameters as well as measurements of affective states while brushing, would be beneficial to elucidate if mechanical brushes can be an enrichment tool for pigs housed in commercial settings, potentially benefitting their welfare.

Oxytocin and cortisol concentrations in milk from dairy goats with different social environment

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This study investigated how social housing conditions affect milk concentrations of oxytocin (OT) and cortisol (CORT) in dairy goats, and how these hormones relate to offspring development. Twenty Alpine dairy goats (10 per group) were housed under either high (HD) or low (LD) stocking density conditions in grouped pens of equal dimensions and flooring type. Milk samples were collected weekly over four weeks postpartum during two routine farm practices: machine milking and kid suckling. Milk OT and CORT concentrations were quantified using ELISA, and the body weights of 38 goat kids (offspring) were recorded from birth to weaning. Mixed linear models with repeated measures and regression analyses were used to examine the effects of housing condition, litter size, and milking order. Goats in the LD group had significantly higher milk OT concentrations (estimate: 297.5 pg/mL) and lower CORT concentrations (0.65 µg/dL) compared to those in the HD group (OT: 211.0 pg/mL; CORT: 1.15 µg/dL; $P < 0.05$). Kid growth was positively associated with milk OT (HD: $t = 3.02$, $P = 0.01$; LD: $t = 2.37$, $P = 0.04$) and negatively associated with CORT in the HD group ($t = -2.22$, $P = 0.04$). Higher litter size was associated with increased milk CORT concentrations ($\beta = 0.42 \pm 0.17$, $P = 0.02$), but showed no significant relationship with kid growth ($P = 0.38$) or milk yield ($P = 0.41$). These findings indicate that milk OT and CORT concentrations are shaped by social housing conditions and are associated with kid growth, supporting their use as physiological indicators of welfare in dairy goats.

Tail and tunnel handling in female C3H mice: effects on behavior, eye- and tail temperatures

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Tail handling has been found to be more stressful than tunnel handling in laboratory mice. Some studies show that infrared thermography (IRT) might be used to get an indication of acute stress. The aim of the present study was to examine if tail handling was more stressful than tunnel handling in C3H mice (by measuring behavior in a voluntary interaction test, VIT) and examine if this is also reflected in eye and tail temperature changes as measured with IRT. Female mice (C3H/HeNCr1) were habituated to handling by either the traditional tail handling method (n=12), a tunnel handling method (n=12), or were not handled (n=6) for nine daily sessions. At three timepoints VIT (during 5 minutes measuring interaction time with the handlers hand in the home cage) and home cage IRT measurements were performed: baseline (T1), after 4 habituation sessions (T2) and after 9 habituation sessions (T3). From the 50 minutes home cage recordings suitable thermal images were selected at set timepoints before handling and after handling (handling at timepoint 20 minutes). Eye and tail-base areas were selected using software (FLIR) and from this temperature data was analyzed. VIT results indicated that tunnel handled mice spent more time interacting with the handler than tail handled mice after 4 and 9 habituation sessions (T2: 12,2% vs. 3.7%; T3: 18,6% vs. 3,6% of total test time, Linear Mixed Models trial*group effect $p < 0.001$). Eye temperature data showed increases after handling (from ~35 -35,8°C in 5 minutes, time effect $p < 0.001$) and tails showed increases and after that quick decreases in tail temperature in comparison with the controls on T1 (LMM time effect and time*group effect $p < 0.001$). Only on T3 there appeared to be a trend for a higher eye temperature response in tail handled mice in comparison with tunnel handled mice and control mice (group effect $p = 0,069$) but no significant trial*group interaction (LMM $p > 0.05$). As was expected from published data in other strains, tunnel handled C3H mice showed less fear of a human hand than tail handled mice. IRT measurements seem to support the conclusion that tunnel handling is less stressful, although only a trend for a difference in temperature responses was found. Methodology and further validation steps of the IRT method will be discussed.

Evaluation of alternatives to straw bedding for grower and finisher pigs commercial in indoor systems

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Rooting and exploration are essential behavioural needs for growing pigs, and failure to meet them may lead to abnormal behaviours such as tail biting, particularly in undocked pigs. Straw bedding is regarded as the “gold standard” for meeting these needs in indoor systems, but there is increasingly poor availability in some countries. This study aims to evaluate Woodchip and Sawdust as alternative bedding materials to Straw for grower and finisher pigs, by assessing their potential to reduce tail damage and agonistic behaviour by better meeting behavioural needs. Ninety-six undocked grower pigs were housed in pens of 8, randomly assigned to one of three bedding treatments: Straw (control), Sawdust, or Woodchip, from 8 to 19 weeks of age. Each treatment was balanced by sex and weight. Wet and soiled bedding was removed twice per week, and the beds were topped-up as required to maintain a depth of 5 cm. Data on 22 different behaviours (importantly tail-in-mouth, agonistic (head butting, ramming, chasing and biting), substrate manipulation and lying behaviours) were collected through post-hoc video analysis using continuous focal sampling. Tail lesions (presence or absence of damage including bitemarks, swelling or open wounds) and cleanliness scores (estimated % of pig covered in manure or urine) were obtained weekly. Effects of bedding type on tail lesions and all other data were analysed using logistic and linear regression, respectively. Pig and pen were included as random effects in all models. No significant differences were found between Straw, Sawdust and Woodchip in relation to the time spent in tail-in-mouth ($0.09s \pm SE 0.047$ vs $1.2s \pm SE 0.066$ vs $0.06s \pm SE 0.066$, $p=0.61$), agonistic ($6.2s \pm SE 1.37$ vs $4.9s \pm SE 1.93$ vs $5.12s \pm SE 1.93$, $p=0.77$), substrate manipulation ($39s \pm SE 3.8$ vs $33s \pm SE 5.4$ vs $31s \pm SE 5.4$, $p=0.27$) or lying ($152s \pm SE 6.2$ vs $151s \pm SE 8.7$ vs $155s \pm SE 8.7$, $p=0.92$) behaviours. There was significantly less tail damage in both Sawdust ($0.25 \pm SE 0.03$, $p<0.001$) and Woodchip ($0.28 \pm SE 0.03$, $p=0.01$) compared to Straw ($0.36 \pm SE 0.02$), and pigs were significantly cleaner in Sawdust ($5\% \pm SE 1.3$) than in either Straw ($11\% \pm SE 0.9$, $p<0.001$) or Woodchip ($15\% \pm SE 1.3$, $p<0.001$). These findings confirm that Sawdust and Woodchip are suitable alternatives to Straw, as they do not significantly differ in terms of agonistic, resting, and substrate manipulation behaviours, and demonstrate potential benefits in reducing tail damage and, in the case of Sawdust, improving cleanliness.

From a pile of videos to a pile of hens?

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In the Netherlands, laying hens are commonly kept in flocks of thousands in cage-free systems. In order to measure aspects related to animal welfare, research traditionally focusses on smaller groups of hens. To make the step towards larger flocks, Computer Vision could provide a useful tool to measure behaviour of interest over long periods of time. Computer Vision allows the detection and tracking of hens without identification. Applying Computer Vision with additional methods for identification would allow us to study interactions between individuals over time. Here, we focus on piling behaviour, which is described as three or more mostly immobile hens standing in close proximity, with most hens facing in the same direction. The aim of the present study is to find indicators related to piling behaviour based on position data of group housed laying hens. To collect information on the individual level, ArUco marker backpacks could enable tracking and identification in laying hens. In developing this method, we have shown that using these backpacks in small groups of hens, we were able to identify 94.0% of the individuals and track them 75.6% of the time they were visible. In the current study, we used Computer Vision in combination with these markers to track activity, proximity and space use in a semi-commercial flock. In our semi-commercial setup, we housed 12 pens with 135 Dekalb White hens each and captured video over 3 months from 3 different camera perspectives. The hens were equipped with lightweight paper backpacks, with a printed ArUco marker. First, from a selection of over 5000 hours of video, we extracted Bounding Boxes with a FairMOT algorithm, a form of Computer Vision which recognizes hens and tracks them for a period of time. For identification, we linked the backpack numbers to the Bounding Boxes from the Computer Vision algorithm. We first described daily patterns and pen differences. The analysis of the data is still ongoing. First results indicate that the current performance of our tracking algorithm does not provide the detection levels required in practice. To reach that level of performance, we would need to include additional training data.

Early detection of calf diarrhea using sensor technology

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The objective of this experiment was to assess if early signs of calf diarrhea could be detected using different technologies, for welfare improvement and efficient monitoring of animals. This study was conducted at an experimental dairy farm from September to December 2024. A total of 69 dairy calves (Holstein, 3-25 days old) born at the farm were used. Calves were distributed into 3 Pens (22-25 calves per pen) according to their birth date. At 3-7 days of age, each calf was fitted with two different types of sensors: GoChip (Victoria, Canada) and IceQube (Stirling, Scotland) which record a measure of activity (motion index) and steps taken, for 16 days. Milk consumption of individual calves was automatically recorded via automatic feeders. Behaviour was recorded via video-cameras and analysed using an ethogram and scan sampling to allow comparison with the sensor data. Once a day, rectal temperature and clinical signs of diarrhea in individual calves were scored based on a scoring system (including the Wisconsin method of diarrhea scoring, skin tenting for dehydration, depression for behavioural signs of sickness). We set 'day 0' as being when clinical symptoms were first observed and analysed behavioural changes across the period from 3 days prior to day 0 and three afterwards. Behavioural differences between healthy and sick calves were analysed using Linear Mixed Models in RStudio. There were significant effects of day on rectal temperatures ($p < 0.001$). With clinical scores, significant differences in faecal scores were identified over days ($p < 0.001$). The mean motion index ($p = 0.024$) and steps ($p = 0.011$) from the IceQube sensors, and motion index from GoChip sensors ($p = 0.01$) were significantly different between days. For the clinical scores, faecal scores were positively correlated with the skin tent scoring and depression ($r = 0.57, 0.46$, respectively). Steps from IceQube ($r = -0.46$) and Gochip ($r = -0.43$) were negatively correlated with total clinical scores, which could be used as a potential enhancement to human observation. The peak correlation between sensors and human observation occurring at day -1 is when total clinical scores are generally high for all calves. The two sensors detected changes in activity associated with clinical signs. Indicating that using technology could be beneficial in helping stock workers detect signs of animal disease.

Piglets play more when sow is free, all other things being equal

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Temporary crating (TC) refers a management practice that involves crating the sow for the first few days after farrowing but then allowing her to freedom of movement throughout the lactation pen for the remainder of the lactation period. 2) It is argued by some that limiting the days where the sow is crated during lactation is critical for good welfare but little is known on how this type of limiting crating impacts piglet welfare during the nursing period. In this study, we recorded play behaviour of 10 litters up to 26 hours after crate opening on Day 4 postpartum and compared it with 6 litters in identical lactating pens (6 m²) with permanent crating. We split the evaluation period into first 4 hours after crate opening (Period 1, Day 4, 10.00-14.00) and later hours until Day 5 at 14.00 (Period 2). During the first Period 1, there were no significant differences in play between TC and PC piglets. During Period 2, TC piglets played more than twice as much as PC piglets (TC: 2.29 % of time vs PC 0.98 %, t-test: $t=2.66$, d.f.=14, $p=0.019$, large effect size by Cohen $D=1.37$). All four major types of play (solitary motor, object, piglet-piglet play, piglet-sow play) were higher in TC than in PC during Period 2, with the difference being significant in piglet-piglet play (TC: 1.47 % of time vs PC 0.48 %, t-test: $t=3.36$, d.f.=14, $p=0.005$, large effect size by Cohen $D=1.73$) and object play (TC: 0.06 % of time vs PC 0.00 %, t-test: $t=2.44$, d.f.=9, $p=0.038$, large effect size by Cohen $D=0.96$). Our results are among first to show that increased sow movement achieved by removing the crate by day 4 postpartum increases piglet play behaviour, with the greatest increases observed in social piglet-piglet play. This increase in play behaviour was maintained throughout the nursing period and thus is not simply a temporary response to the crate removal. We speculate that the ability of the sow to move around the lactation pen, facilitates the presence of open spaces which maybe a requirement for piglets to initiate play. In conclusion, removing the grate facilitate movement of the sow which in turn provides opportunities for the piglets to engage in play behaviour, thus contributing to their positive welfare.

Cognitive enrichment for laying hens: A pilot study

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Cognitive enrichment is a type of enrichment that takes advantage of animals' existing cognitive abilities by providing animals opportunities to solve problems and control some aspects of their environment. There are almost no studies on cognitive enrichment in poultry, although many studies have demonstrated cognitive abilities in chickens that could be used. Building on our experience with touchscreen operant chambers for laying hens and knowledge from avian studies, our aim is to construct an automated learning device for laying hens. The voluntary use of the device by unrestrained hens will offer them an opportunity of controlling part of their environment. We hypothesise that a voluntary positive reinforcement training, reward that can be accessed by solving a cognitive problem, will enhance the welfare of hens. Crucial components of the learning device are one-way entrance roll-up doors, allowing access to the device to only one individual, a radio frequency identification system using custom developed leg bands, and a central main chamber with touchscreen and food dispenser for the reward delivery (dried mealworms). The main chamber contains a session termination mechanism, to prevent individual hens from monopolizing the device. The belt conveyor system gently forcing the hen to leave the system via the exit roll-up doors after longer inactivity or predefined time limit will be tested. The whole system will be controlled by a single-board computer. Cognitive tasks (operant visual discrimination tasks, e. g. discrimination stimuli of different colours or shapes) will be controlled by the Biopsychology-Toolbox, an open-source Matlab toolbox. The automated learning device will be placed in a deep litter pen with a group of laying hens. At this stage, we are testing the functionality of distinct parts of the system. The use of the prototype device will be monitored by behavioural observations of hens in the home pen and in the main chamber (number of entrances, duration of stay in the device and part of day when the device will be used), and by the analysis of performance in cognitive tasks (proportion of obtained rewards). The next step will be to test the hypothesis, that the voluntary participation of unrestrained animals in the learning environment can improve the behavioural competence of laying hens in challenging situations and may have beneficial effects on their welfare.

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Optimizing enrichment strategies to enhance hen longevity

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The Interreg NWE OMELETTE (NWE0200174) project aims to improve hen longevity for a more sustainable and resilient egg production system in North-West Europe. Enrichment materials play a crucial role in maintaining hen welfare throughout their extended lifespan. At facilities of the Experimental Poultry Center (Geel), field tests are conducted on a semi-commercial scale to evaluate optimal practices and the impact of various enrichment materials on laying hens. By analyzing usage, consumption, preferences, and habituation, the project seeks to determine the ideal timing for replacing enrichment materials to maintain their effectiveness and promote positive behaviors. Experiments take place in eight pens with aviary housing and no outdoor access. Two pens house 960 Dekalb White hens each, two house 960 ISA Brown hens each, and the remaining four pens accommodate 1325 Warren Brown hens each. The hens are fed in five time slots distributed throughout the light period, from dawn (03:00) to dusk (18:00). Alfalfa hay bales and pecking stones are provided ad libitum in each pen. Overhead Dahua cameras (DH-SD1A203T-GN) capture top-down images of the free-range area where enrichment materials are placed. Forty-eight images are taken at 30-minute intervals daily, creating time-lapse sequences to analyze hen interaction patterns. The project quantifies and tracks hens actively engaging with enrichment materials. Images were recorded from 23 October to 11 November 2024. Hen interaction peaked at 16:00, with an average of 8.3 ± 2.1 hens. To facilitate analysis, the day was divided into five periods: dark (before 03:00 and after 18:30), pre-work (03:00–07:30), morning shift (08:00–12:00), afternoon shift (12:30–15:00), and post-work (15:30–18:00). Interaction with the pecking stones varied across these periods, with no interactions during dark hours (0.0 ± 0.0 hens). Engagement increased steadily throughout the day: 2.2 ± 1.7 hens during pre-work, 2.9 ± 1.8 during the morning shift, 4.6 ± 2.3 in the afternoon shift, and 7.4 ± 3.7 hens during post-work. These findings highlight the increased interaction with pecking stones in the late afternoon. While this period coincides with the eggshell calcification phase in the oviduct, further research is needed to determine the exact drivers of this behavior. Providing enrichment materials at appropriate times may support hen welfare by encouraging engagement and reducing inactivity. Future work aims to automate hen counting, enabling continuous monitoring of enrichment use. This automation could help detect shifts in daily consumption patterns, offering potential for early detection of flock deviations and improved poultry management.

Tricky trainees and troubled teachers: challenges in live laboratory animal handling classes

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Researchers need training to develop adequate competence before using animals in experimental procedures, and it is also a legal requirement in many jurisdictions. Such training needs to include handling of and procedures on laboratory animals of the same species that the researcher will later do experiments on. Even though they may prepare on mannequins, there will always be a first time for inexperienced handlers to practise on living animals, either in classes or in individual practice “on the job”. This is never an easy situation and can sometimes be extremely challenging for all parts – teachers, trainees and animals. Most of these trainees learn to work with animals as a necessary skill for conducting their research rather than because they are interested in working with animals. Based on our experience of teaching >50 students yearly during 15 years, we have identified typical challenging situations which we have subsequently discussed with other trainers (n=10) in our institution in a workshop format in order to validate descriptions and discuss best teaching practice. Some of the challenges are technical, the most common being trainees with previous experience who have learned or developed an incorrect way to perform (part of) the task. However, the most common and also most difficult challenges most likely involve affective factors. This is obvious in the case of trainees who react with aversion when asked to handle the animal, and trainees who react with strong emotional distress when required to perform invasive procedures. However, also what comes across as a problematic attitude may be stress-related. Disengaging with the class, disregarding and even questioning instructions or claiming already knowing how to do the procedure, are recurrent in these scenarios and may be an attempt to escape the situation. Even reckless handling may be a result of fear and anxiety rather than a lack of respect for animals. Whereas the problematic situations represent a minority of the students, they may nevertheless have a large impact especially in group teaching where there is emotional contagion between trainees. Trainers report this to be very frustrating and stressful also for them. Trainees may not be aware of how they will react and speaking openly about this before practical classes is helpful. However, for students whose aversion or reluctance is very strong, it seems justified to ask whether they should be in a laboratory animal science course at all.

Size does matter – a visual discrimination-based judgement bias task for pigs

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In farm (and lab) animals, there is an increasing demand for valid welfare monitoring tools. Cognitive bias tests provide a proxy measure of affective valence, which plays a central role in animal welfare, but current methods for testing judgement bias do not allow for an easy use on-farm. Therefore, it is our aim to develop an automated judgement bias task for pigs that can ultimately be implemented in the normal housing environment and enable self-initiated training and testing. As a proof of concept, we conducted a series of pilot studies, where we established a methodology for testing judgement bias based on a visual discrimination task. Experiments were approved by the local authority (LALLF M-V ref. no. 7221.3-18196_21). In an experimental pen, we investigated whether pigs (female, 4 wks old at beginning, n=23) can discriminate visual cues of different lengths (5cm vs 25cm) in an active choice paradigm, and whether they perceive intermediate stimuli (10, 15 and 20cm) in a graded way. Counter-balanced across subjects, the pigs had to learn to associate cue length (long vs short) with choice of buttons (left vs right) and reward size (small vs large); e.g. 5cm – left button – 2ml applesauce vs 25cm – right button – 5ml applesauce. Pushing the wrong button resulted in a 30 sec timeout. In the final two pilot studies, 4 out of 12 and 6 out of 11 subjects reached the learning criterion ($p < 0.05$ for two consecutive days in sign-tests calculated per training day per subject) within 16 to 37 training days (median: 20.5; 18 trials/subject/day). In the successful subjects, the probability of optimistic choices (choosing the button associated with a large reward) showed a linear decrease from the positive cue, along the intermediate cues to the negative cue. The successful discrimination between reference cues and graded responses to intermediate probe cues are the key prerequisites for any judgement bias task. In conclusion, we could prove that visual discrimination tasks can be used as a basis for a judgement bias test paradigm in pigs, laying the groundwork for a new approach to assessing affective valence. In the future, we will develop an automated learning apparatus to implement in the housing environments of fattening pigs and breeding sows. The apparatus shall enable self-initiated learning and automated testing, and thus be a valuable tool for the assessment of affective states as part of welfare monitoring.

Sexually dimorphic symptoms of happiness: using rat tickling to investigate the biology of positive welfare and resilience

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Positive animal welfare relates to animals having a good life with positive effects on their resilience. Here we used laboratory rats to investigate physiological correlates of positive affect; through rat tickling, a heterospecific play model, we induced positive affective states, as measured by total 50-kHz UltraSonic Vocalisations (USV) emissions. Pinning refers to placing the rat on its back and tickling its belly. Previously, we tested the confirmatory hypothesis that, compared to a standard tickling protocol with 4 pins/session (P4), playful forms of tickling with fewer pins (0 or 1 pin/session; P0 or P1) would be preferred by juvenile Wistar rats. We identified sexual dimorphism in tickling preferences; males showed no tickling treatment preference over non-handled controls (C), whereas females prefer P1. In the same experiment, following 6 tickling sessions (males/females, C/P0/P1/P4, n=16/treatment, N=128), we tested for anxiety-like behaviours (Elevated Plus Maze, EPM, and Open Field, OF). We also carried out biological sampling to test exploratory hypotheses on the impact of tickling on stress and resilience markers (fecal corticosterone metabolites (FCM), and caecal microbiota). We sampled fecal pellets before and after the 6 tickling sessions (time points (T) 1 and 2), and after EPM and OF testing (T3). We measured the FCM 5 α -pregnane-3 β ,11 β ,21-triol-20-one. We assessed the treatment impact on gut microbiota by extracting DNA from caeca and sequencing the V4 region of the 16S rRNA gene. We present evidence for physiological and microbial changes, in a treatment- and sex-dependent fashion, and propose these provide indications on the effects of tickling on the physiology of resilience. There were no treatment-induced differences in EPM and OF behaviours. We found sex- but no treatment-effect on CORT at T1 and 2. Post-exposure to the EPM and OF (T3) males, but not females, differed by treatment group, with controls showing the highest levels of FCM. This suggests a sex-dependent stress-protective effect of tickling in males but not females. For gut microbiota, a linear mixed model showed a significant sex-treatment interaction, with treatment differences in females but not in males. We found increases in *Turicibacter* spp. in the groups treated with the forms of tickling preferred by the females. Little data is available on physiological and microbial changes that characterise positive welfare states; these results support rat tickling as an approach to investigate how positive experiences shape the physiological-microbial axis with a view to improving welfare and resilience to challenges.

Evaluating scratching brush use in pasture-based dairy heifers

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This study investigates the use of scratching brushes by pasture-based dairy heifers, focusing on the frequency of use and the value placed on access to the brushes. Scratching is a natural behaviour in cattle and is thought to contribute to positive mental state by fulfilling grooming needs and providing sensory stimulation. Our research aims to determine whether interactions with a scratching brush could serve as a potential indicator of positive mental state in dairy heifers. We conducted the study on six groups of eight pasture-based pregnant kiwi-cross dairy heifers during the Autumn in Hamilton, NZ. After an initial five-day familiarization period with stationary scratching brushes constantly accessible to the heifers within a break-fed paddock, access was blocked for three days in three of the six groups, followed by reintroduction for three days to assess rebound behaviour towards the brush. Interactions with the brush were recorded using overhead video cameras, capturing contact, and proximity to the brush, and agonistic behaviours including displacements. The heifers also wore Cow-Manager ear tags and IceQube sensors to measure time budget behaviours throughout the study. Preliminary results indicate that after reintroduction of the brush heifers who had been deprived showed an increase in grooming time (average 67.6 ± 40.28 mins, $n=3$ groups) compared to continuous access (37.63 ± 3.93 mins, $n=3$ groups). However, this result was largely driven by a single group. There was also considerable individual variation in brush use. All heifers except one interacted with the brush at some point during the study, while some heifers interacted with the brush over 300 times within the 11-day study period. However, heavy rainfall occurred during the rebound phase, which may have influenced scratching behaviour. Traffic around the brush created mud, and heifers were seen to use the brush as a windbreak or as shelter from the rain, standing or lying near or next to it but not scratching. Future research should consider how weather conditions affect brush use and whether access remains equally valued under varying environmental conditions. These findings highlight that pasture-based dairy heifers value access to scratching opportunities. We believe scratching brush use shows promise as an indicator of positive mental states, but further research is needed to assess its reliability in variable outdoor conditions and to investigate individual preferences.

A systematic review and meta-analysis of lameness scoring methods and the prevalence of lameness and claw disorders of dairy cows in North-West Europe

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Lameness in dairy cows is associated with claw disorders and pain and constitutes a major welfare issue. Studies worldwide assess lameness using different scoring methods and report widely varying prevalences. Since part of this variation might be due to the different scoring methods and used cut-off values for what constitutes lameness, we created a comparative lameness scale (WQE; Welfare Quality Equivalent; modeled after the Welfare Quality methodology), with the aim to directly compare outcomes of studies using different scoring methods and to provide insight into the prevalence distribution of lameness and claw disorders in North-West Europe. A second aim was to inventory associated risk factors. We identified studies performed in North-West Europe in the last 25 years, in which cows were scored for lameness and/or claw disorders, and which fulfilled a set of inclusion criteria relating to housing and study methodology. We selected 53 studies reporting lameness prevalence and 32 reporting claw disorder prevalence. Cow-level prevalence of lameness reported by studies ranged between 2.6 and 63.7%, and that of claw disorders between 0 and 92.0%. The claw disorder most reported was digital dermatitis, for which prevalence across studies ranged between 2.8 and 52.5%. A random-effects model was used to describe the lameness distribution defined on the WQE scale and estimate weighted average lameness prevalences. Prevalence estimates were 28% (95% CI 23-33%) for lameness, and 15% (95% CI 10-20%) and 10% (95% CI 5-14%) for 2 different definitions of severe lameness. Subgroup analyses were performed to explain high heterogeneity between studies, and although unexplained heterogeneity remained, lameness prevalence estimates differed between country and pasture access subgroups. Finally, we inventoried risk factors for lameness and claw disorders reported in North-West Europe using 38 studies on lameness and 24 studies on claw disorders. Risk factors consistently associated with lameness included absence of pasture access, floor characteristics, hard lying surfaces, low body condition score and higher parity. In this meta-analysis, we compared outcomes of prevalence studies using different lameness scales and showed high variability in lameness prevalence. We encountered sparse reporting of detailed information of herds, and subjective language and short descriptions in the reported lameness scoring systems. This posed challenges for interpreting study results and creating the WQE scale which may have impacted estimates. Our findings highlight the need for more large-scale observational lameness prevalence research using a standardized way of assessing lameness and detailed reporting.

Factors contributing to the prevalence of dairy cow lameness in selected milk shed areas of Bangladesh

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Lameness is a condition characterized by gait alteration resulting from pain caused by injury or disease to the hoof or limb. Lameness is a common problem in dairy cows and can significantly affect the welfare and productivity of the animals. Despite the apparent serious impact of lameness on the performance of cattle and recent growth in the dairy sector, little attention has been given to the study of lameness in Bangladesh. In addition, Bangladeshi dairy farmers often underestimate lameness occurrence and their lack of knowledge of lameness- causing risk factors and foot health management. Therefore, the objectives of this study were to estimate the prevalence of lameness, identify the risk factors associated with lameness, and assess the effect on milk production of lactating cows among dairy herds. A cross-sectional study was conducted on 643 randomly selected cows from 30 dairy herds in Pabna and Sirajganj districts, the highest milk-producing areas in Bangladesh. Data regarding lameness and its possible risk factors were collected both at animal and farm levels using a questionnaire by two trained veterinarians. Data were collected from farmers, with inclusion criteria of having at least five cows with dairy farming experience of more than six months. A five-point locomotion score was used to assess lameness in cows, with score 1 representing normal gait and score 5 indicating severe lameness. The logistic regression was applied to assess the prevalence of lameness and its association with potential risk factors. Out of 643 dairy cattle examined, 107 (16.64%) showed lameness in different grades, with 58.0% mild, 29% moderate, 11% lame, and 2% severely lame. Lameness was significantly associated with floor type, concentrate feed, parity, pregnancy, and milking status ($P < 0.05$). The study revealed that lameness mainly occurred due to hoof disorders like overgrowth/lesions/cracks (20.56%) and carpal/tarsal joint lesions (14.95%). Lameness was significantly higher in hind limbs (13%) than in forelimbs (3.5%). In addition, the study revealed that the mean daily milk yield (av. 11.46 L/day/cow) was significantly reduced (av. 9.38 L/day/cow) after the onset of lameness in milking cows. Lameness was found to be an important disease in dairy cows in selected study areas; thus, farmers' awareness regarding the impact of lameness on cows should be improved. Prevention and early diagnosis leading to prompt treatment of lameness in cows should be part of dairy farm management practice to reduce the prevalence of lameness.

The association between body weight and hip and elbow dysplasia in Labrador retrievers of companion and gundog type

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Hip and elbow dysplasia (HD, ED) are common orthopaedic conditions in dogs, developing during growth and frequently resulting in chronic lameness and pain due to secondary osteoarthritis. High body weight (BW) is a proposed risk factor for HD and ED, and large fast-growing breeds such as Labrador Retriever (LR) are predisposed. There are two LR types: companion and gundog, with gundog having a leaner body type. The study aimed to evaluate associations between breed type, BW and HD/ED in LRs. This cross-sectional study included 12-24 months old LRs, radiographically examined for HD and ED within the Swedish Kennel Club's screening program during 2007-2016. HD was graded A-E and ED 0-3, respectively. LRs were classified as gundog and companion type based on registered kennel names. Analysis of variance (ANOVA) and t-test were used to compare BWs, and two proportion test to compare prevalence between breed types. Bonferroni correction was applied. The study population included 6,485/6,446 companion LRs and 6,009/5,993 gundog LRs screened for HD/ED, respectively. The total prevalence of HD (grades C-E) was 16.2% and ED (grades 1-3) 9.0%. Companion LRs had higher BW than gundog LRs, and higher prevalence of HD grades C and D and of ED (all grades, $P < 0.05$ after correction). The prevalence of HD increased with increasing BW, and dogs with ED had higher BW than dogs without ED ($P < 0.05$ after correction). Heavier gundogs displayed more severe HD than leaner, although they were less heavy than companion types with grades A and B. In conclusion, the results indicate that low BW potentially could protect from HD and ED, improving the welfare of dogs. Further details about body condition and size would give more information on what constitutes the BW. By investigating interactions between breed type, BW and body composition in relation to disease development, further knowledge that could benefit healthy breeding might be obtained.

Development of a welfare assessment strategy for gene-edited farm animals

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Gene editing involves the use of methods such as CRISPR-Cas9 to create small changes in the genome of organisms. In farm animals, gene editing is thought to be particularly useful for traits that are challenging to alter using conventional breeding methods, such as increasing resistance to disease. Recent legislation was passed in England to outline a regulatory framework that would allow gene edited animals to be brought to market more easily. Similar initiatives are being pursued in other countries. However, there is public concern about the effects of this genetic manipulation on animal welfare. Editing may have major effects on functionality or more subtle unintended consequences, in particularly where an edited gene performs more than one function (pleiotrophy). The aim of this project was to create a welfare assessment framework and lists of indicators allowing a comprehensive assessment of welfare in gene edited animals. The study focused on pigs, poultry and salmon as the breeding companies in these sectors are currently the most likely to use gene editing. A different approach to welfare assessment is required for gene edited animals than that used in on-farm welfare assessment, because rather than assessing the effects of housing and management on welfare, we need to determine whether the edit has affected the biological functioning and behaviour of the animals. The Five Domains framework (Mellor et al 2020) was used because it highlights the main domains of animal function and experience. As the edited gene may be expressed at any stage of development, key life stages of the animals were identified. Using a review of existing welfare assessment protocols and the literature, indicators based on behaviour, health and other aspects of functionality were identified for each of the domains for each of the life stages. In addition, three levels of assessment were created: a basic level that included checks routinely carried out by farmers, a comprehensive level that included more behavioural and mental state indicators and finally an enhanced level that included more advanced methods. For example, for pigs the life stages were immediate and later neonatal period (<12h and 72h), weaner, grower, finisher and reproductive, and lactating adult. The indicators by domain included growth and intake (nutrition), activity patterns (environment), disease (health) and QBA (mental state). This framework is designed to detect any positive or negative effects on the welfare of the gene edited animals.

Growth performance, iron concentration and behavioural response of weaned pigs raised on different bedding materials

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Maintaining weaned pigs on concrete floors is labour intensive, requiring daily cleaning to maintain hygiene. This developmental stage is critical, marked by significant physiological, nutritional, and behavioural changes that impact growth and long-term productivity. Bedding materials can improve welfare by providing warmth, comfort, and reduced pathogen exposure. While straw bedding is well-documented for enhancing comfort and promoting natural behaviours, the effect of alternative bedding material such as clay remains unclear. Therefore, this study investigates the impact of different bedding materials on the welfare and performance of weaned pig. Twenty-seven weaned pigs (Large white × Landrace) were randomly allotted to three flooring treatments: Concrete floor (T1), Wood shaving bedding (T2) and Clay bedding (T3). Each treatment had three replicates with three pigs/replicate in a completely randomized design. Evaluated parameters included weight gain, feed intake, feed conversion ratio (FCR), white blood cell (WBC) counts, iron concentration, skin lesion score, and behaviour (feeding and aggression percentages, monitored via CCTV from 08:00 - 12:00 hours at three-day intervals). Feeding and aggression percentages were calculated as the proportion of respective interactions observed during the total behavioural monitoring period, expressed as a percentage of total behaviour observed. Data were analyzed using descriptive statistics and ANOVA (N=3) at $\alpha_{0.05}$. Pigs on concrete floors (T1) had the highest weight gain (8.48 kg) and lowest FCR (2.95), significantly outperforming wood shavings (T2) (7.77 kg, 3.22) and clay bedding (T3) (7.74 kg, 3.23) respectively. However, feed intake did not differ significantly among treatments. WBC counts were significantly higher in T1 ($12.06 \times 10^3/\mu\text{L}$) and T3 ($12.51 \times 10^3/\mu\text{L}$) than in T2 ($8.46 \times 10^3/\mu\text{L}$). On day 0, iron concentration was significantly higher in T2 (116.00 $\mu\text{g/dL}$) and T1 (113.00 $\mu\text{g/dL}$) than in T3 (110.00 $\mu\text{g/dL}$), while on day 28, iron concentration was significantly higher in T3 (139.00 $\mu\text{g/dL}$) and T1 (137.00 $\mu\text{g/dL}$) than in T2 (109.00 $\mu\text{g/dL}$). By day 56, pigs on T3 (147.00 $\mu\text{g/dL}$) had the significantly highest iron concentration, followed by T1 (133.00 $\mu\text{g/dL}$) and T2 (117.00 $\mu\text{g/dL}$). Skin lesion scores ranged from 0.56 (T3) to 0.11 (T2), while feeding behaviour was highest in T2 (90.91%) and lowest in T3 (78.26%). Aggressive behaviour was lowest in T1 (0%) and highest in T3 (21.74%). The study concludes that concrete flooring (T1) optimizes growth performance, wood shavings (T2) enhance welfare, and clay bedding (T3) improves iron absorption but poses significant welfare challenges due to increased aggression and skin lesions.

Activity and social behaviour of cows in Swiss dairy farming with confinement or pasture-based strategy

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In Switzerland, two opposing dairy production systems can be found. In the confinement-based system (CB), high-yielding dairy cows are fed a mixed ration in the barn throughout the year with access to a pasture for animal welfare. In the pasture-based system (PB) dual-purpose cows are grazing during the vegetation period and fed mainly grass silage or hay during the rest of the year. This study aimed to compare the activity and social behaviour in the two systems throughout one year. Thirty herds, 15 of each system, were observed four times (late spring, summer, winter and early spring) after one hour of the morning milking. The activity was assessed by counting the number of cows eating, standing and lying per area (e.g. cubical area or pasture). The two areas with the most cows present were chosen to observe the social behaviour (each area 10 min), by assessing the frequency of head butts (times per cow and hour), displacements, chasing, fighting, chasing up and social licking, according to the Welfare Quality[®] protocol. The assessments were conducted three times per morning with one hour break in between. Activity (% of herd) was analysed by a linear mixed model. Social behaviour showed low incidence. Thus, only displacements, head butts and social licking were analysed with a mixed logistic regression and a mixed linear model. Over all 360 assessments per system, PB herds showed a higher feeding activity (median±SD) ($56\pm37\%$ vs. $28\pm19\%$; $p<0.001$) and a lower lying activity ($20\pm26\%$ vs. $46\pm19\%$; $p<0.001$), but were standing to a similar extent ($24\pm27\%$ vs. $25\pm14\%$; $p=0.59$) as compared to the CB herds. The PB herds showed (median±SD) less social licking than the CB herds (0.283 ± 0.441 vs. 0.261 ± 0.650 ; $p<0.001$), but no difference was found for head butts (0.063 ± 0.157 vs. 0.050 ± 0.154) or displacements (0.137 ± 0.357 vs. 0.097 ± 0.284). Other assessed social behaviour showed values of 0.008 ± 0.046 vs. 0.003 ± 0.034 for chasing, 0.004 ± 0.035 vs. 0.002 ± 0.028 for fighting, and 0.009 ± 0.058 vs. 0.010 ± 0.052 for chasing up for the PB and CB herds, respectively. Over all four visits, the time cows spent eating and lying differed significantly ($p<0.001$) between the two production systems, but no difference was found for standing or social behaviour, with exception of social licking ($p<0.001$). In conclusion, the PB system does influence the activity but does not seem to impact negatively the social behaviour as compared to the CB system.

By your side - Social support in a Judgement Bias Task decreases stress-related behaviours while not affecting task performance in pigs

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Most farmed species, including pigs, are social animals that are suffering from stress when isolated from their social group members. However, their social needs are mostly ignored in behavioural and cognitive tasks, on which they are trained and tested individually, which may impact their welfare and consequently the validity of test results. We compared training duration, task performance and behaviour of pigs trained and tested on a Judgement Bias Task either in social isolation (ISO, $n = 12$) or with physical and visual contact to social companions through an opening between the test and a neighbouring area, which was covered with wire mesh (SOC, $n = 12$). The JBT is a promising proxy measure of affective state and is based on the assumption that individuals in a positive mood will make more optimistic choices when confronted with an ambiguous stimulus compared to negatively-minded individuals that will decide more pessimistically in such situations. Here we used a spatial Go/No-go Task with active trial initiation, i.e. that pigs were trained to initiate each trial by touching a bell. Data were analysed using (generalised) linear mixed-effect models. Eleven SOC pigs and eight ISO pigs learned the task in 14 to 44 training sessions. SOC and ISO pigs did not differ in the number of sessions they needed to reach the learning criterion ($X^2_1 = 1.04$, $p = 0.31$) or task performance when tested on the JBT ($X^2_1 = 0.77$, $p = 0.38$). However, ISO pigs showed a higher frequency of all behavioural parameters indicative of stress, i.e. high-pitched vocalisation, freezing behaviour, exit approaching behaviour, heavy escape attempts, defecation and urination compared to ISO pigs (X^2_1 between 4.44 and 27.75, all p -values ≤ 0.03). This is a first study systematically comparing the effect of social support on stress-related behaviours and task performance in pigs. Future research should replicate our study in combination with other treatments, for example different housing conditions, to investigate potential interacting effects between social support and treatment on learning and task performance. Several open questions remain, e.g. with respect to the qualities of a good social companion, but the strong behavioural differences between SOC and ISO pigs call for more attention towards the use of companion animals to decrease the stress and thus improve the welfare of pigs and other social animals in behavioural and cognitive tasks.

Can a one-shot session of a spatial discrimination task inform us on the affective states of pigs?

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The assessment of cognitive biases has emerged as a promising approach to evaluate affective states in farm animals. However, existing methods are time-consuming and challenging to implement in farm facilities. To address these limitations, we adapted the spatial judgement bias task into a single training and testing session. We individually tested 114 piglets aged 65 ± 5 days. They were split in two contrasted housing conditions: minimal (MIN) versus enriched (ENR), intended to elicit different welfare experiences and corresponding affective states. ENR pigs were born in free-farrowing system with early sociabilisation and had access to a variety of enrichments from birth onwards: extra space, rooting materials, play objects in regular rotation, feeding toys, music and daily petting. MIN pigs were born in conventional farrowing systems equipped with a single rope and a plastic chewing ball. The one-shot spatial discrimination task (SDT) took place in a testing arena to which the pigs were habituated. The SDT consisted in the association of one corner of the arena (left/right) with a positive outcome (grenadine syrup) and the other corner with a negative outcome (air puff). The SDT was a one-shot testing session consisting of 19 training trials (11 positive, 8 negative, pseudo-randomly ordered) and 1 final ambiguous trial (at equal distance from the positive and negative corners). The piglets had a maximum of 30s to respond to each trial. We extracted approach behaviours and their associated latencies. We also included the number of escape attempts and occurrences of defecation as indicators of a fearful response. We estimated the proportion of pigs who managed to learn the task, and the proportion of pigs who approached during the ambiguous trial. Preliminary results on 74 individuals (37 ENR, 37 MIN) suggest a higher success rate for ENR pigs (ENR: $76 \pm 10\%$, MIN: $71 \pm 11\%$, $U=348$, $p=0.04$), with 11 individuals that stopped participating before the end (3 ENR, 8 MIN). Among the 63 pigs who completed the test, 36 had an approach response to the ambiguous trial (17 ENR, 19 MIN) and 27 had an avoidance response (17 ENR, 10 MIN). The training success rate shows that pigs are able to learn the discrimination task in a one-shot session. However, the response to the ambiguous cue did not seem to be affected by housing conditions. These results suggest that the test might not reflect affective states or that the contrasted housing conditions did not induce a cognitive bias in piglets.

Judgment bias in turkey (*Meleagris gallopavo domestica*) when housed in a small versus very large group

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Poultry is often housed in very large groups of thousands, raising societal concerns about large-scale farming. Such group sizes may hinder the formation of stable social bonds, potentially affecting animal welfare. This study aimed to assess how turkeys perceive housing in large versus small groups. We hypothesized that turkeys separated from a large group to a small subgroup would exhibit a more positive judgment bias than those remaining in the large group. From a flock of approximately 1,000 turkeys kept under commercial conditions, a convenience sample of 14 focal birds was selected, individually marked for recognition, and trained to distinguish a positive stimulus (S+), a black feed bowl containing feed, from a non-positive stimulus (S-), a white feed bowl without feed. A partition was then installed in the barn, separating a group of 70 birds from the remaining flock. For various reasons only ten of the focal birds were available for final testing. They were equally divided between the large and small groups. All focal birds switched groups two weeks before testing began. Total space, feeder space, and drinker-to-bird ratios were kept identical across both groups. Judgment bias testing involved presenting an ambiguous stimulus (MS, a grey bowl), along with S+ and S-, across six sessions, each consisting of nine trials per day over eleven days. Testing started ten days after the focal birds had been placed in their respective groups. A linear mixed model (latency = GROUP + STIMULUS + GROUP * STIMULUS + bird + error; capital letters = fixed effects, lowercase = response/ random effects) accounting for repeated measures revealed that birds approached S+ significantly faster than S- ($p < 0.05$), with no significant group differences for either stimulus (both $p > 0.05$). Contrary to our hypothesis, birds in the large group approached the ambiguous stimulus (MS) significantly faster (least square means $\pm$ SE: 12.1 ± 1.2 s; $p < 0.05$) than birds in the small group (20.4 ± 1.2 s). Results were comparable for the go/no-go response, indicating a more positive judgment bias in birds housed in the large group. While these results require replication in other flocks to account for potential flockspecific factors, they are consistent with findings from our comparable study in pigs. These preliminary results suggest that turkeys' mental welfare may initially be more compromised in smaller groups than in very large ones—possibly due to reduced total space and/or fewer opportunities to avoid negative social interactions in smaller groups at a given stocking density.

Animal caretaker perceptions and experiences of the use of local anaesthesia in piglet castration in Finland

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Male piglets are routinely castrated to prevent boar taint in pork. Surgical castration causes severe pain, which can be alleviated by using local anaesthesia. In Finland, local anaesthesia in piglet castration will become mandatory in 2027, and only trained individuals can administer it. During the transition period, implementation of local anaesthesia is supported by the state through animal welfare payments. The introduction of local anaesthesia changes castration practices, requiring new skills in piglet medication and increased handling. Research suggests that farmer attitudes are linked to the treatment of pain in animals. However, there is limited research on farmers' views about castration pain in piglets and its mitigation. This study aims to investigate producers' and farm workers' perceptions of castration-related pain, pain alleviation, and the effects of local anaesthesia on piglet welfare. Additionally, we aim to examine their experiences regarding the use of local anaesthesia and its practical farm-level aspects. Semi-structured interviews of 10-15 Finnish farmers and piggery workers will be conducted in January-May 2025. The interviewees include producers who have implemented local anaesthesia at their farms, and farmers and workers who have completed the piglet castration training and have at least two months of experience using local anaesthesia. The interviews will explore the farm-level implementation of local anaesthesia, analgesia, castration, piglet handling, monitoring of castrated piglets, views about castration pain and its mitigation, and changes in working conditions brought by local anaesthesia. The interviews will be analysed using qualitative content analysis. Additionally, farm-level observations of piglet castration and medication will be carried out on five farms. The study will be complemented by a short survey of farmers and workers who have completed the piglet castration training. Preliminary findings from ten interviews suggest that animal caretakers regard surgical castration without pain relief as highly painful and generally find local anaesthesia effective in reducing pain during castration. Conversely, the injection of local anaesthesia was considered painful, and the increased handling and restraining of piglets were typically seen as negatively impacting piglet welfare. Application of local anaesthesia significantly increased workload. In conclusion, interviewed farmers and workers tend to view local anaesthesia as beneficial for piglet welfare overall. However, interviews indicate that increased handling and restraining of piglets due to the administration of local anaesthesia necessitate the development of less stressful methods that can be implemented in practical farm work. Conclusions will be refined based on further interviews.

OinkScope – a computer vision-based spatial intelligence tool for monitoring behaviour of group-housed pigs

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Video recording of ethological experiments creates a large bulk of footage to be manually annotated in order to extract the data. This often creates a critical bottleneck in data processing and can limit the time available for analysis and delay reporting of the results. To meet the growing demand for accurate automated behaviour monitoring, we present a new tool for pig behaviour monitoring. OinkScope is a novel computer vision (CV) algorithm that integrates real-time object detection, customizable region-of-interest (ROI) monitoring, and automated heatmap analysis. At its core, OinkScope relies on Detectron2 object detection and segmentation framework built on the PyTorch ecosystem. Our video analysis pipeline is orchestrated by a Python-based script, enabling OinkScope to work with custom model weights from models trained on different species. For this implementation, we fine-tuned a Mask R-CNN model (ResNet-50 backbone) on a pig-enclosure dataset containing varied lighting and grouping conditions (346 images, 10 pigs in each, labelled using the Roboflow Smart Polygon tool). After ingesting raw video streams, the script performs inference frame-by-frame. In a pilot study analysing 20 hours of video from commercial pig pens (group size 10), OinkScope achieved a bounding box classification accuracy of 98.73% and a segmentation accuracy of 96.16% on a single frame. This corresponds to a mean average precision (mAP) of 86.5% in pig detection and over 90% accuracy in associating individuals with user-defined ROIs when analysing new videos. Using an NVIDIA RTX 4090 GPU (Graphics Processing Unit) for both training and inference, OinkScope maintains near real-time performance (20–25 frames per second), supporting continuous on-farm data processing. A major advantage of OinkScope lies in its user-friendly GUI (Graphical User Interface), designed to streamline analysis for animal scientists with minimal programming or CV expertise. Once a video is loaded, the first frame appears, and ROIs are defined by simple click-and-drag operations. The script then detects objects throughout the video, counting them within these ROIs via bounding-box centers (default) or using an optional overlap-based method that checks segmentation masks against a user-defined threshold. Researchers can also enable a cumulative heatmap feature to visualize hotspots where objects spend the most time. By uniting customizable ROIs, scalable deep learning models, and an intuitive GUI, OinkScope provides insights into group dynamics, crowding patterns, and resource utilization. Ultimately, it offers a powerful yet accessible toolkit for automatic and real-time behaviour analysis — showcasing the transformative potential of modern CV systems in ethological research.

Effects of transport on end-of-breeding parent stock chickens

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Transporting animals by vehicles is an essential practice. However, the transport process and environment are complex, and negative effects on animals have been reported. In the poultry industry, birds transport involves multiple steps—capturing, crating, loading on a vehicle, transporting, unloading, uncrating—which have been linked to increased stress levels and birds dead-on-arrival. Chickens kept for breeding purpose are referred to as end-of-breeding (spent) once their breeding ability declines. Although end-of-breeding parent stock chickens are transported as well as broilers, turkeys, and end-of-lay laying hens, the specific circumstances under which they are transported remain unclear. Understanding the current transport condition is crucial for improving their welfare. Therefore, this study aimed to investigate the physiological conditions experienced by end-of-breeding parent stock chickens during commercial transport to a slaughter plant. All procedures complied with ISAE ethical guidelines. The study focused on three breeds of parent stock layer hens kept for breeding purposes and scheduled for a single transport to a slaughter plant in Japan: Lohmann Julia (Julia: White Leghorn line), Hy-Line Brown (Brown: a cross breed between Rhode Island Red and White Plymouth Rock, known as Boris Brown in Japan), Sakura (a cross breed between White Leghorn and Rhode Island Red×White Plymouth Rock). Body weight and heterophil-to-lymphocyte (H/L) ratios were measured before and after transport, and behaviors during and after transport were observed under similar conditions, including the duration of the transport process. Behavioral observations were categorized as follows: agonistic behavior, feather pecking, foraging, huddling, moving, panting, piloerection, preening, resting, shivering, neck stretching, and vocalization. Before transport, Brown hens had significantly higher H/L ratios than Julia hens (Steel-Dwass test; $p < 0.05$). H/L ratios increased significantly after transport across all breeds ($p < 0.05$). Regarding body weight, no significant difference was observed in Sakura hens, whereas Julia and Brown hens exhibited significantly lower weights after transport ($p < 0.05$). Resting was the predominant behavior observed; however, its occurrence decreased after transport compared to during transport in Sakura and Brown hens ($p < 0.05$). Additionally, Brown hens exhibited significantly more feather pecking after transport compared to before, and also more than Julia hens (both $p < 0.05$), while other behaviors remained similar across the three breeds. These results indicate that the end-of-breeding parent stock chickens experience negative effects from transport, with responses varying among breeds. Further research is necessary to identify strategies that mitigate negative impacts and promote animal welfare during transport.

An exploratory study of factors influencing stress in mares of Hokkaido native horses during weaning process

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The customary weaning process in captivity is a typical example of a situation where livestock welfare can be compromised. If the degree of stress in individual animals after weaning can be predicted, we may offer more appropriate care toward them and prevent a decline in their welfare. Therefore, we explored the factors influencing stress in mares after weaning using information that could be obtained relatively easily before weaning, such as the age of mares and foals in days at weaning and the foal weight at weaning. We observed twentytwo mares of Hokkaido native horses being pastured in groups outdoors year around from the day before to two days after weaning in October and November over four years and recorded whinny and locomotion using 20-min focal sampling method: these behaviors are indicators of stress behavior in Hokkaido native horses (Takimoto-Inose et al., 2019). The frequency of the mares' whinny and locomotion surged on the day of the weaning (Day 1) and reduced to the pre-weaning levels on Day 2. However, there were large individual differences in the frequency of stress behaviors on Day 1. Therefore, we fitted linear models to the mares' stress behaviors on Day 1. The age of mares in days and its square, the age of foals in days, and the foal weight were used as explanatory variables. We conducted model selection based on AIC to explore which variables can be used as predictors of stress behavior. The best model for the frequency of the mares' whinny was the model in which the age of mares in days and the foal weight were used as explanatory variables. The frequency of the mares' whinny decreased as the age of mares in days and the foal weight increased. The best model for the frequency of the mares' locomotion was the model in which the age of mares in days and its square, and the age of foals in days were explanatory variables. The frequency of the mares' locomotion increased in the younger and older mares compared to the middle-aged ones and decreased as the age of foals in days increased. These findings suggest that the stress on mares after weaning may be greater for younger and older mares, the smaller the foal weight at weaning, and the younger the foals. Caring for the mares after weaning with consideration of these factors may effectively prevent a decline in their welfare.

The frequency of conflict behaviour in Icelandic competition horses is related to the prevalence of oral lesions

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The occurrence of oral lesions in sports horses is a welfare concern. Lesions may be caused by inappropriate training and/or ill-fitting equipment and knowledge about behavioural signs of pain and discomfort in horses with oral lesions may help reduce the occurrence. This study aimed to investigate the prevalence of oral lesions and related behavioural signs in Icelandic horses competing in two breed-specific gait competitions (Fivegait F1 and Tölt T1) at the same event. All horses participating in the two competitions were included (n=70). When leaving the competition arena, each horse underwent an examination for oral lesions by a trained inspector and bridle and bit type were recorded. Subsequently, two observers scored behaviour (mouth opening, sudden head movements, tail swishing and undesired gait changes – commonly jointly labelled ‘conflict behaviour’) of the horses during the competition from official online video recordings. Sixteen of the 70 horses (i.e., 22.9%) had abrasion of the skin and/or mucosa at one or both sides of the commissures of the lips (i.e., oral lesions, chronic ulcer type). Twenty-three horses (32.9%) had erosion/contusion (red marks) of the commissures at one or both sides. In total, 32 horses (45.7%) had findings. The horses were either ridden in a snaffle (n=49, of which 28.6% had lesions) or a curb bit (n=21, of which 9.5% had lesions). Mouth opening was the most frequently observed behaviour, e.g., in F1, median [25;75%], mouth opening: 34.0 [25;54], head movements: 18.0 [11;25], tail swishing: 1.0 [0;9], and undesired gait changes: 0 [0;1], Kruskal-Wallis One Way ANOVA on ranks, $H=101.0$, $P<0.001$. In both competitions, the frequency of conflict behaviour was higher for horses with oral lesions, e.g., in F1, mean $\pm$ se, mouth opening (with lesions: 72.3 ± 9.9 vs. without lesions: 30.9 ± 3.3 , t-test, $t_{35}=-5.1$, $P<0.001$), undesired head movements (with lesions: 33.9 ± 13.4 vs. without: 17.6 ± 1.5 , t-test, $t_{35}=-2.2$, $P=0.03$) and tail swishing (with lesions: 13.6 ± 4.4 , vs. without: 4.0 ± 1.4 , t-test, $t_{35}=-2.7$, $P=0.01$), whereas gait changes occurred infrequently and did not differ between the groups. We conclude that conflict behaviour is related to the prevalence of oral lesions. Increased awareness of behavioural signs of pain and discomfort may therefore help improve sports horse welfare.

The maternal-offspring relationship in tailed and docked ewes and their lambs

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The hours after lambing are crucial for establishing the lamb-dam bond, which plays a key role in lamb development and survival. A dam's maternal behavior may be influenced by her early life experiences, including routine painful procedures such as tail docking, potentially impairing bonding. We tested whether neonatal tail docking in ewe lambs altered (1) their maternal behavior and their offspring's behavior after lambing and (2) behavioral and physiological stress responses to separation. Polypay ewe lambs from the same flock were tail docked using a rubber ring between 24-36 hours of age (n=11) or left undocked (n=10) and remained housed together until their first parturition. At approximately 13 months of age, they gave birth to singleton (n=6) or twin (n=15) litters. Between 30-60 minutes after the last lamb's birth, the ewe and her lamb(s) were moved to an individual maternity pen, where behaviors were video recorded for 2 hours. Between 6-12 hours after lambing, the lambs were separated from their dam by moving them to an adjacent room that prevented visual but not all auditory contact for 15 minutes. Video recordings were taken from 15 minutes before separation until 15 minutes after reunion. Ewe and lamb eye temperatures were assessed using infrared thermography immediately before and after separation. From video recordings, we analyzed the duration the ewe spent eating, pacing, lying, and grooming her lambs, as well as the duration the lambs spent tail wagging, nursing, and lying. Transitions from lying to standing were also recorded for ewes and lambs. All models included the dam's tail docking status as a fixed effect with litter size as a covariate; separation models also included observation period (before, during, and after separation). We found no significant effect of the dam's tail docking status on maternal and offspring behavior following lambing or on their responses to separation. However, lambs of undocked ewes tended to spend more time lying in the bonding period compared to lambs of docked ewes. Regardless of docking status, ewes ate less while separated from their lambs and spent 26% of this time pacing, a behavior not observed before or after separation. Following reunion, ewe-lamb interactions increased from baseline, with more grooming, nursing, and tail wagging, and less lying. No differences were observed in eye temperatures before and after separation. Our findings suggest that neonatal tail docking does not impair the ewe's ability to bond with her lambs later in life.

Physiological response of bucks of varying coat colours to diurnal changes in temperature and relative humidity

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Sub-Saharan Africa is especially badly struck by climate change and after-effects such as high temperatures and varying levels of precipitation among others are experienced. The use of modern technologies on farms is still minimal, and these region's economies are heavily reliant on agriculture. An experiment was conducted that sought to better understand how a certain adult male goat breed (West African Dwarf) noted for its dynamic coat colour pattern and found in 15 West African countries responds to varying temperature as influenced by solar radiation. The goat Unit of the Teaching and Research Farm, University of Ibadan was the experimental location. Thirty (30) West African Dwarf (WAD) bucks i.e. adult male goats were grouped into six treatments on the basis of their coat colours viz: Black, Brown, White, White/Black, White/Brown, and Brown/Black. The study was carried out during the low temperature humidity index (THI) of the year – June, July, August. Parameters determined include: Pulse Rate (PR, Beats/minute), Respiratory Rate (RR, Beats/minute), Rectal Temperature (RT, °C). Ambient Temperature (°C) and Relative Humidity (RH) were measured twice daily to estimate THI. Data obtained from the study were analysed using ANOVA at $\alpha_{0.05}$. It was observed that the average daily PR was significantly lower in White (54.47 ± 2.93) as well as Brown (53.91 ± 2.80) bucks compared with those of other coat colours. Rectal temperature was significantly lower in White (38.88 ± 1.07) as well as White/Brown (38.97 ± 0.97) bucks than those of other coat colours. There was no significant difference in respiratory rate among all the bucks. A full comprehension on the role of coat colouration in helping goats to adapt to changing environmental conditions is still evolving. Findings from this study suggest that a morphological trait linked to adaption i.e. coat colour, may guarantee animal survival under harsh environmental conditions. The study demonstrated that WAD bucks with lighter coat colours were better adapted to a humid tropical environment as evinced by their physiological responses.

Animal welfare indicators at the slaughterhouse (aWISH)

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The aWISH (Animal Welfare Indicators at the Slaughterhouse) project is a Horizon Europe initiative that aims to transform animal welfare monitoring through automated, sensor-based assessments. Running from November 2022 to October 2026, the project involves 28 partners across 11 countries with a budget of €8 million. It seeks to develop and implement 70 novel animal-based welfare indicators for broilers and pigs—species that dominate the European livestock industry and face distinct challenges due to intensive production practices. By integrating automatically collected data from farms, transport, and slaughterhouses, aWISH aims to enable rapid detection and response mechanisms to enhance animal welfare outcomes. Slaughterhouses provide a unique opportunity for large-scale welfare monitoring due to their centralised role in the production chain, handling vast numbers of animals and generating extensive data. The project focuses on key indicators for broilers and pigs throughout the production chain, from farm to slaughter, including stress vocalisations, bruises, skin lesions, fractures, organ health, footpad dermatitis, tail biting, and mortality rates. These measures enable objective welfare assessments that can inform management practices and policy decisions. The project structure comprises six work packages, including technology development, monitoring and improving animal welfare, socio-economic and environmental impact assessments, and communication and dissemination. Advanced sensor technologies are being deployed across six pilot sites in the Netherlands, Spain, France, Poland, Austria, and Serbia. Key innovations include AI-driven analysis of animal stress and handling, automated lesion detection, barn climate monitoring, and transport condition assessments. For example, STREMODO technology analyses stress vocalisations in pigs, while EBroilerTrack monitors broiler activity and heat stress during transport. Other systems, such as PigInspector and ChickenCheck, use imaging and algorithms to evaluate injuries, hock burns, and footpad dermatitis. By integrating data from on-farm conditions, transport, and slaughter, aWISH aims to create a comprehensive welfare monitoring system that enables rapid intervention and corrective actions. The project also facilitates expert panels, engaging stakeholders from research, industry, government, and NGOs to ensure practical applications and policy impact. Ultimately, aWISH seeks to enhance animal welfare monitoring efficiency, promote evidence-based policy decisions, and support the expansion of welfare assessment methods to other species. The project's findings will contribute to improved welfare practices, consumer trust, and sustainability in the livestock sector.

Impact of stress triggered by wildfire on the ingestive behavior of beef cattle in São Paulo state, Brazil

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In August 2024, the state of São Paulo, Brazil, suffered one of the biggest wildfires in its history. The fire achieved ~236 thousand ha, including the Experimental Farm of the *Instituto de Zootecnia*, located in Sertãozinho-SP. Approximately 90% of the farm's area was affected by the wildfire, compromising both the pastures and the animal handling facilities. At the time, the *Instituto de Zootecnia* was conducting a feed efficiency test (FET) with young Caracu bulls in a 3020m² paddock, equipped with electronic bins (Intergado[®]; 12 for feed and 4 for water), which automatically record the animals' feed and water intake behavior. Due to the fire, the animals remained loose on the farm, with restricted access to food and water, for two days until they could return to the FET paddock. Fortunately, none of the cattle were injured, and the electronic bins were not damaged by the fire. Thus, we explore the impact of the stress caused by the wildfire on the ingestive behavior of Caracu bulls. The ingestive behavior of 44 young Caracu bulls (mean±SD: 320±31 days of age) was assessed 5 days before and 5 days after the fire. For the analyses, the animals were divided into two categories based on their entry weight: light (239±34 kg, n=21) and heavy (279±34 kg, n=23). Data were analyzed in R using a linear mixed-effects model, with fire (β ; before and after), weight category (β ; light and heavy), and their interaction (β) as fixed effects, and animal as a random effect. The results include the regression coefficients (β) and the associated p-values, with significance declared at $p \leq 0.05$. The interaction ($p=0.02$) showed that heavier animals had a decrease in feed intake ($\beta=-1.07$; $p=0.02$), number of visits ($\beta=-5.01$; $p=0.04$), and visit duration ($\beta=-0.08$; $p=0.004$) after the fire. There was no effect of fire ($p=0.05$) and the interaction on water intake ($p=0.22$). Overall, heavier animals drink more water ($\beta=4.16$, $p=0.002$) than light animals. All animals increased ($\beta=0.73$; $p=0.0004$) the number of visits to the water trough after fire, while the duration of visits was not affected ($p>0.05$). The decrease in feed intake, particularly in heavier animals, suggests that stress impacts individuals within the herd differently. The increase in water intake highlights the importance of ensuring continuous access to quality water resources in stressful situations. These findings emphasize the need for preventive strategies against such disasters, as well as the selection of more resilient animals.

Effect of feed and water provision strategies on broiler breeder pullet drinking behavior

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Skip-a-day (SAD) feed restriction programs for broiler breeder pullets results in excessive drinking behavior. Water restriction (WR) protocols have been implemented to reduce water spillage. However, the relationship between drinking behavior, WR protocols, and feeding programs is unclear. We aimed to evaluate the effect of feeding programs and WR on pullet drinking behavior. Nine hundred sixty Cobb 500 FF pullets were randomly assigned to 16 floor pens with a 2x2 factorial design: two feeding programs (SAD and ED) with two water protocols (restriction 1100-1400h daily, WR, or *ad lib* access, ADLIB; 60 birds/pen, n=4 pens/treatment). Drinking behavior, defined as beak in contact with drinker, was observed for 10 focal birds/pen at 16 and 22 wks on one on-feed day/age for three continuous 15-min periods: an hour after feeding (HAF), water off for WR (1200h), and water on for WR (1430h). Data were analyzed with linear mixed effects models in R Software with feeding program, water protocol, and their interaction as fixed effects and focal bird nested within pen as a random effect. Separate models were run for each time of day. There were no significant interactions between feed and water treatments ($p>0.05$). The ED pullets spent more time at the drinker than SAD birds at HAF overall (ED:169±0.5, SAD:110.25±0.5 sec, $p=0.014$; mean±SE). At 1200h and 1430h, SAD drank longer than ED at 22 wks (1200h: SAD:101.0±0.6, ED:28.8±0.6 sec, $p<0.0001$; 1430h: SAD:193.2±0.6, ED:106.1±0.6 sec, $p=0.003$). The WR birds displayed longer drinking behavior compared to ADLIB birds at HAF at 22 wks (WR:233.5±0.7, ADLIB:86.3±0.7 sec, $p<0.0001$) and at 1430h overall (WR:252.8±0.4, ADLIB:54.8±0.4 sec, $p<0.0001$). At 1200h, the WR pullets displayed less drinking behavior than ADLIB both ages, but WR pullets increased at 22 wks (16 wks: WR:2.89±0.6, ADLIB:50.7±0.6; 22 wks: WR:41.1±0.6, ADLIB:81.0±0.6 sec, $p=0.008$). These findings suggest that pullets have a greater need for drinking as they mature. Feeding program affected the timing of drinking behavior, where SAD pullets fed a larger quantity of feed drink more at later times in the day than ED pullets, likely related to gut fill and/or the timing of digestion. The WR protocol does not eliminate drinking behavior attempts when water is off (1200h), and WR pullets displayed anticipatory and compensatory drinking behavior when water was available to them (HAF and 1430h). These findings indicate welfare concerns with WR protocol, and additional welfare indicators should be evaluated with this program.

Can we predict cat behaviour in veterinary consultations through personality assessment?

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Personality assessment methods are underexplored in veterinary clinical setting. Personality traits may be assessed via questionnaires or behavioural tests. This study aimed to identify cat personality traits measured using both methodologies and their relationship with observed behaviours during veterinary consultations. 19 healthy cats (9 males, 10 females), aged 4 months to 10 years, with owners who could provide behavioural information, were enrolled. Initially, cats underwent three behaviour tests: open field, novel object, and unknown human, each lasting 3 to 5 minutes. Behaviours were recorded, and analyses included vocalisations, exploration, latency and time spent interacting with the novel object or human. While the cats participated in the tests, owners completed a simplified anonymous version of the FE-BARQ behavioural questionnaire, focusing on fear, sociability, aggressiveness, and demographic questions. The clinical evaluation simulated a routine veterinary consultation, with owners and cats present in the consultation room. The evaluation had two parts: Anamnesis and Parameters (heart and respiratory rate, blood pressure, and temperature measured gently by the same evaluator). Cats roamed freely during the evaluation and physical restraint for parameters was adapted to each cat's tolerance, using minimal handling or gentle wrapping. Behaviours included exploration, vocalisation, cat-to-human approach, alertness, resting, hiding, being petted, and rubbing. Behaviours were recorded and analysed using BORIS[®] software. A principal component analysis extracted personality traits from the behavioural tests. To compare personality traits with behaviours during the clinical evaluation, linear regression models were used, with Age, Neutered Status, and Sex as covariates. Three personality traits were identified: Anxious (Vocalisation Open field [loading = 0.83], Vocalisation Novel object [0.84], Exploring Novel Object [0.60], Latency Unknown Human [-0.83], Vocalisation Unknown human [-0.83]), Bold-Cautious (Exploring Open field [0.84] Contact Novel object [0.83] Latency Novel Object [-0.70]), and Human-Independent (Contact Unknown Human [-0.78] and Exploring Unknown Human [0.86]). During the anamnesis phase, more anxious cats vocalised more ($p = 0.01$). More independent cats spent less time approaching humans ($p = 0.02$), while bolder cats approached more ($p = 0.04$) and hid less ($p = 0.02$). During parameters evaluations, more independent cats vocalised more ($p = 0.03$). Regarding the questionnaire, owners' responses suggested that more aggressive cats approached humans less during anamnesis ($p = 0.04$), hid more in both phases ($p = 0.03$), and were petted less during anamnesis ($p = 0.02$). Each method predicts different behaviours. Although the questionnaire is easier to apply, both methods need refinement to capture key behaviours.

Cow Agency: Investigating self-regulated dry-off for cows in an automatic milking system

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Abrupt cessation of milking (dry-off), especially in high-yield dairy cows, can increase udder pressure and risk for intramammary infections. Automatic milking systems (AMS) present the opportunity for cows to selfregulate milking visits and an alternative, cow-driven approach to the commonly adopted abrupt dry-off. The objective of this observational study was to characterize the behavior of late-lactation dairy cows when allowed free (voluntary) access to an AMS without incentives (concentrate) or being brought to the AMS by humans (fetched). Data collection is ongoing, with 4 Holstein dairy cows completed (2 = primiparous, 2 = multiparous) and 15 total cows targeted. Eligibility criteria included a 10-d average of >2.2 voluntary daily milkings before enrollment and not flagged as a chronic fetch cow by the farm staff. Cows were enrolled 74 ± 3 d before their expected calving date. At enrollment, cows no longer received a feed incentive in the AMS and were no longer fetched. Cows were considered dry when they did not visit AMS for 72 h or produced <4.5 kg milk/d for 3 d consecutively. The number of days to self-dry off, daily milkings, refused milkings (visited within 3.6 h of previous milking), time between AMS visits (h), and daily milk yield (kg), were recorded by the AMS. To date, enrolled cows were 321 ± 31 d (mean $\pm$ SD) in milk at enrollment and took 22 ± 8 d to dry-off. At enrollment, cows produced 36.6 ± 6.8 kg of milk over 2.8 ± 0.5 milkings/d with an interval of 9.6 ± 2.9 h between milkings. On the last day cows were milked before being considered dry, cows produced 20.8 ± 13.6 kg milk over 1.0 ± 0.0 milkings per day, with an interval of 26.4 ± 0.3 h between milkings. Cows also decreased the number of refused AMS visits, suggesting reduced motivation to be milked; cows had 0.8 ± 1.0 refusals on the day of enrollment, and 0.0 ± 0.0 refusals on the last day they were milked before drying off. This preliminary data illustrates that cows can naturally reduce their milking frequency and, consequently, milk yield to self-dry off. Milk yield level when cows dry themselves off may serve as a guideline to dry off cows in other milking systems based on output. This study is a novel exploration into cow motivation to be milked and opportunities for cow agency in AMS systems.

Evidence of negative effects of piglet tail-docking and castration on sow welfare

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For group-housed animal welfare, such as pigs, it is not only relevant how an individual animal feels but also the extent to which its conspecifics are affected by its emotions. Therefore, painful husbandry procedures performed on piglets might also negatively affect their dam's welfare. The objective of this study was to evaluate sow behavior in response to piglets experiencing tail-docking and/or castration. We hypothesized that sows would increase positive interactions with piglets (nosing, nuzzling and nudging piglets gently), increase standing and postural transitions, and decrease lying, nursing, drinking, feed-related behaviors (eating, sniffing, interacting with the feed), and nosing the stall structure after piglets have been processed. In total, 19 sows housed in farrowing stalls with slatted flooring were enrolled. Sows were provided *ad libitum* access to water and were hand-fed to appetite two times daily (at 7 a.m. and 3 p.m.). All piglets were tail-docked and males surgically castrated at 7 d of age. Sow behavior was recorded by cameras mounted on the ceiling from 5-7 p.m. a day before processing as well as on the processing day (~8 h after processing). Videos were watched continuously by two observers using BORIS. Lying, standing, nursing and feed-related behaviors were recorded as states in seconds but converted to minutes for statistical analysis. Positive piglet interactions, posture changes, drinking, and nosing the stall structure were recorded as point events. Inter-observer reliability was calculated from ~ 9% of video recordings in BORIS. Cohen's Kappa varied between 0.88-0.97. The differences in pre- and post-processing sow behaviors were tested by paired t-test/Wilcoxon signed-rank test (if data was not normally distributed) in SAS. Sows decreased standing (Median: -7.5, range: 73.9, $P=0.009$) and feed-related behaviors (Median: -2.1, range: 40.4, $P = 0.004$) after piglets had been tail-docked and/or castrated. No other sow behaviors changed in relation to piglet processing ($P > 0.05$). In conclusion, this is the first study that tail-docking as well as surgical castration resulted in negative effects on sow behavior. Additionally, these findings contribute to the growing body of literature that from an animal welfare perspective, tail-docking as well as surgical castration should be refined or avoided. The study was funded by the Artz Chair for Faculty Excellence in Animal Science, Iowa Pork Industry Center, and the Iowa Farm Bureau Federation.

Providing uniform or gradient light intensity to broilers and layer pullets and its effects on behaviour, activity level and distribution within pens

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There are still many questions on how to provide light to broilers and layer pullets. Previously, we found that light intensity preferences depended on age, breed and behaviour, but that there were always chickens present at each light intensity. Therefore, we studied the effect of providing an uniform or gradient light intensity distribution in the pen on behaviour of broilers and layer pullets. Day-old chicks from a fast- (Ross 308) and slower-growing broiler breed (Hubbard JA757) were housed in groups of 346 per pen (27.3m²) with 16 pens per breed. Per breed, 8 pens received uniform lighting (± 20 lux) and 8 pens received gradient lighting (range $\pm 25 - 200$ lux from front to rear or vice versa). Behavioural observations were performed via live scan sampling at four target weights, with a total of 20 scans per pen per target weight. In a separate trial, day-old layer chicks (Lohmann White Classic) were housed in groups of 42 per pen (4.8m²), 6 pens received uniform lighting (± 20 lux) and 6 pens received gradient lighting (range $\pm 20 - 100$ lux from front to rear or vice versa). Behavioural observations were performed via live scan sampling at five ages, with a total of 36 scans per pen per age. Behavioural data were expressed as percentage of broilers performing a certain behaviour based on total number observed. Generalized linear mixed model with a beta binomial distribution were used, consisting of a random effect pen within room and fixed effects breed (broilers), treatment, target weight (broilers) or age (layer pullets), all 2-way and the 3-way interaction (broilers). Means $\pm$ SE over target weights or ages are given.

For broilers, a main treatment effect was found for drinking ($P < 0.001$), with less drinking in gradient (6.1 ± 0.22) versus uniform lighting (7.3 ± 0.21). For layer pullets, an interaction between light treatment and age was found for eating ($P < 0.05$), inactive ($P < 0.001$) and perching behaviour ($P < 0.05$), with less eating and inactive behaviour, but more perching at specific ages in gradient (11.8 ± 0.90 ; 6.9 ± 1.25 ; 10.9 ± 0.73 , respectively) versus uniform lighting (13.1 ± 0.88 ; 9.7 ± 1.19 ; 8.4 ± 0.58 , respectively). Thus, for broilers, gradient lighting reduced drinking behaviour compared to uniform lighting. For layers, gradient lighting stimulated perching, but reduced eating and inactive behaviour. These findings indicate that gradient lighting might promote species-specific behaviours.

Vocal correlates of negative emotional arousal in lambs (*Ovis aries*): relationship with behavioural and physiological indicators

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This study aims to fill a knowledge gap on potential indicators of emotional arousal in sheep, by considering both behavioural and physiological markers. Vocalisations are a validated indicator of emotional expression for many animal species, but for some, including sheep, there is still little scientific evidence. To this end, twenty lambs were subjected to a short, mildly stressful experience, represented by a two-phase short-term isolation test, characterised by a different degree of separation from conspecifics (partial, where the lamb was placed in a pen with visual, acoustic and tactile contact with other lambs in the barn through a fence, vs. full) and conducted to induce different levels of negative arousal. We collected vocalizations and maximum eye temperature using thermography. Moreover, we quantified the bodily activation in partial and full isolation by collecting stress-related behaviours. These data were used along with individuals' height and social proximity to investigate how vocal and thermal profiles vary with the lambs' reaction. Linear Mixed-Effects Models were used to examine relationships between behavioural responses, vocal features and thermal responses, using composite scores from principal component analyses carried out on behavioural variables and acoustic parameters as response variables. The results revealed that, in full isolation, lambs spent more time running, exhibited more jumps and body position changes (i.e., higher bodily activation), and produced more open-mouthed bleats ($n_{\text{total}} = 382$ vs 27) compared to partial isolation, indicating a higher overall level of arousal ($p = 0.0003$ for tall lambs and $p < 0.0001$ for small lambs). In addition, small lambs showed a greater behavioural response to isolation than tall lambs, which was related to thermographic analysis of the eye ($t_{\text{ratio}} = 6.70$; $p < 0.0001$). We identified vocal markers of arousal in lambs, with vocalisations produced in high arousal phases showing higher frequencies (energy quartiles, formants, fundamental frequency) and increased noise (higher Wiener entropy) compared to low arousal phases ($\chi^2 = 4.47$; $p = 0.035$). Furthermore, these changes were accompanied by a decrease in bodily activation and in maximum eye temperature ($\chi^2 = 4.20$; $p = 0.04$). However, we found no evidence that individual difference in social proximity influenced lambs' response to isolation, contrary to our a priori hypothesis. This study suggests that behavioural and vocal markers are promising non-invasive indicators of negative arousal in lambs, which could be used to help monitor stress. Maximum eye temperature seems to be a potential physiological marker, but further research is needed to confirm its practical use.

Suckling behaviour of dairy calves in two types of dam-rearing systems using automatic milking

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Rearing dairy calves with their dams is becoming more common in Europe, but depending on how the system is implemented the calves can have more or less restricted access to their dams, which in turn may affect their suckling behaviour. This research had two main aims: (1) explore how suckling behaviour changed over time for calves kept in either a cow- or calf-driven dam-rearing system using automatic milking, (2) identify factors associated with allosuckling in the two systems. In the cow-driven study, dam-calf pairs could have unrestricted physical contact in a contact area that the cows could leave at will (n=19 bull and heifer calves), while in the calf-driven study calves had access to the whole pen (n=24 heifer calves). As two separate pens were used for the two studies, results are reported separately. Dam suckling and allosuckling events were continuously recorded from 24-h videos at an average calf age of 3, 6, 9, 12 (both studies) and 15 (cow-driven only) weeks. Suckling bout frequency, bout duration, and total suckling time were analyzed as response variables in relation to calf age (both studies) and calf sex (cow-driven only) using linear mixed effects models. Mixed logistic regression was used to test for an association between allosuckling and calf age, sex (cow-driven only), birth weight, and the cow already being suckled by other calves. In the calf-driven study, number of suckling bouts per 24 h decreased from 4.9 with 0.1 bouts per week ($P=0.003$) during the study, while suckling bout duration instead increased from 546 seconds with 24.5 seconds per week ($P<0.001$) resulting in 0.54 min longer daily suckling time per week ($P=0.06$). Contrarily, suckling behaviours did not change over time for calves in the cow-driven study, nor was any effect of calf sex observed. Allosuckling was more common in the cow-driven study (36% vs. 14% of all suckling bouts) but increased as the calves aged in both systems (cow-driven: odds 0.18 vs. 0.79 at 3 vs. 15 weeks, $P=0.01$; calf-driven: odds <0.01 vs. 0.03 at 3 vs. 12 weeks, $P=0.003$), while no effects were observed for birth weight and calf sex. Other calves already suckling the cow increased the odds of allosuckling in both the cow-driven ($OR=170$, $P<0.001$) and calf-driven ($OR=141$, $P<0.001$) study. Our findings provide some evidence that both age-related changes in suckling behaviours and the frequency of allosuckling can be affected by how dam-rearing is managed on the farm.

Mitigation of heat stress in dairy cows via building adaptations under current and future heatwaves

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Heat stress mitigation for dairy cows has become increasingly challenging due to more frequent, intense, and prolonged heatwaves, driven by climate change. Effective building adaptations can help reduce indoor thermal stress, providing immediate relief to cattle. However, limited research has critically examined the impact of such adaptations on dairy buildings, particularly under current and future heatwave scenarios. This study aims to address this gap by: 1) assessing indoor heat stress in a UK dairy cattle building during the 2021 heatwave through microclimate measurements in barns and milking zones, and 2) evaluating potential building adaptation strategies under projected future heatwave conditions using dynamic building simulations. The thermal model of the dairy building incorporated realistic heat dissipation from the cows, considering key factors such as ambient temperature, body mass, and daily milk production when calculating metabolic heat generation, sensible, and latent heat dissipation from the dairy cows. Temperature-Humidity Index (THI) was used to calculate heat stress risk during occupied hours. Results indicated that, during the 2021 UK heatwave, barns and milking parlours experienced heat stress risks ($\text{THI} \geq 68$) for 72% and 86% of occupied hours, respectively. The barns generally faced moderate heat stress (Level 2), while the milking parlour experienced severe stress (Level 3). This difference was due to higher internal heat gains and limited ventilation in the milking zone. Projections for the 2080s heatwave suggest a significant increase in heat stress risk, with both spaces at emergency level (Level 4) for 92% and 100% of the time, respectively. For the barns, solar reflective roof paint (S1) was the most effective adaptation, while hybrid ventilation (S2) proved more successful in the milking zone, reducing heat stress severity from Level 3 to Level 2. Therefore, tailored building adaptations are essential for effective heat stress mitigation in dairy facilities. In addition, integrating S1 and S2 reduced peak temperatures by 2.0°C in the barns and 5.6°C in the milking zone during the 2021 heatwave. However, these adaptations were insufficient for the projected 2080s heatwave conditions. This underscores the need for more advanced building adaptations strategies to combat the growing risks posed by climate change.

Optimizing environmental enrichment for stress resilience in laying hens

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Environmental enrichment (EE) is widely used to enhance animal welfare by encouraging species-specific behaviours and reducing stress. While the detrimental effects of under-stimulation are well-established, leading to limited choice, novelty, and control, the potential risks of over-stimulation are less explored. Some enrichment strategies may inadvertently increase stress sensitivity rather than resilience. This study assessed the behavioural and physiological responses of laying hens (n=60; 20 per 3 conditions) subjected to different EE strategies over three weeks and focusing on the impact of enrichment complexity and novelty on stress resilience, with behavioural tests conducted immediately afterward. Hens were randomly assigned to one of three conditions. The Baseline group received the minimal level of enrichment allowed by DEFRA (a perch, a straw bale, a nest box, shavings, and a rope). The Complexity group had a stable yet diverse set of enrichment items (perches, a ramp, a table, bedding materials, hanging/spinning/scattered/rolling food enrichments). The Novelty group was provided with the same enrichment as Complexity but rotated daily. Data were collected via video recordings, accelerometers, and eggshell assessments during treatment. Post-treatment tests: social isolation with infrared thermography, attention bias test, and automated tracking during novel arena (NAT) and novel object (NOT) tests. Preliminary results indicated distinct welfare outcomes among groups. Novelty hens showed more soft-shelled or shell-only eggs than Complexity (ZIP model with post-hoc comparisons (Tukey- adjusted): $p=0.007$) and tended to exceed Baseline ($p=0.10$). Total egg abnormalities from 1086 eggs were also highest in the Novelty group relative to Baseline (NB model with post-hoc: $p=0.051$) and Complexity ($p<0.001$). During social isolation, Novelty hens experienced prolonged decreases in comb temperature, indicating delayed recovery from stress, while Complexity hens returned to the baseline comb temperature quicker (Survival analysis: $\chi^2=8.8$, $df=2$, $p=0.01$; Novelty vs. Complexity, $p=0.004$). During the NOT, both enrichment groups showed enhanced behavioural flexibility: they stayed closer to the object (LMM with post-hoc: Complexity vs Baseline, $p=0.07$; Novelty vs Baseline, $p=0.06$), kept smaller spacing between individuals (LM with post-hoc: Complexity vs Baseline, $p=0.07$; Novelty vs Baseline, $p=0.13$), and the Novelty group explored more arena zones (Novelty vs Baseline, $p=0.07$; Novelty vs Complexity, $p=0.16$). Behaviourally, both enriched groups appeared more flexible, though in the Novelty group, this was accompanied by physiological cost. Further analysis will clarify these relationships. The findings underline the need for balancing novelty with predictability in EE to optimize welfare outcomes, aligning with studies on zoo-housed animals suggesting risks from both under and over-stimulation.

Why do hens pile? Cracking the case of smothering and piling behavior in UK egg-layers

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Piling occurs when laying hens cluster densely together and is a precursor to smothering. Smothers cause approximately 21% of laying hen mortalities in free-range flocks. The triggers of the behaviour remain elusive due to its intermittent nature. This talk summarizes a large-scale, five-year project investigating piling. Piling behaviour will be framed by reflecting on potential causes (evolutionary past and immediate present) and tools to predict piling behaviour in the future. Regarding potential causes from the evolutionary past, we observed that the piling behaviour of brown hens in UK flocks exhibited circular “vortex” motions. Vortex behaviour is seen across a wide range of animal taxa and is understood to arise from group repulsion from stimuli, attraction to a stimulus, or social motivations. Regarding immediate present causes, we considered what might trigger an initial pile to form, exploring the previously hypothesised links to light, daily routine, and shed location. Using machine learning (XGBoost) and a large flock management dataset (Birdbox, FAI), we explored potential relationships between the hens’ environment and cases of smothering in 40+ flocks across the flock cycle. We found associations between light in the early morning and smothering. As the method cannot model causal links, we suggest that such machine learning approaches could help form hypotheses for future research. To move towards predicting piling behaviour, we used a video dataset of 10 commercial flocks we had annotated across three weeks to develop a method for automated classification of piling from images. All were flocks of UK brown free-range hens (3,000–16,000 birds, 18–72 weeks of age), which had been observed to pile and with 0–9 smothers occurring during the observation period. A total of 33,669 video frames of piling and 16,239 frames of non-piling were used to train and test a model for the classification of piling. An overall accuracy of 87% was achieved using ResNet (a convolutional neural network pretrained for image detection). This method shows good promise, but since chickens seem to pile far more often than they smother, its future use might be more suitable for expediting research on piling rather than for predicting the occurrence of a smother on commercial farms. This programme of work sheds light on a significant problem in egg production, offering insights into the links between chicken behaviour, welfare, and productivity. Smothering is vastly understudied compared to other poultry behaviour problems like feather pecking, and there is much still to uncover.

Automated annotation of inter-individual distances to assess goats' social behaviours

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Developing algorithms and artificial intelligence has opened up opportunities for behavioural research, particularly for automated behaviour annotations. The VerZi project aims to develop a digital tool that automatically detects agonistic interactions among goats and alerts the farmer. Successfully executing this project has the potential to enhance the farmer's awareness of social dynamics within the herd and enable precise, efficient monitoring of changes in social behaviour following interventions. Eight video cameras were installed (ceiling level, side view) in a commercial dairy goat barn to continuously record the goats (females; Saanen, Thuringer and Alpine breed) from 0500h until 1800h daily, 7 days/week, over six months. Frames were then extracted from the videos, randomly selected, and body key points on the visible goats were manually annotated using DeepLabCut ("goats' skeleton"). The body key points included the nose, eyes (right and left), horn bases (right and left), ears (right and left), spine-shoulder crosspoint, tail base, tail tip, carpus (right and left), and tarsus (right and left). Each goat was individually identified over a sequence of frames when recognition was possible based on its previous position and physical features. The algorithm is being trained on a database of these annotated images using a Region-based Convolutional Neural Network (R-CNN) with a ResNet50 architecture enhanced by a Feature Pyramid Network (FPN). The first aim is to train the algorithm to automatically detect and annotate the goats' body parts on video sequences. The ongoing retraining of the algorithm with new annotated images has shown reductions in cross-entropy losses during training and validation to 3.6 and 4.17, respectively, improving detections by nearly 50%. The second aim is to assess the distances between individuals to identify targeted social behaviours. Indeed, inter-individual distances between key points (e.g., between horn bases of two goats) will be calculated and used to identify sequences in which goats perform agonistic or affiliative behaviours. Finally, the algorithm will be retrained on the sequences showing the targeted behaviours to automatically detect the agonistic (and possibly harmful) behaviours. The work completed so far with a neural network-based algorithm trained on 1,180 annotated images featuring over 2,000 goats highlights the potential of automated behavioural annotation to enhance the efficiency of detecting (and analysing) rare behaviours, thereby reducing the workload. Despite the labour-intensive nature of the manual annotations, the promising results have led to a decision to proceed with assessing distances while expanding the database with new annotations.

Cat owners' assessment of pain in cats based on a video material- a pilot study

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The majority of cats will at some point during their lifetime experience pain. To have a good quality of life, the pain needs to be detected to enable correct pain-relieving treatment. Detecting pain in a cat is a complex matter, which requires knowledge about its' natural behaviours. Research shows that cats in pain express subtle behavioural changes, changes similar to fear, stress or anxiety. Cat owners spend the most time with their cat, however the knowledge of their cat's individual pain related behaviours is not known. The aim of this pilot study was to investigate how well cat owners could identify signs of pain, based on videos of cats with and without pain. Further, if these signs of pain corresponded to those described in validated pain assessment protocols, and whether responses differed between the three trials. An on-line survey, including three videos of cats with visceral pain (2) and without pain (1), was conducted, based on videos recorded during a visit to a clinic. The survey consisted of nine general questions regarding their experience of cats and of pain assessment, and three question per video regarding the eventual signs of pain the cat presented. The answers were categorised and the respondents were grouped depending on their experience of being cat owners. The results are presented as descriptive statistics. The survey was answered by 293 cat owners, of which 110 completed it. The result showed that cat owners possessed knowledge of several signs of pain listed in validated pain protocols. Although the cat owners indicated that visceral pain was the most difficult to identify, the majority of the respondents correctly assessed that these cats were in pain (68%). However, 13% assessed the cats with pain as pain free and 18% assessed the pain free cat as having pain. A higher percentage (74%) of experienced cat owners (>6 cats and >10 years) assessed the videos correctly compared to those with less experience (28%). The study suggests that experience as a cat owner is an indication of a better knowledge in assessing pain, highlighting the importance of human-animal bond. Thus, education in pain assessment can be a possible way to enhance cat welfare.

Dog owners' assessment of pain in dog based on a video material- a pilot study

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The ability of dog owners' recognition of pain plays a major role in reducing dogs' suffering and increasing their welfare. Early detection of pain in a home environment can lead to care being sought up earlier and a better prognosis of the affliction with early onset treatment. It is also shown that dogs may hide their pain in a clinical environment. Therefore, it is of great importance to investigate dog owners' knowledge regarding pain assessment. The aim of the pilot-study was to investigate dog owners' ability to identify signs of pain in dogs, based on video material. Further, to compare the results with those of an expert group. The web-based study was aimed at former or current dog owners. The survey consisted of 27 questions, including 8 general questions about owner experience with dogs and pain in dogs. Further, the responders were asked to evaluate four videos on dogs with or without orthopaedic pain and answer 19 video-associated questions regarding eventual signs of pain. The footage consisted of dogs standing still, walking and trotting, shot from different angles. An expert group consisting of two veterinarians also assessed the videos. The results are presented as descriptive statistics. 243 respondents answered the survey, of which 103 completed it. The results showed that the most common signs of orthopaedic pain that dog owners identified in the videos were, in falling order, changes in physical activity, lameness, motion abnormalities, changes in body language, behavioural changes and facial expressions indicating pain. However, a higher percentage of respondents (16%) assessed the videos on a dog without pain as having pain, compared to the expert group (0%). The respondents' assessment of pain in dogs agrees to a higher degree for dogs with pain than those without, compared to the expert group. The results indicate that the respondents interpret normal behaviour or movement patterns as signs of pain, and highlights the difficulty in identifying less obvious signs of pain such as changes in body language and posture. Further research is needed to investigate the human-dog interaction in pain assessment.

Real-time detection of vocal distress in weaner pigs as a welfare indicator

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The welfare of pigs in commercial farming is a critical aspect of sustainable and ethical livestock production, significantly influencing animal health, productivity and product quality. For instance, aggression and tail biting are significant welfare concerns in weaner pigs, often resulting from stress, inadequate environmental enrichment or poor management practices. Proper welfare practices and access to veterinary care minimize stress and reduce the incidence of diseases. Detecting responses of agonistic interactions in weaner pigs using sound analysis is increasingly recognized as a vital method for assessing animal welfare and health. The automated detection methods minimize the need for constant human observation and provide valuable data for optimizing housing conditions, group composition and management practices. By using sound monitoring, identification of potentially harmful interactions, such as biting or chasing, can help farmers to intervene immediately and prevent severe injuries and stress in groups of pigs, improving animal welfare and productivity. In a research farm in Vienna (Austria), in total 210 weaner piglets between 8 and 30 kg were kept in 4 trials in groups of 10 to 40 animals, all in one room and each with a heated lying area. Each group was videotaped separately 24/7 with 1280x720 pixel resolution at 30 fps, and audio data were collected with two SoundTalks monitors installed over the 6 pens. To provoke a high number of agonistic interactions and create situations with high frequency of vocalization, in total 26 regrouping events were performed over all trials. Sound events were labelled for vocalizations that are linked to aggressive interactions namely screams and squeals. Using the labelled events, a sound event detection model was trained to detect events indicating aggression. A Vocal Distress Index (VDI) was developed based on the number of sound events detected by the classifier. The observations in the VDI were validated with the analysis of corresponding video recording. The study showed that sound-based methods for vocalization analysis align with traditional video-based metrics. At the same time it can offer unique advantages, such as automated real-time monitoring of distress calls at reduced costs.

Effective strategies for debunking myths in animal welfare policy discussions

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Policymakers and the public often rely on myths or misconceptions that can undermine evidence-based decision-making in animal welfare. These misconceptions can skew policy decisions, limit progress, and affect public support for crucial welfare initiatives. This poster presents an interactive framework designed to help researchers develop skills for addressing and debunking these myths when engaging with policymakers. The activity focuses on equipping researchers with tools to craft persuasive, evidence-based arguments that clarify misconceptions, using simple language that resonates with policymakers. Researchers learn to strategically address the political context and understand the potential impact of myths on public perception and policy outcomes. In an era of increasingly complex animal welfare issues, researchers need to be able to communicate their findings effectively and to advocate for policies grounded in science rather than misconceptions.

Key Components: 1. Identifying and Understanding Myths: Participants discuss common misconceptions they've encountered in their work. 2. Myth-Busting Techniques: Teams create clear, evidence-driven counter-arguments to debunk myths, emphasizing accessible language and the political implications. 3. Role-Playing: Participants engage in mock policy discussions, practicing how to present research persuasively and respond to pushback. 4. Effective Communication Strategies: Group discussions explore best practices for presenting scientific evidence and building trust with policymakers. 5. Action Planning: Researchers reflect on specific myths they've encountered and develop action plans for future policy engagement. This interactive approach ensures researchers gain the confidence and skills to effectively challenge myths, influence policy, and compellingly communicate science. By mastering these skills, researchers can help shape more informed and effective policies that reflect the best available evidence.

Friend or Foe: understanding public perception of stray dogs in India

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This study investigates public perceptions, behaviors, and challenges related to dog ownership, stray dog management, and neutering practices in India. A survey was conducted across India to assess human-dog interactions. The questionnaire included sociodemographic details, attitudes toward animals, and questions on ownership and neutering. Most questions were close-ended, while demographic ones were open-ended. Consent was obtained before participation. We used simple random sampling to circulate the survey via Google Forms on email and social media. Responses were filtered using Microsoft Excel 2021, and statistical analysis was conducted using chi-square tests in IBM SPSS Statistics 29.0.1.0. The survey included 128 participants from 53 districts across 16 states, with 65% from urban areas. Indigenous (38%) and Labrador (21%) breeds were the most owned. Overall, 52.3% had owned or currently owned a dog. Among rural respondents, 74.28% had dogs, compared to 48.19% in urban areas. Only 7.46% currently own a stray dog. Dog ownership varied by age, with 72.7% in the 18–22 age group and 50% in the 23–27 group owning or having previously owned a dog. Younger (0–5 years) and male dogs (55.4%) were preferred. Most respondents (88.2%) acknowledged the presence of stray dogs, with 51.5% witnessing predatory behavior like chasing vehicles. While 37.4% considered strays a problem, 24.2% disagreed, showing divided opinions. Neutering was supported by 71% of participants due to concerns about mating, gatherings, and heat cycles. However, only 23.4% had neutered their pets due to cost (11%), health risks (18.7%), breeding intentions (11%), and ethical concerns (19.5%). Post-neutering changes were observed by 65%, with reduced aggression (57%) and shifts in dominance (40%). 60% believed neutering impacts a dog's natural life cycle. Although 53.1% supported neutering older stray dogs if safe, 41% reported a lack of neutering facilities. Findings aligned with Sensharma et al., where Indian respondents saw strays as community animals, unlike US participants. Concerns about aggression and disease were common in both studies. However, support for euthanasia differed—8.6% in our survey vs. 14.7% in the US. While 53.1% expect government-backed neutering programs, 41% reported lacking facilities. This study shows varied public views on human-dog interactions, with urban areas more concerned about strays. Though 71% support neutering, only 23.4% have done so due to cost, ethics, and health concerns. Over half expect government-supported programs, but many report lacking facilities. The findings stress the need for awareness, accessible services, and stronger pet management policies.

Inter-observer reliability using Welfare Quality® to assess sow welfare in Maternity Rings and farrowing crates

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The Welfare Quality® protocol is based on four principles: Good feeding, Good housing, Good health and Appropriate behaviour. The protocol includes a Qualitative Behaviour Assessment (QBA) to evaluate the expressive quality of how animals behave, interact with each other, and interact with their environment as a component of the 'Appropriate behaviour' principle. We applied the Welfare Quality® pigs' protocol QBA to sows housed in two different farrowing environments: the Maternity Ring (MR), a novel free farrowing system that eliminates sow confinement whilst preserving an existing footprint of 4.3m², and farrowing crates (FC). The aim of this study was to determine the inter-observer reliability following a training session of two independent observers who evaluated the behaviour of the same sows in FC and MR in early and late lactation. Following familiarisation with the protocol, two individuals spent 5 minutes quietly walking the peripheral and central pathways within each of four farrowing rooms containing FC and MR whilst observing sow behaviour. The observers then exited to record QBA scores for each room on a visual analogue scale across 20 positively and negatively valenced emotional states. The scores were transformed into numerical values between 0 and 125. Interobserver reliability agreement was calculated using intraclass correlation coefficients (ICC; IBM SPSS Statistics for Windows v26.0. Armonk, NY, USA). An ICC of below 0.5 indicated poor agreement, 0.5 – 0.75 was moderate, 0.75 – 0.90 was good and above 0.90 was excellent. The ICC for early lactation FC (0.83), late lactation FC (0.74), early lactation MR (0.96) and late lactation MR (0.84) illustrated some variation in the level of agreement between observers across treatments, although the majority were within the good to excellent categories. The observer alignment was greater for sows in MR. This could be due to the design of the MR, which enabled better observation of sows and greater diversity of behavioural expression. Given there were 20 different adjectives used to score behaviour in the QBA, clear definitions and descriptions of the different behaviours may improve calibration between observers. This is particularly important where subjective scoring is applied across a wide scale, to improve the inter-observer reliability. In conclusion, the Welfare Quality® QBA successfully evaluated a range of sow behaviour in different farrowing systems in a consistent pattern across observers. Free farrowing systems enable a greater range of expressive behaviour which may improve congruity between observers during a QBA.

The effect of ventilation systems on layer performance

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Breeding over the decades has significantly enhanced the production performance of laying hens. However, higher production performance is often associated with increased metabolic rates, making hens more sensitive to environmental changes. This study aimed to investigate the effects of ventilation systems on layer performance during the peak production period. The experiment was conducted in two commercial barn farms: one was a semi-closed house without ventilation system (WVS, hen no. = 5,000), and the other was a closed house equipped with an automatic ventilation system (AVS, hen no. = 13,500). Both farms reared ISA Brown hens with identical peak diet and lighting programs as recommended by the management guide. Data on hen-day egg production, daily feed intake, and number of dead birds were recorded from 26 to 40 weeks of age (WOA). The data were analyzed using the generalized linear model in SPSS version 25, with WOA included as a covariate. The trial was conducted in collaboration with commercial farms, and the rearing periods were scheduled according to each farm's production timeline. Therefore, environmental data were collected during different times of the year. The outdoor and indoor temperature ranges in AVS were 15.0–25.6°C and 20.8–26.5°C, while the humidity varied between 81.9–92.3% and 66.1–83.6%, respectively (January–May 2024). In contrast, WVS recorded temperature and humidity ranges of 22.8–29.7°C and 75.5–88.8% (August–November 2024). Hens in AVS exhibited a significantly higher hen-day egg production rate ($77.7 \pm 1.5\%$) compared to those in WVS ($72.4 \pm 1.5\%$) ($P < 0.01$). Additionally, AVS hens had higher daily feed intake (125.3 ± 4.0 g/d) compared to WVS hens (100.9 ± 4.0 g/d) ($P < 0.001$). It should be highlighted that the mean daily feed intake in WVS was 11 g/d below the recommended level in the management guide. The mortality showed no difference between the two groups (WVS: $17.9 \pm 4.8\%$; AVS: $7.8 \pm 4.8\%$; $P > 0.05$). In conclusion, barns equipped with AVS provide a more stable environment for layers, closer to the recommended thermal comfort zone (18–25°C, 50–70% RH), compared to WVS. AVS barns ensuring thermal comfort, maintaining feed intake, and enhancing egg production performance. Although the difference in mortality was not statistically significant, the observed reduction in the AVS group indicates potential welfare benefits that merit further investigation.

Thermal perches as cooling devices for reducing heat stress in laying hens

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Alternative housing systems that include resources such as perches are being used worldwide to meet laying hens' behavioral needs; the use of perches can additionally mitigate heat stress (HS). This proof-of-concept study investigated if cooled perches could minimize deleterious effects of HS in caged hens. White Leghorn hens (n=288) were assigned to 1 of 6 banks of 6 cages each (76 cm x 52 cm x 18 cm; 8 birds/cage) within an environmentally controlled room at 17 weeks of age (WOA). A bank consisted of 3 deck levels with 2 cages per deck. Banks were assigned to 1 of 3 treatments for an 80-week trial (2 banks/treatment): 1) circulating cooled water (10° C) perches (CP), 2) ambient air only perches (AP), and 3) no perches (NP). Two HS episodes (35°C for 12 h, 6:00-18:00 daily) were applied at 21-35 and 73-80 WOA. Samples (body weight, blood, organs, brain, and behavior) were collected at multiple time-points. Data were analyzed using PROC MIXED (SAS 9.4) and a GLMM with a logit link (R, LEM4 package) with body weight included as a covariate. When room temperature peaked, perch use was higher for CP (58%) vs. AP (45%, $p<0.0001$). HS-induced thermoregulatory behaviors were delayed in CP hens: panting was observed at 32°C in AP and NP hens vs. 35°C in CP hens; fewer CP hens displayed panting (21% vs. 50% AP and NP; $p<0.0001$) and wing spreading (21.8 % vs. 50% AP and NP; $p<0.0001$). At 80 WOA, CP hens had higher hen-house egg production (CP: 76.1 > AP: 73.7 > NP: 69.0; SEM=0.5, $p<0.0001$), feed intake (CP: 103.02g > AP: 98.28 ~ NP: 100.56g; SEM=0.82, $p<0.02$), T3 levels (CP: 288ng/dl > AP: 269ng/dl > NP: 245 ng/dl; SEM=9, $p<0.01$), T3/T4 ratios (CP: 0.038 > AP: 0.034 > NP: 0.032; SEM=0.003, $P<0.001$), and egg quality (weight: CP: 61.1g > AP: 60.0g ~ NP: 59.6g; SEM=0.1, breaking force: CP: 36.5N > AP: 34.9N ~ NP: 35.0N; SEM=0.3, $p<0.0001$) and lower heterophil/lymphocyte ratios (CP: 0.83 < AP: 1.20 < NP: 1.24; SEM=0.08, $p<0.01$). Results indicated that conducting body heat from hens directly to the cooled perch reduced the deleterious effects of heat stress on behavior, endocrine homeostasis, and egg quality. This work was supported by the Agriculture and Food Research Initiative, Foundational and Applied Science Program, project award no. 2013-67021-21094 and 2023-67015-39679, from the U.S. Department of Agriculture's National Institute of Food and Agriculture.

Comparing continuous observation and subsampling for pain related behaviors after disbudding in dairy calves

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Disbudding is a painful management procedure that occurs on 94% of U.S. dairy farms. Pain-related behaviors can be used as indicators of dairy calf welfare in the weeks after disbudding, as wounds heal, however continuous sampling of these behaviors can be labor intensive. Our objective was to validate instantaneous sampling for measurement of known pain-related behaviors following caustic paste disbudding. A total of 33 dairy calves (24 Holsteins and 9 Jersey heifers) were video recorded at 6 wk of age. Of these, 18 calves were caustic paste disbudded at 3 d of age and 15 were non-disbudded controls who received a sham procedure. We note that in separate analysis, there were no differences among breed or treatments. The average time to healing was 18.8 weeks after the procedure, so we aimed to describe calf behavior partway through this process. Video recordings were continuously sampled for 75 min beginning at 0630 h. Six pain-related behaviors that are commonly used in the disbudding literature were observed for their frequency. The 75-min data were subsampled at 5 random start times (1-5 respectively: 00:00:00; 00:18:02, 00:07:00, 00:25:37, 00:02:28) for 5-, 10-, 15-, and 20-min. All data were converted to a per min basis. Estimates obtained through subsampling were compared with true values via regression analysis. A subsample was considered an accurate representation if $R^2 \geq 0.85$, and if the slope and intercept were not significantly different from 1 and 0, respectively, as these values do not over- or underestimate true values. Continuous 75-min observation resulted in (mean $\pm$ SD) behaviors/min: 1.42 $\pm$ 1.70 ear flicks, 0.16 $\pm$ 0.14 head shakes, 0.07 $\pm$ 0.11 head rubs, 0.05 $\pm$ 0.05 head scratches, 1.18 $\pm$ 1.37 tail flicks, and 0.04 $\pm$ 0.03 transitions. No subsampling intervals of the continuous data produced consistently accurate representations of any of the pain-related behaviors analyzed. Of the 120 comparisons made across the 6 behaviors, 5 start times and 4 durations, only 2 subsamples for ear flick R^2 values indicated a strong correlation ($R^2 \geq 0.85$), which may have occurred by chance. Some samples from the 20-min interval had $R^2 \geq 0.80$ but failed to meet the slope or intercept criteria ($P < 0.05$). Our approach to subsampling did not create consistent results with the full 75-min observation period, indicating that this is likely not an appropriate way to save labor and time in the weeks following disbudding.

Veterinarians' and technical experts' perspectives on the adoption of immunocastration in Brazil: preliminary results

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Surgical castration in male piglets is widely used to prevent boar taint and aggression in post-pubertal boars, despite causing significant pain. Immunocastration (IC) is an alternative method to avoid boar taint that mitigates risks of tissue damage, infection, and pain, improving animal welfare. The uptake of this technology varies widely across countries and there is a need to better understand factors influencing adoption. In Brazil, IC is used in over 85% of the pig production system. This study aimed to identify the key drivers, success factors, motivations, challenges, and benefits of implementing IC in Brazil. Five semi-structured ~1h interviews were conducted with pig farm veterinarians and technical experts who participated in the transition to IC in three main Brazilian pork-producing regions (South, Southwest, and Midwest). The interviews were transcribed and analyzed using deductive thematic analysis. Four themes were described (T1–4): T1) Foundations for IC integration: Improved feed conversion efficiency was the primary factor driving the transition to IC. Principal elements facilitating the conversion include robust scientific research and on-farm pilot studies supporting its feasibility and the role of regulatory frameworks and policy changes enabling its implementation. T2) Building the structure for IC adoption: The continuous support, training, and education provided by the IC vaccine supplier to farmers and slaughterhouses facilitated IC integration. Additionally, efficient logistics, a simplified two-dose protocol comparable to a surgical castration protocol, and infrastructure and process adaptations, particularly in slaughterhouses, were crucial for processing entire pigs. T3) Difficulties in integrating IC: Challenges to IC adoption included skepticism about vaccine efficacy, and concerns over the risks associated with incorrect administration, including the presentation of behaviours typical of entire males. Additionally, industry challenges, such as market resistance and federal inspectors' reluctance to accept immunocastrated pigs, which led to carcass condemnations, hindered IC adoption. T4) The broad impact of IC on swine production: This theme highlights benefits like improved growth rates, feed conversion, and carcass quality. Reduced piglet mortality and minimized health risks from avoiding surgical castration were also mentioned and associated with piglets' welfare. Economically, faster growth enabled earlier slaughter and increased production cycles, while streamlined labour freed workers to focus on essential tasks, such as ensuring adequate colostrum intake in newborn piglets. Overall, preliminary data suggest immunocastration adoption in Brazil was fueled by scientific support, policy changes, and continuous assistance, which helped overcome challenges and improve production efficiency.

Growth, behaviour and stress response of weaned pigs to different space utilization on elevated platforms

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Due to their high prolificity, pigs are one of the livestock highly affected by intensifying pressure on agricultural land use due to urbanization in Africa, causing space constraints and leading to challenges in maintaining animal welfare and production efficiency in pig farming. However, elevated platform housing systems, creating more space and supporting play behaviour suggest a promising solution. Hence, this study investigated the effect of different space allocations of elevated housing on the growth, behaviour, and stress response of weaned pigs. Seventy-two weaned pigs (Large White × Landrace)—3 replicates/3 treatments: 0.75m² /5 pigs (without elevated platform, NP), 0.75m² /8 pigs (with elevated platform, EP1), and 0.75m² /11 pigs (with elevated platform, EP2). The elevated wood platforms of closed flooring were installed at a height of 1m above the flooring, and the pigs had access via a ramp (1.75m x 0.5m, 45° slope with crossbars). Average weight gain (AVG, kg), average feed-intake (AFI, kg), and feed conversion ratio (FCR) were evaluated. Skin lesion score and behaviour (feeding and aggression, %) were monitored from 08:00 to 12:00 hours at three-day intervals during the experiment with CCTV and evaluated using a stipulated ethogram. Corticosterone concentration (ng/mL), white blood cell (WBC) counts ($\times 10^3/\mu\text{L}$), neutrophils, and lymphocytes were also measured at days 1, 28, and 56. The experiment lasted 8 weeks. Data were analyzed using descriptive statistics and ANOVA at $\alpha_{0.05}$. AVG in EP1 (9.57) was significantly higher ($P < 0.05$) than NP (8.60) and EP2 (6.68). AFI in NP and EP1 were significantly higher than in EP2. The FCR in EP1 (2.78) was lower ($P > 0.05$) than NP (3.20) and EP2 (3.65). The corticosterone concentration ranged from 25 (EP2) to 17.5 (EP1). The WBC counts were not significantly different across the treatments. The neutrophil in NP and EP1 was significantly higher than in EP2 (33.50%), while the lymphocyte was higher in EP2 (58%). The skin lesion score was between 0.56 (EP2) and 0.22 (NP and EP1). Feeding behaviour ranged from 89.13 (NP) to 77.86 (EP2), while aggressive behavior ranged from 22.14 (EP2) to 10.87 (EP1). The study found that weaned pigs housed under moderate space allocation in EP1 demonstrated superior growth performance, efficient feed conversion, lower corticosterone levels, and less aggressive behaviour, which might be due to its lower stocking rate. Emphasizing the critical importance of optimal space allocation in housing system design, serving as enrichment for play behavior and reducing aggressive behavior.

Mom is calling! Sows nursing vocalization changes with the housing system

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Conspecific communication by gregarious species like pigs is used to share important information about environmental and social conditions. In particular, pig vocalizations can play a fundamental role in communicating emotions like fear, pain, curiosity, or excitement. This study examines whether different farrowing systems affect the initial vocalizations of nursing sows. One week before farrowing, pregnant gilts (Landrace x Large White) were weighed and allocated to either a barren (standard farrowing crate $n = 11$) or enriched (farrowing pens with straw, $n = 13$) farrowing system. Study sows shared the farrowing environment with as many as 9 other individually-housed and farrowing non-study sows. On the second or third day after farrowing, vocalizations from a single nursing bout were recorded using the ZOOM H4n Pro recorder and a Sennheiser MKE 600 Shotgun microphone at 0.8 - 1m from the sow's head. The nursing bout was defined by the sow calling her piglets to nurse. The initial one-minute sample was used for call labeling based on aural and visual inspections using Raven® Pro 1.6. The audio recordings were digitally filtered with a Hamming window length of 1024 and 90% overlap, as well as an FFT size of 512. The total number of vocalizations labeled was 898 yielding an average of 37.5 calls per minute per sow. However, 44% of the calls had to be excluded due to overlapping contaminant acoustic signals from neighboring sows and piglets. This left 494 calls for bioacoustics analysis. The data was divided by treatment: 212 calls from barren and 282 calls from enriched farrowing systems. Statistical analyses were conducted with a significant level of $p < 0.05$. Results showed no difference in body weight between the groups (Barren 219 ± 14 SD Kg vs Enriched 218 ± 16 SD Kg). However, the calls were longer in the sows housed in barren (0.29 ± 0.14 s) when compared to those of sows housed in enriched (0.22 ± 0.09 s) farrowing systems ($p = 0.045$). No treatment differences were observed for low-frequency calls. However, the frequency of these calls did depend on body weight, as the dominant frequency of calls from heavier sows was lower ($p = 0.024$). Previous work suggests that longer calls in pigs are often associated with stressful conditions and negative emotions, whereas short calls can reflect positive emotions and low stress. Our findings demonstrate that the farrow system can impact features of the nursing call and potentially influence a sow's communication with her piglets.

Gilts transitioning from a group pen to individual crates express an increase in abnormal behaviors

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Common husbandry practices on farms today have the potential to compromise animal welfare. Confinement can inhibit the expression of species-specific behaviors and challenge natural homeostatic activities. On pig farms, an animal's social and explorative behavior is often restricted as most breeding females are confined in crates for at least some part of their production cycle. Here, we study how the transition from group housing to the confinement of an individual stall impacts gilt behavior. A within-subject repeated-measure study design was applied to 12 Landrace x Large White gilts that were group-housed in a collective pen for 3 weeks and then moved to individual crates for 4 weeks. Scan sampling was performed every 5 minutes between 7:30 AM and 4:30 PM on video recorded three days per week. Observed behaviors were categorized as posture (lie, stand, sit, and kneel) or activity (drink, stretch, yawn, scratch, shake head, paw surfaces, oral stereotypies, surface interaction with the snout, bite surface, social behavior, and other). Coding was performed in the BORIS software by one trained researcher with an intraobserver coefficient of variance < 5%. The data was analyzed using linear mixed models with behaviors as the dependent variable, week as a fixed effect, and day and subject as random effects to account for repeated measures. Significance level was $p < 0.05$. Lying was the most common behavior, as animals spent 94% of their time down across the study. However, gilts in the crates laid down significantly less than animals in the pen (6.4 versus 30.2 events; $p < 0.001$). Gilts also sat more in the crates than in the pen (4.3 versus 1.4 events; $p < 0.05$). Two activities were most prevalent over the seven weeks: oral stereotypies (30.4%) and surface interaction with the snout (52.1%). These behaviors were performed more when the gilts were housed in the crates than in the pen (oral stereotypies - 15.3 versus 2.4 events; and surface interaction with the snout - 6.1 versus 1.6 events; both $p < 0.05$). Housing impacted gilts' behavior, mainly altering their posture and activity levels. Gilts appeared busier during crate housing, both standing and sitting more, and exhibiting noted increases in select behaviors. However, oral stereotypies and excessive interaction with surfaces are not part of the species-specific swine repertoire. Individual housing increases abnormal behaviors in gilts and seems to reduce resting behavior, suggesting negative consequences for their welfare.

The relationship between foraging enrichment and contrafreeloading behaviour in laying hens

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Contrafreeloading (CFL) is the phenomenon in which animals choose to work for food, even though identical food can be obtained without any effort. CFL is suggested to benefit the animal's survival, since it provides opportunity to discover alternative food sources. CFL has been observed in many species, including laying hens. CFL has also been studied in relation to feather pecking and feather eating, and is positively associated with ranging behaviour in broiler chickens. Offering foraging enrichment to laying hens in captivity can promote foraging behaviour. We investigated whether foraging enrichment with black soldier fly larvae (BSFL) affected the feeding strategy of laying hens, as indicated by their motivation to perform CFL. BSFL provisioning was expected to increase CFL motivation, because BSFL are highly attractive to hens and therefore, hens who find BSFL in their home pens might be more motivated to explore their environment in search for food than hens in the control groups. Bovans White laying hens were housed in 18 pens (n=360, 20 birds per pen). They received either live (LL), dried (DL) or no BSFL (CONTROL) on a daily basis (6 pens per treatment). One pair from each pen was individually trained and tested in a conditioned place preference task, as an indicator for their motivation to perform CFL. Hens were first conditioned to an arena with two zones with visual cues: one zone provided freely available grain, and one zone provided grain that was mixed with wood shavings (CFL zone). In the testing phase, the grain and wood shavings were removed but the visual cues were still present. The time spent in each zone was recorded for 2.5 minutes, as well as the latency for the first movement and the direction of the first choice. Overall, hens spent 245% in the CFL, 255% in the grain, and 537% of their time in the neutral zone. Time spent in the CFL zone per treatment group was 184% (LL), 254% (DL) and 294% (CONTROL), respectively. A linear mixed model with BSFL treatment as fixed effect and pen as random effect showed no differences in place preference among the treatment groups ($p > 0.05$). No differences were found in latency to first movement and direction of first choice ($p > 0.05$). Provision of BSFL as a foraging enrichment does not appear to affect the motivation to perform CFL behavior in laying hens.

Measuring horse welfare during Equine-Assisted Interactions with military veterans with PTSD

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Equine-Assisted Interventions (EAI) have beneficial effects on human participants, but the effects on horses have not been studied extensively. This study investigated the effects of EAI with military veterans with Post-Traumatic Stress Disorder (PTSD), on the heart rate (HR), heart rate variability (HRV), and behaviour of the horses. The horses (N=6, 1♀ 5♂, age: 16±6 years, height: 165.6±8.3 centimetres) were deployed multiple times and had experience with therapeutic horseback riding. The EAI program consisted of 12 weeks of weekly sessions (10.00-15.00) and a follow-up session (week 24). Interactions took place in a octagon shaped ring (11.4 metres diameter), within an indoor riding arena (20x40 metres). Measurements were performed during Baseline conditions (B: 5 minutes in the ring without a veteran present), Free activities (F: 20 minutes of social interactions and relaxation), and Directed activities (D: 30 minutes of shared activities such as grooming, groundwork and riding). Hylofit electrodes, Polar H10 Heart Rate Sensor transmitters and Polar M430 receivers and Kubios software recorded HR and HRV. Oppo A5 2020 phones and The Observer XT recorded behaviours such as locomotion, social proximity to the veteran, received social contact, ear position, lip licking and chomping with focal animal sampling (Cohen's Kappa > 0.70). Behavioural observations were limited to F in week 1, 6 and 12 because this was very time consuming. Statistical analysis were performed using R and R studio with the 'lme4' package computing linear mixed-effects models. During F, the HR and HRV did not differ significantly from B in any week (all $P > 0.05$). During D, HR was significantly higher (all $P < 0.01$) and HRV significantly lower (all $P < 0.02$) compared to both B and F in week 3 to 12, which was likely due to the higher physical activity. No significant changes over the weeks were found for ears forward ($F_{2,133.8} = 0.5$, $P > 0.05$), social proximity (resp.; $F_{2,134.6} = 0.3$, $P > 0.05$), and received affiliative contact from the veterans ($F_{2,134.8} = 1.7$, $P > 0.05$). The horses spent most time with their ears forward and in social proximity of the veterans, while they had the opportunity to walk away or avoid the veterans. This study shows that non-invasive measurements of horse welfare are practically feasible during EAI and that the type of activity affects HR and HRV. No indications were found that interactions with military veterans with PTSD negatively affect the welfare of the horses.

The Influence of Co-Housing on the Welfare of Shelter-Living Dogs

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Meeting the needs of dogs in animal shelters can be a challenging proposition. Negative environmental inputs, such as excessive noise, restrictive kenneling, and social isolation, contribute to the compromised welfare that these dogs experience. Living with a conspecific, co-housing, has been investigated to some extent, and what studies have been conducted suggest that dogs' behavior could be improved by living with another dog. In a smaller study within a larger investigation about weeklong fostering, we explored the effects of co-housing prior to foster care (i.e., with or without a dog) and following (i.e., without another dog or with a familiar or unknown dog) in an open admission animal shelter. To answer our research question, dogs' urine was collected for cortisol: creatinine analysis, and activity monitors were worn by the dogs. We analyzed cortisol and activity spent in five activity levels, from least (Q1) to most intensive (Q5), in the five days before and after foster care. These activity level criteria were utilized across all dogs. In total, 42 dogs participated with 405 cortisol: creatinine values and 390 activity hours across five activity levels utilized. We found no difference of housing type in dogs' in-shelter cortisol levels either before or after foster care with no effect of housing on dogs' activity prior to fostering. However, dogs' activity across levels was affected by living with a familiar dog upon reentry to the animal shelter, $C^2(8, n = 195) = 28.77, p = < .001$. In pairwise comparisons of the housing-by-activity-level interaction, we found dogs' Q1 activity, a measure of rest, was greater for dogs when they were co-housed with a familiar dog versus a new dog, and that difference was nearly significant ($p = .051$). Q2 activity was higher when dogs were co-housed with a familiar dog as compared to singly housing ($p = .043$). Moreover, we found that Q4 activity was lower when dogs were co-housed with a familiar dog versus being housed alone ($p = 0.010$). Lastly, the highest intensity activity, Q5, was lowest for dogs when housed with a familiar dog versus singly housed ($p = .009$) or being co-housed with a new dog ($p < .001$). In total, our findings of increased lower activity and decreased high activity suggest a possible benefit to dogs' welfare when housed with a familiar dog upon reentry to the animal shelter and warrant further investigation and discussion about its application.

Perspectives on cow-calf contact by early adopters in North America

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Research has shown that separation of dairy calves from their mothers immediately after birth is frowned upon by the public. While concerns around this practice are growing in North America, alternative rearing systems allowing for prolonged dam-calf contact remain understudied. Twelve farms (USA = 10, Canada = 2) that have implemented dam-calf contact from calf birth to weaning participated in interviews with a semi-structured guide. The questions pertained to why farmers had decided to implement dam-calf contact, the benefits and challenges they have noticed, and their broader opinion on this practice and its place in the dairy industry. A total of 18 farmers participated (2 persons were simultaneously interviewed on 6 of the farms): 14 were the owners or co-owners, and 4 were the dairy herd managers. Most participants were 41 to 60 years old, 11 identified as males, and 7 as females. Average herd size was 49 lactating cows (range: 23 – 200). Conversations were audio-recorded and transcribed verbatim, and the codebook for thematic analysis was developed by three coders: two who conducted the interviews, and one unfamiliar with both the participants and the interview guide. Four main themes were identified: 1) Animal health and productivity, 2) Animal behavior and emotions, 3) Farm-level considerations, and 4) Exchanges with the outside world. Participants discussed the health and productivity of their animals, highlighting changes in calf growth, cow milk yield, mastitis incidence, and genetics. Farmers were attentive to animal behavior and affective states as a success indicator, observing the bond between dam and calf, but also the pair's interactions with the rest of the herd and the humans. Farm-level considerations, such as personal ethics, job satisfaction, labor, finances, also influenced how farmers developed their system and their willingness to maintain dam-calf contact. Farmers also discussed their exchanges with other farmers and the public, their thoughts of the generalizability of this practice, and their experiences with other rearing systems. Although the farmers differed in the relative importance they attributed to each of those factors, all agreed that rearing calves under their dams had overall been a positive change for their farm. While initial implementation required trial-and-error, the participants indicated they had no intention of reverting to another rearing system for their calves, and some even stated they would rather leave the industry altogether than separate cows and calves at birth again. These findings improve our understanding of farmers' perspectives on dam-calf contact.

Enhancing animal welfare education through interactive comics

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Ensuring a good life for all animals requires not only high welfare standards but also effective education that fosters ethical awareness and decision-making skills in future farmers and veterinarians. However, traditional learning methods in animal welfare often rely on passive knowledge transfer and lack experiential learning opportunities. The “Welfare Xperience” project introduces an innovative learning platform that enhances animal welfare education through interactive comics, enabling learners to engage in realistic yet risk-free decision-making scenarios. At the core of this concept is the Comic Automaton, a digital tool that allows students to create and experience interactive narratives about farm animal welfare. By making choices within realistic livestock management situations, such as colostrum management in calf rearing, learners immediately see the consequences of their decisions—both positive and negative. This learning-by-doing approach fosters a deeper understanding of cause-and-effect relationships in animal welfare, while also increasing motivation and retention. To evaluate the effectiveness of this approach, user-centered workshops were conducted with agricultural students. Participants worked in structured task-based and free storytelling modes, developing comics that reflected key welfare challenges. Observational studies and feedback sessions indicated that students were highly engaged with the format, appreciating the opportunity to experiment with different choices and reflect on their ethical and practical implications. The platform encouraged active participation, critical thinking, and a deeper emotional connection to the animals’ well-being. Beyond individual decision-making, this approach also supports broader discussions on societal responsibility in animal welfare by encouraging students to explore ethical dilemmas in livestock management. The results suggest that interactive comics can be a powerful tool for enhancing practical competence and ethical awareness in animal welfare education. By making complex welfare concepts more accessible and relatable, the platform helps bridge the gap between theory and practice. Future refinements will focus on expanding the range of scenarios to cover different animal species and diverse welfare challenges using AI-approaches. This innovative method contributes to better-informed livestock management and ultimately supports higher welfare standards and a good life for farm animals.

Do laying hens form stable social networks? – A case study

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A social network is a group of individuals forming a non-random social structure where the number of interactions systematically vary among individuals. The ancestor of all domestic chickens, the Red Junglefowl, has been shown to form social structures within a group, however, how poultry in egg production are organized is poorly understood. While some studies indicate that chickens in large groups replace social affiliations with higher social tolerance, other studies show that they can distinguish between familiar individuals and strangers, and that they prefer particular individuals over others. Understanding social structures within a group of layers might help us to understand the underlying mechanisms of two great welfare-issues in today's egg production: feather pecking and cannibalism. In this case study, we followed a group of 20 genetically outbred hens for four weeks, with the aim to explore social structures and degree centrality. The hens were 46 weeks of age, and the group had been stable since hatch. We hypothesized that the hens had preferential affiliations and formed sub-groups, and furthermore, that there was an individual variation in centrality that was consistent over time. By using proximity to assess centralization, descriptive statistics showed that some individuals were more centralized compared to others, and Pearson correlation showed that there was a relatively high intra-individual stability in this trait ($w1-2$, $r=0.55$, $p=0.011$; $w2-3$, $r=0.49$, $p=0.027$; $w3-4$, $r=0.47$, $p=0.033$). Furthermore, no individual spent more than 10% of her total number of interactions with a particular individual (as compared to 5.6 % expected from random distribution), i.e. little consistency in social affiliations could be found. A Louvain clustering analysis was applied to reveal non-overlapping communities within a network. The Louvain method group nodes into clusters based on how movements of nodes affect their modularity. The Louvain clustering showed no consistent social pattern or stable subgrouping over the four weeks of observation. To conclude, there was no evidence for strong social affiliations between specific individuals, or for individuals to form subgroups. However, individuals differed in degree centrality and this trait was stable over time. Although the results from this study do not support the hypothesis that chickens form stable social affiliations, it does not rule it out as a possibility. More research is needed on larger sample sizes with several replicates before it is possible to draw any general conclusions about the presence of stable social affiliations in domestic chickens.

Consistency of dairy cow milking temperament scores over time

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Temperament describes an animal's individual, consistent response. In dairy cattle, milking temperament refers to a cow's response to the milking procedure. This trait has been characterized for breeding animals who are less reactive, which could potentially reflect better welfare. A calm milking temperament is also desirable for maximizing milking efficiency and minimizing residual milk volume. Our aim was to evaluate the consistency of milking temperament measurements over a two-week interval in 103 lactating Holstein cows in Wisconsin, USA. Milking was performed twice daily at 0300 and 1500 h in a 2×16 parallel parlor. Each cow was assessed twice 14 days apart during PM milking by one observer in the center pit of the milking parlor, using a temperament scoring system with a 0 to 2 scale. The definitions were based on the presence of hind leg movements (0: no movement; 1: steps side to side, lifting hooves no higher than hoof-height; 2: lifts hooves above hoof-height), scored separately at 3 stages of the milking procedure: i) during udder preparation, ii) while attaching the milking machine, and iii) while milk is collected. We evaluated overall consistency in milking responses between the 2 days by computing weighted Kappa values, separately for the 3 stages of milking. We also evaluated individual cow stability in responses between the days by computing individual stability statistics (ISS) for the scores summed across the 3 milking stages, then used Pearson correlations between ISS and demographic variables collected on the first assessment day (parity, days in milk, milk yield, and somatic cell count) to evaluate associations between response consistency and cow characteristics. The overall consistency of milking temperament measurements over the two-week interval varied depending on the stage of milking, with poor agreement during udder preparation ($\kappa = 0.185$, $p = 0.059$) and slight agreement during both milking machine attachment ($\kappa = 0.363$, $p > 0.001$) and milking ($\kappa = 0.253$, $p = 0.009$). No correlations were detected between individual ISS scores and cow demographics (r range: -0.13 to 0.02). Our findings suggest that, on average, milking responses show only moderate consistency over time. Rather than representing a stable trait, milking responses may reflect context-specific reactions. Although some cows in our study were consistent in their responses between days, this individual variation was not associated with the other characteristics we evaluated. Therefore, we suggest using caution in interpreting these responses during milking to reflect a temperament trait.

Does increasing the food-related activity of indoor cats lower their attention-seeking behaviors?

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Many domestic cats (*Felis catus*) kept as companions are confined indoors (ranging from 15% in parts of Europe to 80% in North America) and are therefore unable to engage in hunting and other behaviours typical for the species. Instead, these cats may interact with and seek attention from their owners to a degree experienced as problematic. One possible way to avoid or limit this problem may be by providing the cats with enrichment. The aim of this intervention study was to measure the effect of enrichment in the form of food puzzles or object play on the level of owner-directed attention-seeking behaviour among indoor only cats. A sample of 102 Danish owners of indoor cats experiencing at least one kind of attention-seeking behaviour daily or almost daily was recruited in the early fall 2024 from an online screener questionnaire shared through Facebook groups, other social media and posters. These owners were randomly allocated to two groups. Members of the first group were provided with two kinds of toys and instructions to make the toys available during feeding. Members of the second group were given two kinds of food puzzles and instructions on gradually providing dry feed through them. The intervention lasted four weeks, and at the end of each week the owners were asked to fill out a questionnaire reporting on the level of six different kinds of attention-seeking behaviours, and on how much the toys or the food puzzles were used. Complete responses were received from 92 participants. 65% of the cats provided with toys, and 89% of the cats provided with food puzzles, displayed an interest. In both groups a significant decrease ($p < 0.05$) was found over the study period in the attention-seeking behaviours “waking at night”, “begging for food”, “meowing”, “tapping/pushing”, and “doing things not allowed”, while no effect was found for “attacking behaviour”. With Bonferroni correction, only the accumulated results in both groups and the behaviours “waking at night” and “tapping/pushing” in the group with food puzzles showed a significant decrease. There were no significant differences between the two groups for any of the behaviours. Our findings suggest that activation of indoor cats in connection with feeding serves to lower attention-seeking behaviours, but more studies are needed to confirm the finding.

The delivery room for goats - opaque or open?

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To ensure colostrum intake and health monitoring, goats are often separated in small compartments within the pen for kidding and the first few days after. Usually, these compartments are small and made of simple fences. The openness allows social contact to herd members through the fence to a certain extent. However, it is not possible to retreat from e.g. threats or head butts by group members. Aim of this study was to quantify the effect of partly opaque fences at the kidding pen on agonistic behaviour as well as maternal, feeding and lying behaviour. Before kidding, social rank of the goats was determined via direct observations of agonistic interactions. Directly after giving birth in the home pen area (24-33 qm), we separated twelve goats from four groups evenly in either open or opaque kidding pens (3-3.5 qm). The open pens had two closed walls and two open fences, while only a section of approx. 40 cm width was open in the opaque pens. Goats and their kids stayed in these pens for four days, and their behaviour was analysed for eight hours within these four days each using video footage. Data was analysed using linear mixed models with behaviour as outcome variables and pen type (open/opaque) and social rank (high/low) as explanatory variables. In opaque pens, high-ranking goats showed more head butts against the fence than in open pens (rank x pen type $F_{1,8}=2,84$; $p=0,13$). As expected, low-ranking goats showed head butts rarely. Suckling was observed the most in high-ranking goats in opaque pens, but this effect could not be supported statistically. Lying in the hidden part of the pen was shown more often by high-ranking than by low-ranking goats (rank $F_{1,8}=3,07$; $p=0,11$), while goats had a longer lying duration in the hidden part in general (pen type $F_{1,8}=3,25$; $p=0,10$). There was no effect of pen type on feeding duration in high-ranking goats, but low-ranking goats were feeding longer in opaque pens. However, our findings could not be strongly supported statistically, probably due to the rather small sample size. Additional blinds in the kidding pen showed positive effects on the behaviour of low-ranking goats. High-ranking goats, however, might prefer open pens. They showed increased agonistic behaviour in opaque pens and stayed more often near the open segment. We thus recommend to consider the social rank of a goat for the configuration of a kidding pen.

Pained brains: spatial working memory is impaired in female dogs with osteoarthritis

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Chronic pain in humans is associated with impaired working memory. However, it is not known whether this is also the case in long-lived companion animals, such as dogs, who are vulnerable to age-related chronic pain conditions such as osteoarthritis. Pain-related impairment of cognitive function may affect quality of life by impeding a dog's ability to learn effectively in training situations, and engage with its owners and environment. Here we compare the performance of 20 dogs with osteoarthritis (OA) and 21 healthy control (CONT) dogs in a disappearing object task of spatial working memory. Dogs were grouped based on clinical histories and examinations conducted by a veterinary surgeon (MS). The task was carried out in owners' homes (1 visit) using four opaque boxes arranged in a semi-circle behind which an object (tennis ball or rubber ring according to dog preference) could be hidden. Dogs were trained that the object, suspended by string, would be moved in front of all boxes and then hidden behind one, and that they would then be rewarded with food for moving from a start point equidistant from all boxes to look behind the 'correct' box where the object was last seen. During testing, an opaque barrier was placed between the dog and the boxes following the hiding event for a fixed period of time (circa 0s; 60s; 120s). After these memory retention intervals, the barrier was removed and dogs allowed to search for the object. Each interval was tested three times for each box. Mixed effects logistic regressions (R, lme4::glmer) with a binomial outcome (correct first choice vs incorrect) showed no main effects of group (OA vs CONT), sex or age but revealed a group*sex interaction (Beta=1.198, LRT=6.27, $P=0.012$) with post-hoc tests indicating that female ($z=1.964$, $P=0.049$) but not male ($z=-1.574$, $P=0.115$) osteoarthritic dogs had lower predicted probabilities of successful task performance than control dogs of the same sex. Moreover, with increasing memory retention interval, performance declined more steeply in osteoarthritic than control dogs (Beta=-0.611, LRT=5.21, $P=0.022$), suggesting that cognitive effects of osteoarthritis, and potentially other pain-related conditions, are more clearly revealed in tasks presenting a greater cognitive load. One possibility is that ongoing pain occupies cognitive resources resulting in insufficient cognitive capacity for solving tasks, especially more difficult ones. Our findings parallel results from studies of human pain and working memory. That female dogs may be particularly prone to these effects warrants further investigation.

Understanding calf responses to disbudding pain using play behaviours and individual differences in Pessimism

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Calves are expected to play less when in pain, and recent evidence suggests that more pessimistic individuals are also at higher risk of being more affected by painful events. We aimed to explore 1) the impact of hotiron disbudding on different play behaviours, expecting those involving the head (e.g. play-fighting) to be more sensitive to disbudding due to the location of the injury, and 2) the effect of pessimism (assessed using the judgement bias test) on changes and recovery in play behaviour post-disbudding. Calves ($n = 19$) were housed in two groups of 10 (one animal was not included) and were individually tested for judgement bias when 25 days old. Previous studies showed that this trait is consistent over time in young calves. When 45 days old, calves were disbudded following the farm's standards (including general and local anaesthesia). Play behaviours including individual locomotor play, parallel locomotor play, and play fighting were recorded using continuous sampling for 4 h/d (from 1800 h to 2200 h) for 5 d before disbudding, on disbudding day, and for 7 d after. Play fights (which involve head-to-head contact) were suppressed on disbudding day (mean percentage change compared to baseline: -88.7% , $SE = 7.21$) and did not recover on the following days. In contrast, locomotor play duration did not change on the day of disbudding and increased on the day after disbudding (mean percentage change compared to baseline = 195.2% , $SE = 77.37$). More pessimistic calves did not show greater changes in play behaviours post-disbudding, but did show a lower increase in locomotor play on the day after disbudding (marginal $R^2 = .20$, $p = .017$). These results indicate that play-fighting is a more sensitive indicator of disbudding pain than other play behaviours, likely reflecting evoked pain that appears to last for at least 7 d after the procedure. Our results also add to the growing literature demonstrating that pessimistic expectations affect animals' ability to cope with and recover from stressors.

Applying self-organising maps to explore behavioural feeding types in gestating sows

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Electronic sow feeders (ESF) generate large datasets with numerous data points per animal, yet their full commercial potential remains underutilized. Expanding the focus beyond daily feed intake to explore lesser-studied feeding traits in sows could enhance the monitoring of sow performance and welfare. Additionally, investigating whether the substantial behavioural variation among individuals aligns with distinct behavioural types may further enhance this monitoring. The aim of this study was to use the unsupervised machine learning method self-organising maps (SOMs) to explore the existence of behavioural types in various feeding traits of sows. ESF and farm management data were collected during 16 months from a conventional farm (n=1080 sow gestation records) and an organic farm (n=439 records) in The Netherlands. Data were cleaned and aggregated to a 24h- level, calculating traits for both nutritive (N-)visits (i.e. with feed allowance) and non-nutritive (NN-)visits (i.e. without feed allowance). Traits included the frequency of 1) N-visits and, 2) NN-visits, and their timing, including 3) the hour of the first N-visit, 4) and NN-visit, 5) the interquartile range between NN-visits in 24h, and 6) the interval between the last N- and first NN-visit. A total of 12 SOMs (6 feeding traits*2 farms) were trained, each grouped into three distinct behavioural clusters in one feeding trait, representing sow patterns across gestation. Values of feeding traits were summarised with descriptive statistics and cluster patterns were visually compared on their level (i.e. average trait value), trend (i.e. change in time) and regularity (i.e. smoothness of the line) between farms, sow parities and gestation phase. SOMs clusters for the frequency of N- and NN-visits revealed a common and relatively consistent low-level pattern across gestation. Timing-related feeding traits showed more variation in level, trends and regularity between clusters. Depending on the feeding trait, gestation phase and farm, patterns in clusters mostly differed in average expression of a behaviour and showed different changing trends during gestation. Differences in feeding patterns were also observed between farms, gestation phases and sow parities, indicating those factors are important for understanding behavioural variation. Especially feeding traits related to NN-visits showed clusters with more pattern variation, which may reflect behavioural types. This study did not aim to analyse whether trends in feeding traits were statistically different, but rather explored potential interesting feeding traits and trends for consecutive research. Further research could delve into the meaning of patterns and examine how these patterns might be linked to welfare.

The current state of research on peer social bonds in farm animals

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Peer social bonds may be defined as relationships involving frequent and non-random (i.e. preferential) mutual affiliative associations and interactions between peers (excluding parental- and sexual relationships) that are consistent across a biologically relevant time frame, and create distress upon separation. Hence, these bonds can be defined based on the following four criteria: 1) social preference, 2) consistency of preferences, 3) separation distress, and 4) symmetry or reciprocity of interactions. These have been studied in wild animals, particularly primates, and shown to provide fitness benefits. In farm animals, behavioural studies increasingly report social bonds. Yet, it is unclear whether there is sound evidence to draw such conclusions. This systematic review aims to discuss the current knowledge of peer social bonds in farm animals, further assessing the evidential robustness of the literature. We also identify key knowledge gaps and provide recommendations for future studies. The retrieved literature included 47 papers covering a range of species including pigs (n = 9), cows (n = 18), sheep (n = 6), horses (n = 4), donkeys (n = 1), goats (n = 3), chickens (n = 3), and quails (n = 3). In some farm animals species (pigs, cows, horses) there is evidence of variation in strength (e.g. frequency) and/or non-randomness of interactions and associations between dyads, potentially representing peer bonds. However, there is currently insufficient research on the other criteria to draw conclusions on the existence of peer social bonds under farm conditions. Overall, studies face methodological challenges in the assessment of social bonds, which is further complicated by housing and husbandry conditions on commercial farms. This review shows that various methods have been used to assess social relationships, but that many of these have shortcomings, and lack the nuance to make conclusions on peer social bonds. Hence, we provide recommendations to address the identified methodological gaps. Research on peer social bonds in farm animals is in its infancy and we hope this work inspires other scientists to address this important topic diligently, while taking into consideration the implications of research conclusions on animal management in practice.

Camel-assisted services (CAS): Treatment, education, and support programmes

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Animal-Assisted Services (AAS) have shown well-documented benefits for human physical, emotional, and cognitive health. While species like dogs and horses dominate the field, the potential of camels remains largely overlooked. This work presents a literature review of the theoretical foundations, previous experiences, and utilitarian principles related to Camel-Assisted Services (CAS), with a focus on their impact on both human participants and camel welfare. It introduces a conceptual framework to support the continuous valorisation of domestic camels—both dromedaries and Bactrian camels—within animal-assisted services. CAS encompasses three main areas: Camel-Assisted Treatment (CATx), Camel-Assisted Education (CAE), and Camel-Assisted Support Programmes (CASP). CATx involves goal-directed interventions to improve motor coordination, emotional regulation, and cognitive functions, particularly benefiting individuals with autism spectrum disorder (ASD), post-traumatic stress disorder (PTSD), and anxiety disorders. The camel's calm demeanour and rhythmic gait facilitate neurorehabilitation and sensory integration therapies. CAE utilizes camels as educational facilitators, promoting responsibility, teamwork, and environmental awareness, with applications in structured curricula and informal learning settings. CASP focuses on emotional support and social integration, including camel-guided visits to nursing homes, hospitals, and rehabilitation centres, providing psychological relief and stress reduction. Camels offer several advantages over conventional therapy animals. Their hypoallergenic properties make them suitable for individuals with allergies, while their social intelligence and cooperative behaviour support safe human-animal interactions. Additionally, their adaptability to diverse environments ensures their welfare when properly managed. Despite these benefits, challenges remain regarding accessibility, ethical considerations, and scientific validation. The high cost of CAS, often not covered by insurance, limits its widespread adoption. Furthermore, ensuring the well-being of camels is crucial, requiring trained handlers and ethical standards to prevent stress and overexploitation. In conclusion, expanding the scope of AAS through CAS presents new opportunities for therapeutic and educational applications. Further empirical research is needed to evaluate its long-term impact on both human health and animal welfare. Establishing standardized protocols, assessing effectiveness across different populations, and addressing ethical considerations will be key to integrating CAS into mainstream practice.

Reaction of horses at pasture to traffic noise exposure

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Horse pastures are often located in proximity to roads, or even highways without any noise-reduction barriers. Thus, these horses are exposed to an intense, constant sound level, which may affect their welfare and health, such as in humans. To investigate to which extent traffic noise affects horses, we exposed N=20 horses naïve to highway traffic noise and kept in four groups across three facilities to traffic noise of varying sound levels. The noise levels were selected to imitate six different distances to a 4-lane-highway with constant traffic volume (from 54 dB, equivalent to 500 m distance to 71 dB 0 m). Over a 1- to 2-week-investigation period per facility, we played-back this noise for 11 h/day through loudspeakers and recorded behavioural data via direct observations as well as heart rates using the Polar system with equine chest belts, while horses were in their familiar pastures. After an initial habituation and a subsequent control day (both: 0 dB exposure), noise exposure levels were varied between days in random order. After the first 2-3 days (depending on the facility) of noise exposure, we included one wash-out day with 0 dB exposure, summing up to a total of eight (groups A,B), four (group C), and five (group D) days of noise exposure. Mixed model analyses revealed that, upon noise exposure, horses decreased their foraging behaviour ($p<0.001$), spent more time in distant areas ($p=0.003$), showed higher levels of vigilance ($p<0.001$), as well as increased heart rates ($p=0.007$), compared to the control day (0 dB) before traffic noise exposure. Horses were more vigilant with higher sound levels ($p=0.022$), while other observations did not covary with sound levels (foraging, distance to loudspeaker, heart rate: all $p>0.05$). Our results show that negative effects due to traffic noise already become apparent at lower sound levels, at least when horses are newly exposed to permanent traffic noise. If the observed short-term effects persist also in the long-term and during constant (24 h) noise exposure, remains to be investigated. If proximity to traffic indeed affects horse welfare, housing horses (or other livestock) close to intense traffic noise should be avoided. Alternatively, enough time (e.g., periods without noise) and space (e.g., quiet areas) may help horses to recover from such a stressor. However, whether adjusted management strategies can prevent further potential health consequences as observed in humans (auditory system, cardiovascular system) has yet to be investigated, also considering long-term effects.

Interaction dynamics in dog-assisted therapy

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Dog-assisted therapy (DAT) integrates dogs into therapeutic sessions to enhance participants' physical, emotional, and social well-being. This study examined the behavioural dynamics within DAT, focusing on (1) active participation, (2) focus direction, (3) joint focus, and (4) physical contact. Each session lasted 45 to 60 minutes, with one dog present per session. Three dogs participated in the study: a poodle who worked with two participants, a Labrador who also worked with two participants and a Golden Retriever who worked with one participant. The video recordings of sessions 1, 5, and 9 from ten individual therapy sessions were analysed across five participants. Behaviours were registered using an ethogram and scan sampling every 30 seconds. In the ethogram, the positions (walking, sitting, standing, and lying down) of the therapist, the participant, and the dog, as well as the direction of their focus (e.g., toward each other and the environment), as physical contact and joint focus, were scored. Results indicated that therapists' active participation increased over time while participants' activity levels remained stable. Dogs were most active during the first and final sessions. Participants consistently focused on the therapist throughout the sessions, while their focus on the dog declined but then stabilised. Dogs primarily focus on their surroundings (e.g. looking nowhere in particular, not at the participant or therapist). Joint focus between participants and dogs decreases while joint focus between participants and therapists increases over time. This supports the "icebreaker" theory, in which dogs help facilitate the initial connection between participant and therapist. Physical contact with the dogs varied by participant and breed. The poodle was involved in more interactions with participants than the Labrador and Golden Retriever, potentially due to breed characteristics and the texture of the poodle's coat. These findings highlight the nuanced interaction patterns in dog-assisted therapy and offer insights into how different elements, such as dog breeds, may influence therapeutic engagement. This study contributes to a better understanding of the interaction dynamics that occur in DAT.

Using a multi-stakeholder human behaviour change programme to address breeding for extreme conformation in companion animals

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Selective breeding for extreme conformation (EC) can significantly impair animal welfare, behavioural expression and health, implications that are often vastly under-recognised by the public. Trends indicate EC amongst companion animals is becoming increasingly severe and 'normalised' as the popularity of affected breeds - particularly brachycephalic canines - soars. The Royal Society for the Prevention of Cruelty to Animals is seeking to redress this through a comprehensive, multi-stakeholder programme of behaviour change activities aimed at owners, breeders, legislators and the public. The associated research package includes a) review of efficacy of UK and international legislation in protecting animals from suffering due to EC; b) assessment of the impact of targeted educational messaging on prospective buyers' intentions to purchase brachycephalic dog breeds; c) measurement of conformation and health disparities between pure- and cross-bred brachycephalic dogs; d) investigation of acceptability of out-crossing brachycephalic dog breeds; and e) convening a multi-disciplinary consultancy group comprising animal welfare, veterinary, prosecutions, intelligence, campaigning and advocacy expertise. Preliminary findings indicate: • Existing legal protections fail to prevent suffering of companion animals due to EC. • Legislative loopholes pertaining to uncertain or shared ownership of animals, coupled with deficiencies in microchipping systems, inhibit prosecution. • Out-crossing brachycephalic breeds has potential to reduce severity of EC features and prevalence of related health impairment. • Less extreme brachycephalic features may still be aesthetically appealing to humans. • Educating prospective buyers on health impacts can reduce intention to acquire popular brachycephalic dog breeds. Subsequent work will include trialling methods of translating research into action with key stakeholders; advocacy engagement with academia, government, civil society and UK populace; and evaluating impacts of differentiated behaviour change approaches. This programme may offer a model for applying a multi-stakeholder approach to address a complex welfare issue, yielding learnings that are transferable to strategic human behaviour change initiatives in other spheres.

Voluntary wheel running induces nausea in laboratory rats: No sign of nausea habituation over 20 days

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Activity wheels are commonly introduced into rodent cages as environmental enrichment, offering various health benefits. Voluntary wheel running enhances stress resilience, reduces obesity, and promotes neurogenesis in laboratory rats. It also functions as a positive reinforcer for instrumental behaviors and is considered pleasurable, as evidenced by its induction of 50-kHz ultrasonic vocalizations associated with positive affective states. However, evidence suggests that voluntary wheel running also induces nausea in rats. It establishes flavor avoidance, implying a nausea-mediated aversive learning process. Furthermore, it increases the ingestion of kaolin clay, a behavioral marker of nausea in rats. How can wheel running produce both aversive and pleasurable effects? The opponent-process theory, proposed by Richard Solomon (1980), may offer an explanation. According to this theory, a salient event first elicits an excitatory “a-process,” which is followed by a slower, opposing “b-process.” The net affective experience is shaped by the interaction between these two processes. With repeated exposure, the “a-process” weakens and the “b-process” strengthens. If the aversive and pleasurable properties of wheel running are induced by the “a-process” and “b-process,” respectively, the theory can account for its ambivalent effects in rats. To test this, an experiment exposed male Wistar rats (9 weeks old) to activity wheels for 20 days—four times longer than in previous nausea studies. Sixteen rats were housed individually (20 × 25 × 18.7 cm) with ad libitum access to food and water. Each cage also contained 80 g of kaolin clay. Each day, rats were placed in activity wheels (15 cm wide, 30 cm in diameter) for 45 minutes in a separate room. In the experimental group, wheels were unlocked to allow voluntary running; in the control group, wheels were locked. Kaolin consumption increased over days in the experimental group but remained around 1 g in the controls. A split-plot analysis of variance revealed significant effects of group ($F [1, 14] = 15.57, p < .001$), day ($F [19, 266] = 6.17, p < .001$), and their interaction ($F [19, 266] = 3.39, p < .001$). In conclusion, contrary to the theory’s prediction, no habituation of running-induced nausea (i.e., its aversive property) was observed over a long period. No treatment endpoint was set, as kaolin caused no adverse effects and rats remained healthy. This research was supported by a JSPS grant (22K03204) and approved by the Kwansei Gakuin University Committee for Animal Experimentation.

Livestock welfare during transport in New Zealand: Rethinking livestock crate design

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There is a substantial body of scientific literature highlighting many factors that impact on livestock welfare during road transport, with heat stress being a significant concern in hot climates. However, there is limited research on how specific vehicle and crate design features impact on animal welfare. This research reviewed the design features of New Zealand livestock crates to ensure they are fit for purpose and comply with welfare standards. A combination of literature review, analysis of crate design specifications, and stakeholder engagement were undertaken. Workshops were held, involving 65 transport operators, alongside consultation with other industry and regulatory stakeholders to identify current challenges, assess compliance with standards, and propose design improvements. Observations and feedback were thematically analysed to identify recurring issues and opportunities for improvement. One challenge identified was when designing livestock crates, there are often trade-offs between animal welfare, weight and strength of construction materials, cost and other regulatory requirements. For example, floors need to prevent animals slipping, but weight, ease of cleaning, drainage and effluent management are other features considered to ensure compliance with weight and effluent regulations. New Zealand livestock crates have multiple deck configurations and deck heights designed to accommodate multiple species of different ages; however, the different livestock species transported have different behavioural and physiological needs. Therefore, this 'one size fits all', multi-purpose design may not adequately address species-specific requirements. Some specific issues identified included insufficient ventilation and head space to allow adequate airflow and meet requirements for animals to adopt 'normal' postures, depending on deck configuration, and internal ramps exceeding recommended slopes (20 degrees). Other improvements identified included alternative flooring surfaces and covers to protect animals from weather extremes. Some design features make it difficult for transport operators to meet industry guidelines and animal welfare standards and regulations. The current design appears to be ineffective for managing heat stress and given predictions that extreme weather events will increase with climate change, the risks of heat stress in livestock during road transport will likely increase. This research supports the case for reviewing livestock crate guidelines and related animal welfare standards in New Zealand. Key gaps and areas where improvements could enhance both animal welfare and driver safety during transport were identified. These will support initiatives to future-proof livestock crate design and ensure sustainability of the livestock transport industry in New Zealand.

Beyond the rotation: Unveiling affective states in cows through grooming pattern

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Brush use is increasingly recognized as a welfare indicator for dairy cattle, related to both comfort behaviour and positive welfare. In certain regions, providing brushes is even a regulatory requirement for dairy farms. Despite the widespread use of mechanical brushes, little is known about detailed brushing behaviour of cows and its physiological effects. Brushing has been considered a luxury activity of low resilience, associated with positive affective states and reduced as a response to stress and discomfort. This study aimed to (1) examine detailed brushing behaviour and how it is influenced by different affective states before brush access, and (2) explore the physiological effects of brushing through heart activity recordings. Twelve non-lactating cows individually underwent two treatments: head restraint (stressor) or no stressor, before gaining sole access to a mechanical brush in a separate but familiar brush area. Brushing behaviour – including brushed body region (head, neck, body, rump) and brushing intensity (passive vs. active brushing based on the cows' body movements towards the brush) – along with heart activity were recorded. Heart rate (HR) and heart rate variability (HRV; RMSSD, LF-Low Frequency, HF-High Frequency and LFHF ratio) were analysed relative to baseline levels (8-13 minutes before brush access), using foot movements to control for general activity effects. Compared with baseline levels, cows exhibited an increased HR during the first three minutes of brushing ($+3.51 \pm 0.54$ bpm; $P < 0.001$), suggesting positive arousal. As brushing continued, HR and brushing intensity decreased, indicating relaxation. Over time spent brushing, head brushing decreased while rump brushing increased and could potentially reflect changes in arousal states. When exposed to the stressor before brushing, cows showed a smaller HR increase (-1.57 ± 0.489 bpm, $P = 0.002$) and a greater LF HRV increase ($+203 \pm 88$ ms², $P = 0.024$) during brushing, which may reflect relief. The stressor treatment also reduced the proportion of neck brushing (-0.16 ± 0.049 , $P = 0.002$) during brushing, suggesting that both LF HRV and neck brushing frequency may serve as potential indicators of valence. In conclusion, dairy cows' brushing behaviour may provide insights into their affective states, capturing both arousal and valence dimensions.

Shaping the future of animal welfare science in New Zealand: challenges, gaps and opportunities

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1. N/A

For decades, New Zealand has been recognised for its significant contribution to animal welfare research, particularly in livestock welfare but also other species. However, the field now faces challenges, including fragmented expertise, limited visibility, constrained funding and reduced connection with, and influence on, government policymakers. The New Zealand Animal Welfare Science Network (NZAWSN) has been established to recognise the unique knowledge, skills and contributions of animal welfare scientists, connect researchers, promote science-based progress, and ensure that animal welfare science drives meaningful change. This presentation introduces NZAWSN, outlining its mission, goals, and early initiatives. Insights from the inaugural workshop will be shared, highlighting key barriers and systemic challenges, national and broader research gaps, and collaborative opportunities. The challenges identified in the New Zealand context fall into seven major themes including: 1. Recognition and visibility: The need to raise awareness of animal welfare scientists and their expertise 2. Perception and positioning: Addressing misconceptions and elevating animal welfare science as an essential discipline. 3. Succession and competition: Navigating career pathways, workforce retention, and competition with the veterinary profession 4. Status quo inertia: Overcoming perceived resistance within government and industry 5. Confounding issues: Managing external factors that overshadow the importance of animal welfare science 6. Leadership: Strengthening the ability to influence decision-makers and drive policy change 7. Funding: Ensuring the sustainability of animal welfare research now and into the future. We will explore strategies to elevate the role of animal welfare scientists in decision-making, foster stronger industry and government engagement, and create a more sustainable future for the discipline. By building a connected, proactive scientific community, NZAWSN aims to position animal welfare science at the heart of policy development and best practices in New Zealand. Through leadership, collaboration, and action, we seek to shape the future of animal welfare in a meaningful and sustainable way.

Behavioral and physiological responses of therapy dogs to animal-assisted therapy in an inpatient stroke rehabilitation program

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1. Nestle Purina

Therapy dogs have been increasingly incorporated into a variety of medical treatment programs to improve patients' treatment outcome and wellbeing. However, research investigating the stress level of therapy dogs in this setting is limited. In this study, a multimodal approach, involving both physiological and behavioral parameters, was utilized to measure the welfare of animal-assisted therapy (AAT) dogs. Fourteen therapy dog-handler pairs were embedded in an inpatient stroke rehabilitation program to provide AAT. All human participants were patients with a recent stroke who were hospitalized in the Stroke Rehabilitation Unit of Mayo Clinic and enrolled in the inpatient brain rehabilitation program between February 2023 and February 2024. The therapy dog-handler pairs actively participated in stroke rehabilitation by walking with the patient, playing fetch with the patient, being petted/brushed by the patient, amongst various other AAT activities. To measure canine stress responses during the rehabilitation sessions, salivary cortisol ($\mu\text{g/dL}$) and oxytocin (nM) concentrations, heart rate (beats/min) and heart rate variability (RR interval, RMSSD, SDNN, RMSSD:SDNN ratio), tympanic membrane temperature ($^{\circ}\text{C}$), and behavioral evaluation (Canine Fear, Anxiety, and Stress scale) were recorded before and after interactions with the patient. Results demonstrated that therapy dogs had significantly decreased heart rate ($p < 0.0001$) and increased heart rate variability (RR interval= $p < 0.0001$; RMSSD= $p < 0.0001$; SDNN= $p < 0.0001$; RMSSD:SDNN ratio= $p < 0.0001$) after the AAT session. The right tympanic temperature significantly increased ($p = 0.034$) after the session, but the left tympanic temperature remained stable ($p = 0.50$). There was no significant difference in terms of salivary cortisol ($p = 0.13$) and oxytocin ($p = 0.17$) levels nor in stress-related behavioral evaluations ($p = 0.86$). Taken together, our results suggest that incorporating AAT into an inpatient stroke rehabilitation program did not induce stress in the therapy dogs, and that the therapy dogs may have been more relaxed after the session. In this study, we used a rapid behavior evaluation tool (Canine FAS) and only one person administered it. Quantifying the canine behavioral stress response using video recording, detailed ethograms, and inter-rater reliability is a more objective and robust approach, but due to patients' privacy, we were not able to record the rehabilitation sessions. However, because we used multiple noninvasive physiological indicators of stress that provide solid evidentiary support for the positive welfare status of the dogs, we are confident in the evaluation of the dogs' behavior.

Prevalence and impact of lighting regimes on the circadian rhythms and behaviour of stabled horses in the UK

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Light plays a significant role as a regulator for circadian rhythms, and arousal and sleep behaviours in most mammalian species. Modern horse husbandry practices can involve significant time spent indoors, involving variable exposure to light under different lighting regimes. Little evidence exists that can be used as a guide for horse care givers on best practice in the use of light in equine husbandry, whilst little is known about how lighting is managed and the extent of the variability. This study aims to report novel information about the prevalence of different lighting regimes employed in stables/barns in the UK. An online questionnaire using MS Forms has been launched to gather responses from a broad variety of UK-wide equine establishments. Using a blend of categorical, Likert scaled and open-field questions, responses to the questionnaire will provide an overview of the different light schedules that stabled horses experience, details about late night checks, and perspectives on the importance of light relative to equine sleep. Following the application of standard analytical techniques such as the Chi-Squared test of association (categorical questions) and Kruskal Wallis one way ANOVA (Likert scaled questions) the results will be discussed in the context of existing knowledge about the influence of lights on stabled horses. For example, in a recent study investigating the influence of a standardised red/white LED lighting system, compared to fluorescent tube lighting, on the behaviour and circadian synchronicity of stabled horses, we discovered no significant differences in clock gene expression, sleep behaviour, or blink rate between the two lighting conditions. This is in contrast to results of research showing how circadian disruption can occur when late night checks involving white light are used. The outcomes from the discussion aim to help inform future research and industry practice, whilst the results of the questionnaire will serve to demonstrate how widely these recommendations need to be promoted to help both the equestrian sector and horse care givers to facilitate optimal equine wellbeing.

From cages to cage-free: a qualitative exploration of Chinese egg producers' views on the opportunities and challenges to adopting cage-free egg production systems in China

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Despite growing consumer interest in cage-free eggs, the transition from conventional cage systems in China remains limited. This study explores the perspectives of 15 large-scale Chinese egg producers operating battery cage and/or cage-free systems (single-tier, multi-tier, and free-range), to examine the perceived challenges and opportunities of adopting cage-free production. Cage farms ranged from 110,000 to 30 million hens, while cage-free farms housed 12,000 to 300,000 hens. This study, guided by the Capacity-Opportunity-Motivation Behaviour (COM-B) model, examines how producers' Capabilities, Opportunities, and Motivations influence their decision-making. Data were collected through semi-structured interviews and analysed using template analysis. Findings reveal that consumer demand and profitability are key drivers of cage-free adoption. Free-range producers expressed greater market confidence, while barn system producers faced uncertainty due to limited corporate buyer engagement. Producers emphasised the need for credible certification and labelling schemes to build consumer trust and signal quality. Access to land and financial capital was also noted as a major constraint to scaling up cage-free operations. While education is often recommended as a long-term strategy, our findings suggest that in the short term, corporate buyer engagement and trustworthy certification schemes are the most urgent interventions to enable the growth of large-scale cage-free farms and improve animal welfare in China.

The effect of imprinting in laying hens on behavior after introduction to an aviary system

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Aviary systems enable birds to express their natural behavior to a greater extent and achieve a higher level of welfare for laying hens. However, birds not climbing to the top of the system and laying eggs outside the nest box has been a problem. One of the reasons for this could be that the chickens raised in a non-spatial environment have a limited motivation to climb higher after growing up. This study aimed to investigate whether it is possible to lead chickens to the floor of the aviary system and the nest box after they grow up by using “imprinting learning,” which involves memorizing and following objects immediately after hatching. In the experiment, 110 Boris Brown chicks were divided into two groups immediately after hatching: an imprinting group, in which the experimenting individual moved an imprinting stimulus (stuffed toy) fitted with a loudspeaker and the chicks followed; and a control group. In the imprinting group, imprinting training was conducted 15 hours after hatching, which was followed by reinforcement training, which was conducted 11 times at intervals of several days until the age of 23 days. Tests were carried out with both groups to check the following response. Chicks from both groups were subsequently introduced to the floor of aviary system at the age of 42 days. Chicks from the control group were housed in one section and chicks from the imprinting area were housed in two sections. At 138 days of age, the section of control group and one of the imprinting aviaries was fitted in the nest box and resting area, respectively, with the stuffed toy used for imprinting learning, and the top of the aviary was opened. The occupancy rate of the upper part and the nest box area was then observed for 10 hours. A strong following response to the imprinting stimulus was observed immediately after hatching in the imprinting group but this response was observed to weaken after one week. A weak following response was observed in the imprinting group in the following confirmation test. The upper utilization rates immediately after opening for the imprinted group and control group were 29% and 5%, respectively, with stuffed toys, and 38% for the imprinted group without stuffed toys. These results indicate that the presence or absence of imprinted learning immediately after hatching, rather than induction by imprinted objects, might enhance exploration in the novel location of the aviary.

AI approaches for detection and removal of environmental sounds in audio recordings to enhance automated annotation and extraction of cattle vocal parameters

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Machine learning (ML) techniques are increasingly being used in cattle vocalization research, addressing tasks such as distinguishing between high and low frequency calls, identifying ingestive behaviour sounds or classifying calls like oestrus and coughs; however, although some studies addressed cattle sound classification from background noise, extraction of cow sounds from complex on-farm recordings remains limited, highlighting the need for annotated vocalization datasets of interest. The main objective of this study was to develop a model for cattle vocalization extraction, while filtering out unwanted environmental sounds (e.g., farming equipment, birds, rodents, metal clanging, wind) from livestock audio recordings, using ML techniques. Our dataset contained both cattle sounds and interfering environmental noises, that have been manually annotated in previous audio-recordings (over 120 hours). The study was conducted at the experimental farm of the Research and Development Institute for Bovine in Balotesti, Romania. The raw audio recordings were collected from 20 multiparous dairy cows, each individually recorded for 4 hours post-milking while tethered in identical barns. We manually cleaned, preprocessed and annotated 71 cow calls and 64 environmental sounds. In the first step we developed a deep learning (DL) classifier for the binary classification of cow/environmental sounds. We then used this classifier with a sliding window technique for the detection of the cow sounds in raw audio files. For the first classification task we adopted the Wavegram-Logmel-CNN model as a pre-trained audio model, finetuning it using our data, reaching 0.9231 accuracy. For the second detection task, we used a window in the size of half of the duration of an average cow sound, reaching 0.77 accuracy. These promising results can be further improved using more sophisticated preprocessing techniques. The outcomes of this study have practical applications in welfare research, enhancing extraction of vocalizations in bioacoustics studies. Using it significantly reduces the time required for annotating vocalization datasets, enhancing efficiency in sound data processing. Moreover, by enabling the automatic detection of vocal indicators linked to emotional states, it supports the development of behaviour-based tools for welfare monitoring.

A non-invasive tool for Real-time Automated Multi-Species Monitoring of animal Activity in Research Trials (RAMSMART)

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Real-time monitoring of animal activity with sensor technologies can help to refine and improve the quality of animal experiments. Most available sensor tools, however, are suboptimal for monitoring activity in various (livestock) species in the experimental research setting. The aim of this study was to develop and test a non-invasive tool for real-time automated multi-species monitoring of individual animal activity in research trials ('RAMSMART'). We developed software that calculates the vectorial dynamic body acceleration (VeDBA) from raw accelerometer data and uploaded this software to the Movesense HR2 (Movesense Ltd, Vantaa, Finland), a lightweight commercially available 3D acceleration sensor (10 grams, diameter of 36.6 mm). Through edge computing, the sensor continuously calculates the VeDBA and then broadcasts the VeDBA through Bluetooth Low Energy to a nearby receiving device, e.g. a laptop. The user can set various parameters, such as the sampling rate (from 12.5 Hz to 833 Hz) and the updating interval (whether output should be per second, minute, half an hour, etc.). Battery life depends on these settings. For example, battery life was 47.7 days (± 1.9 days) when continuously monitoring with a sampling frequency of 12.5 Hz and an updating interval of one minute. We used RAMSMART in multiple infectious disease experiments, e.g. to monitor the activity of sheep ($n = 24$) and calves ($n = 24$) from one week before a challenge with Bluetongue virus (BTV3), to three weeks after the challenge. RAMSMART provided high resolution time series and offered additional insights at the individual level (e.g., for informed decision-making on humane and/or scientific endpoints) and at the group-level (e.g., for comparing vaccinated and non-vaccinated groups). In cattle, chickens, pigs and sheep, we have furthermore observed that increasing the sampling rate from 25 Hz to 1 Hz increased VeDBA levels, but hardly affected VeDBA trends over time. This suggests that 12.5 Hz is more than sufficient for the purpose of activity monitoring in an animal experiment. Moreover, in sheep and cattle we found that the positioning of the accelerometer (ear, neck, back or leg) affected VeDBA levels, but hardly affected VeDBA trends over time. Thus, one may opt for the most practical solution and still capture the main activity trends. The source code and documentation of RAMSMART are openly available at <https://git.wur.nl/nlas-asg/ramsmart>. Overall, RAMSMART provides a non-invasive, affordable, re-usable, generalizable and plug-and-play approach for routine and long-term real-time automated activity monitoring tailored to the experimental setting.

Effects of time of calving and early-life experiences on the position of seasonally-calving dairy heifers in the milking order

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In pasture-based dairy systems, the herd walks long distances between pasture and the milking parlour. Animals which milk later in the milking order thus have access to less total mass of pasture, and graze on less nutritious pasture than those which milk and return to pasture sooner. While dairy cattle milk in a consistent order, contributory factors to the individual's position in this order are poorly understood, with the effects of social dominance and personality debated. The implications of this for heifers transitioning into their first lactation are similarly unknown. This study aimed to determine whether complex social and physical early-life environments, known to shape the development of personality and social behaviour, influenced the milking order of first-lactation dairy heifers in a single mixed-age herd. Data were collected from 43 Australian heifers, reared in one of three early-life treatments: 1. Groups of 10 in covered, bedded pens with no adult contact (CC, n=16), 2. Groups of 10 at pasture with no adult contact (-S, n=14), or 3. Groups of 10 housed at pasture with 3 non-maternal mature dry cows per group (+S, n=13). From 13w heifers were housed together at pasture, calving in spring 2021 at 24mo in concentrated peaks commencing 18d apart. After 8±4d in the fresh herd, heifers joined the main milking herd and milked twice-daily. The herd rotationally grazed paddocks 601±352m from the 20-a-side swing-over herringbone parlour. Individual heifer position in the milking order was automatically collected at milking for the first 28d of lactation. Data were analysed using linear mixed models (REML) with treatment, week in milk, and calving peak fitted as fixed effects. Heifers were most likely to be milked in the middle 50% of the herd, with heifers which calved in the later calving peak more likely to milk later than those which calved during the first calving peak ($p=0.018$). CC heifer position in the main herd milking order stabilised the fastest (ls-means $1.75\pm0.33d$) and -S heifers the slowest (ls-means $5.14\pm0.61d$; $p=0.001$). The less enriched early-life environment of CC heifers may have influenced their coping style, or reduced behavioural flexibility, increasing their preference for routine and leading to a more rapid development of milking order position. This study supports existing evidence that early-life experiences longitudinally affect how cattle interact with their environment. Understanding how individual differences influence milking order and access to resources may assist producers in identifying animals requiring extra support.

What does 'solving' the surplus dairy calf challenge look like? Australian public attitudes to future scenarios

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Early life killing of surplus dairy calves (males and females not required as future milking cows) is widely recognized as a threat to both calf welfare and the dairy industry's social license to operate. In response, many countries are making efforts towards raising surplus dairy calves to older ages for meat, with some also making formal commitments to ending early life killing. The aim of this study was to determine how different future scenarios influence the Australian public's perceptions of surplus calf management. A representative sample of the Australian public (n=1000) was recruited to an online survey. Participants were randomly presented with 1 of 4 treatments comprising different combinations of 2 factors: (1) (a) presence, or (b) absence of a dairy industry commitment to discontinue slaughtering calves in the first 2 weeks of life; and (2) surplus calves are raised to 18 months of age in either (a) a grazing system, or (b) a feedlot system. After reading the vignette, participants were asked to respond to 3 questions on a 7-point Likert scale regarding agreement with, acceptance of, and appropriateness of the life led by the calves in the provided scenario. Each series of questions included an open-ended qualitative question for participants to explain their answers. Presence of pasture in the provided scenarios positively influenced participants' attitudes towards the life lived by calves on the dairy farm. However, presence of an industry commitment to ending early life slaughter did not influence participants' attitudes. Inductive thematic analysis of the qualitative data resulted in 3 key themes, each with underlying subthemes: (Theme 1) 'Ethics', including the subthemes 'age of slaughter', 'pasture access', 'cow-calf separation', 'expectations of care', 'raising and killing animals for food', and 'environmental impacts of farming'; (Theme 2) 'Economics', including the subthemes 'farmer income', 'industry profitability', and 'the role of the consumer'; and (Theme 3) 'Trust', including the subthemes 'knowledge and understanding of farming practices', 'trust in farmers as people', and 'the role of regulations'. Our results provide insights into how different systems that address early life killing may impact public perceptions, indicating that even when early life killing of calves is addressed, the management of these animals may continue to present challenges. In particular, the public may be reluctant to accept systems where surplus calves are raised for beef without access to pasture as an alternative to early life killing.

Behavior analysis as a refinement in rhesus macaque medical research care

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Behavioral analysis, most commonly employed with learners diagnosed with Autism Spectrum Disorder, allows us to understand the functions of behavior and support the behaviors a learner deems significant. Despite extensive literature in productive applications of behavioral analysis in humans, common practices within animal research utilize water or food restriction to motivate behavioral task performance. Applied behavioral analysis (ABA) strategies such as errorless learning, token systems, picture exchange communication systems (PECS), and antecedent arrangements may elicit the necessary motivation required to produce similar quality data results while improving the experience of the animal in a research setting. In a brain-computer interface (BCI) study, motivating the performance of rhesus macaques (*Macaca mulatta*) in a cursor controlled grid task was evaluated using token systems compared to no token system. Separately, icons on an augmentative and alternative communication (AAC) device, were introduced to macaques similarly to PECS. We hypothesized animals would obtain similar or higher trials per minute while expressing less abnormal behaviors and increased engaged behaviors than if they did not use these tools. Animals were reinforced with a diversified diet, including a monkey biscuit based smoothie and rotating produce. Metrics evaluated included the number of trials per minute, level of engagement (gameplay duration and frequency of animal lead breaks), and the presence of abnormal behaviors (frequency of bar licking and mock grooming). Preliminary results in three male rhesus macaques serving as their own control suggest that a token system (delayed reinforcement by exchanging tokens for a higher-value reward), allowed animals to engage for longer periods (mean = 41.99 min vs. 64.98 min, +55% increase) on their own volition, reduced animal led breaks (mean = 57.40 sec vs. 22.88 sec, -60% decrease), and increased the number of trials per minute (mean = 46.3 vs. 50.77, +9%). Additionally, two observers scored abnormal behaviors a week prior to and after the implementation of available reinforcement choices indicated by icons on an AAC device, using instantaneous point scan sampling in two male rhesus macaques serving as their own control. Macaques were able to make daily choices and communicate which activities they preferred, reducing abnormal behaviors by 35%. The use of behavioral analysis is a novel alternative to industry standards with the aim to support researchers and animal care teams in achieving practices in alignment with the refinement principle of the 3Rs to significantly improve the animal's experience in research.

The effect of litter parameters on stereotypic behaviour and normal activity – preliminary data from female European mink (*Mustela lutreola*)

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Normal behavioural development plays a key role in the copulatory success of many species, and is critical to meet the goals of conservation breeding programmes. For example, captive-born European mink males fail to successfully copulate with receptive females due to abnormal courtship behaviour, and stereotypic behaviour (SB) has been linked to breeding success in these males and those of two other mustelids. However, female behaviour in relation to breeding success in this species remains un-investigated – important both because of the role it plays in mate choice and mate compatibility, as well as to address research biases. Here, we present preliminary data from an ongoing study, where we test whether the litter size (small: < 4 kits, large ≥ 5 kits) and litter sex-ratio from which females originate affect their adult normal and abnormal behaviours (SB), and how these relate to their reproductive behaviour and success. We first video recorded the behaviour of 14 females outside the breeding season. Behaviour was scanned every 5min during their peak activity period (5pm-7am) for 4 days to calculate % SB (out of all active scans), and % normal activity (excluding SB out of total scans). During the breeding season the behaviour of the female was recorded (receptive vocalizations – clucking – and postures, fighting/attacking the male). Litter parameters (litter size, sex-ratio and weaning time and copulatory success (whether they mated and produced a litter) were obtained from the studbook. Data were analysed using generalized linear models. Normal activity was affected by the interaction between the litter size and sex-ratio ($F_{1,10}=5.27$, $p=0.04$); females from large litters with more brothers as well as females from small litters with more sisters displayed significantly more normal activity. Additionally, females who originated from large litters displayed significantly more SB ($F_{1,10}=8.26$, $p=0.02$), with no interactive effects of litter sex-ratio. On going analysis will determine the relationship between female behaviour and breeding success - preliminary data from five females suggest that females from large litters with more brothers might fight more during the mating attempt. Our results indicate that the adult behaviour of females differ, depending on the early social environment – which might have implications for their breeding and other behaviours of importance in conservation breeding programmes such as maternal care.

Enhancing swimming activity in captive African penguins: evaluating the impact of sensor-activated bubble machine enrichment

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This study examined the effects of a bubble machine as environmental enrichment on swimming activity in 20 African penguins (*Spheniscus demersus*) housed at the Minnesota Zoo. Captive penguins often swim less than their wild counterparts, which can contribute to health concerns such as bumblefoot, increased stress, and abnormal behavior. The enrichment consisted of a commercial bubble machine (Fubbles No-Spill Fun-Finiti Bubble Machine) placed above the land area of the enclosure, releasing air-filled bubbles into the habitat. These bubbles served as a novel, dynamic visual stimulus intended to encourage naturalistic behaviors, particularly swimming. Data were collected over a nine-week period from January to April 2024 using a repeated-measures design. The study included two phases: a pre-enrichment period (February 2024; 32 hours) when no enrichment was present, and a post-enrichment period (April 2024; 32 hours) during which the bubble machine alternated between active and inactive sessions. Observations were conducted using scan sampling at one-minute intervals during 20-minute sessions. Behaviors recorded included standing, swimming, and out-of-view states, as well as location (land or water), using ZooMonitor software. Data were analyzed using binary logistic regression in SAS Studio 9.4 (GLIMMIX procedure), with significance set at $P \leq 0.05$. Penguins were 1.3 times more likely to swim during the pre-enrichment phase compared to the post-enrichment phase overall ($P = 0.005$). However, real-time enrichment presence significantly increased swimming behavior across both phases. Penguins were observed in the water during 32.7% of observations when the bubble machine was active, compared to 19.4% when it was not ($P < 0.0001$). This effect was strongest when enrichment was present and feeding was not occurring (34.6%), and lowest when enrichment and feeding occurred simultaneously (2.5%). These findings suggest that while overall swimming decreased during the post-enrichment phase, the presence of the bubble machine during observations had a positive and immediate impact on water use. The enrichment may have promoted increased group swimming and engagement when timed appropriately. Limitations include potential observer bias, seasonal variation, and individual differences in enrichment responsiveness. Future research should explore long-term effects, age- and sex-specific responses, and different types of enrichment. This study underscores the importance of targeted, well-timed enrichment in promoting species-typical behaviors and improving welfare for zoo-housed African penguins.

Association between family dogs' inattention, hyperactivity and impulsivity and their gut microbiota composition

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Evidence suggests an association between Attention-Deficit/Hyperactivity Disorder (ADHD) and the gut microbiome community in humans. Since the family dog serves a valuable model for ADHD research, this study aimed to explore potential associations between dogs' gut microbiome and ADHD-related traits, including inattention, hyperactivity, impulsivity, and their total and functional impairment (how problematic is the dogs' ADHD-related trait for the owner in everyday life) scores. We evaluated 164 pet dogs' ADHD-related traits using the validated Dog ADHD and Functional Rating Scale and analysed the bacterial 16S rRNA gene from their faecal samples to determine the gut microbiome composition. We used the decision tree statistical approach and found several associations between the relative abundance of gut microbiome families/genera and ADHD-like behaviours in family dogs. Negative associations were found with *Prevotellaceae* (inattention, inattention-related functional impairment, ADHD total), *Prevotella* (inattention), *Lachnospiraceae* (inattention, hyperactivity-related functional impairment), *Lachnospira* (ADHD total), unclassified lineages of *Bacteroidales* and *Succinivibrionaceae* (both inattention-related functional impairment), *Candidatus Stoquefichus* (hyperactivity, impulsivity), *Allobaculum* (impulsivity) and *Negativibacillus* (impulsivity-related functional impairment), from which many has roles in carbohydrate degradation, fermentation and short chain fatty acid production. Positive associations were found with *Clostridiaceae* (impulsivity-related functional impairment), possibly pathogenic and toxin producing, and *Streptococcus* (inattention), which may play a role in gut dysbiosis. Dogs with higher functional impairment scores had lower alpha-diversity in their gut microbiome. Age, which has been associated with ADHD-like symptoms both in humans and dogs, had a mediating effect, as the decision trees first split several factors based on age and then on bacterial taxa. Our study identified certain bacterial taxa that were previously shown to produce various neurotransmitters/metabolites and some were linked to ADHD. These bacterial taxa could potentially have an effect on inattention, hyperactivity and impulsivity in dogs too. Further research in this field may eventually lead to potential therapeutic approaches for modulating gut microbiota in managing ADHD-like behaviours in dogs.

Relationship between behavioural and physiological responses and milk production of dairy cows reared in a small scale dairy herd

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Dairy cattle are vulnerable to poor welfare management, such as but not limited to rough handling of humans, climatic extremes, feed alteration, social grouping, and transportation. Poor welfare management can affect negatively in their behaviour, physiology, milk production and health. This study investigated the potential relationship between the behavioural and physiological responses, and milk production of 25 lactating dairy cows for 5 repeated days, reared in a small-scale dairy herd at Rajshahi district of Bangladesh. Each cow's behaviours were video recorded at around morning milking time for 2 min in each day for 5 repeated days from a one-meter distance of head facing to tail to identify ear position, rumination, urination, defecation, sniffing and kicking behaviours. Environmental temperature and relative humidity of the farm area was also recorded to determine temperature humidity index (THI) of the area. The rectal and vaginal temperature, pulse rate, and body condition score has recorded. The daily milk production of each cow and the frequency of milking in a day were also recorded. Mean THI was found higher than the cows comfortable ranges. The forward ear position was negatively related to milk production (-0.42 , $P < 0.05$) while upright ear position was positively related to milk production (0.42 , $P < 0.05$) variables and tend to ruminate more frequently. Regression analysis show that cows with elevated rectal temperatures produce less milk per day ($R^2 = 68.5\%$). Therefore, THI affecting welfare of cows in current setting thus in production and health. These findings might help in the livestock development strategy of developing countries such as Bangladesh.

ManyPigs: Establishing a global community for pig behaviour and welfare researchers

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At the 2023 International Society of Applied Ethology (ISAE) congress in Tallinn, Estonia, a group of motivated ethologists, inspired by the ManyGoats network, met to discuss the possibility of establishing a similar initiative for pigs. Why? During the congress discussions, we identified shared research interests in pig emotions, cognition, development, social relationships, and welfare. We also recognized that joining forces would greatly benefit pig research by allowing us to learn from a diverse range of experiences and expertise and apply our knowledge across the different geographical and culture contexts. Additionally, collaboration could enhance opportunities for funding and facilitate the development of joint projects spanning several institutions and research facilities. How? The group came together and met with leaders of the ManyGoats project (<https://www.themanygoatsproject.com/>), the ManyPrimates project (<https://manyprimates.github.io/>), and the coordinator of the PigWeb project (<https://www.pigweb.eu/>) to learn from the experiences of similar networks while building own aims and approach. After reflections, discussions, and forming impressions of what was needed, it was clear a large research network that could offer a global perspective on pig ethology and welfare, would be beneficial. The ManyPigs initiative aims to bring together experienced experts and early-stage researchers of pig behaviour and welfare to facilitate discussions on emerging research trends, identify key knowledge gaps, and exchange ideas and experiences on methodological limitations and protocols. ManyPigs seeks to improve training and knowledge transfer in pig behaviour and welfare research, through efforts such as establishing a researcher database, leveraging social media and online communication platforms, and hosting periodic online meetings that accommodate international participation. Additionally, ManyPigs will foster opportunities for collaborative projects, including those involving shared experimental protocols implemented across the group's research facilities or commercial farms. By working collectively, we can enhance the visibility and impact of our research and ensure that scientific advancements in our field translate into meaningful improvements in pig welfare. ManyPigs currently consists of nine researchers across three continents, with expertise in several facets of pig behaviour and welfare, but we welcome more researchers and labs to join the network.

How does cow-calf contact affect the biological functioning of calves under Norwegian conditions? A scoping review of research methodology

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In her plenary at ISAE 2023, G. Mason alerted us to concerns of internal, external, and construct validity. Farmers, consumers and policy makers now ask for evidence-based advice on the implementation of cow-calf-contact (CCC), which deems a critical appraisal of research methodology in CCC studies relevant. The aim of this scoping review was to investigate research methodology used to assess the association between cow-calf contact (CCC) and indicators of biological functioning under Norwegian conditions. A (self-) critical review of the studies' internal, external, and construct validity was undertaken while the usefulness of observational studies to study how our exposure (CCC) and the outcomes (calf mortality, calf morbidity, cow udder health, cow-calf performance) is elaborated on. This scoping review used own data from all own studies published in peer reviewed scientific publications or conference abstracts and accessed via Cristin (Current Research Information System in Norway) database is the national research information system of Norway. To be included, studies include CCC as an exposure and indicators of biological functioning as outcome variables. Nine studies were included, published in peer review (n=6) or conference abstracts (n=3). These studies use descriptive (n=2), controlled clinical trial (n=1), cross-sectional (n=3), retrospective and prospective cohort (n=3) designs. The sample size in these studies vary from 17 to 4759 cows or calves. Among the observational studies, the exposure (CCC) is quantified on herd level (n=4) or at the individual level (n=2). CCC is a time varying and complex exposure variable (e.g dam or foster cow, whole-day or part-time contact etc.) which varies within-herd. The outcomes in this study were calf growth (n=1), calf morbidity (n=3), calf mortality (n=3) and medical treatments for mastitis (n=3). This scoping review indicates that detecting differences in calf health is often complicated by the unmeasured herd effect. Though differences were detected for mastitis treatments, I discuss how the chosen study design is valid for drawing causal inference. I propose future work on CCC to use observational studies across an array of different farms and I propose a way to record the exposure CCC at individual calf level. With this abstract and self-critical appraisal of study designs, I encourage a transparent discussion on how different study designs actually can be used to claim causal inference within animal welfare science in general and CCC specifically. These discussions may be of importance when translating science in to evidence based advice regarding cow-calf contact.

Impact of early creep heating on piglets' pen use, growth and survival in outdoor production

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This study investigated the impact of creep heating on piglet welfare in farrowing huts on paddocks. We hypothesized that providing creep heating from birth to day 7 would increase piglets' early creep use and improve their survival and growth until weaning at seven weeks. The experiment included TN70 sows delivering 88 litters over 530 days across all seasons at an organic farm in Denmark. The mobile farrowing hut was divided into four pens, half featuring heated (HEAT) and half an unheated piglet creep area. The hut had eight cameras to record videos for behavioural scan sampling every 15 min per 24h. Statistical analysis included ANOVA with litter as a random effect (when appropriate) and survival analysis for individual piglet mortality. P values are given for significant effects. During the first day of life, creep usage was low and not significantly different across seasons (spring: 1.5%, summer: 2.7%, autumn: 1.8%, winter: 3.1% of 24h observations), regardless of heating. Most piglets D0 were at the udder (71.5%) or in the pen without physical contact with the sow (25.9%). By day 2, heated creeps showed significantly higher usage ($28.0 \pm 3.16\%$ vs unheated: $6.8 \pm 1.85\%$; $P < 0.001$), at the expense of being located in the pen without sow contact (HEAT: $16.6 \pm 2.76\%$ vs unheated: $32.5 \pm 3.06\%$; $P < 0.001$). HEAT did not influence the proportion of piglets in udder contact. HEAT did not significantly impact piglet survival or growth (individual weighing days 1, 21, and 49). The piglet mortality before weaning was 16.9% (i.e., 242/1431 live piglets). The risk of dying was higher in piglets fostered by a nurse sow (in contrast to their mother; tendency, $P = 0.085$) and higher for males (Hazard ratio vs female: 1.4; $P = 0.004$). Male piglets experienced surgical castration, which appears to contribute to the surplus male mortality in our study. Average Daily Growth (ADG) was negatively correlated with litter size at weaning ($P < 0.001$) and positively with sow parity ($P = 0.042$). Seasonal variation in ADG ($P < 0.001$) was observed, with spring and autumn showing higher growth rates than summer (g/day, spring: 321 ± 12^a , autumn: 338 ± 12^a , summer: 272 ± 11^b ; winter: 297 ± 14^{ab}). Fostered piglets exhibited lower ADG than native litter piglets (283 vs 331 g/day; $P < 0.001$). These findings contribute to our understanding of piglet challenges, which are less studied in extensive outdoor than in indoor production systems. In conclusion, our results suggest that additional farrowing hut features like heating may increase piglet welfare.

Effects of stocking density during simulated transport on behaviour and physiology of largemouth bass (*Micropterus salmoides*)

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The live transport of farmed fish is a key practice in Chinese aquaculture but can also be stressful, raising welfare concerns. This study investigated the effects of transport density on the welfare of largemouth bass (*Micropterus salmoides*). Fish were assigned to four experimental treatments in a two-factor design (5 groups/treatment). The first factor was stocking density: 39 (low density) versus 78 kg/m³ (high density). The second factor was transport, with half of the groups exposed to transport stress for 3 h using a motion platform, while the other half kept in static tanks for the same duration. Baseline behaviour and physiology were assessed after acclimation but before group assignment, with post-transport data collected immediately after treatments. Skin mucus was collected using cell scrapers, and blood was drawn from the caudal vein. Physiological data were analysed using one-way ANOVA with four orthogonal contrasts; behavioural data were analysed using independent samples Kruskal-Wallis tests. Water quality was measured pre- and post-transport and analysed using two-way repeated measures ANOVA. Dissolved oxygen levels decreased ($p = 0.005$), while water temperature increased ($p < 0.001$) over time. Total ammonia nitrogen levels rose significantly across all treatments ($p < 0.001$), particularly in high-density groups. Fish at higher densities exhibited significantly more ventilation activity, regardless of transport stress. Notably, transported fish at high densities displayed significantly more anxiety-related behaviours, including freezing ($p < 0.001$) and thigmotaxis ($p < 0.001$), suggesting increased stress. Erratic swimming and aggression were rarely observed across treatments, suggesting that the primary behavioural response to transport stress was likely anxiety-related, rather than aggression. Transport and density had an interactive effect on serum cortisol ($p = 0.032$), with higher levels observed in transported fish ($p = 0.015$), while density alone did not significantly increase cortisol. Blood sampling, although invasive, is widely used to assess stress. Skin mucus sampling was included as a non-invasive alternative to explore less intrusive welfare assessment methods. A moderate positive correlation between serum and skin mucus cortisol ($r = 0.50$, $p = 0.001$), glucose ($r = 0.589$, $p < 0.001$), and lactate ($r = 0.503$, $p = 0.001$) suggests the potential of non-invasive indicators for largemouth bass welfare. We conclude that high stocking density combined with transport stress significantly affected largemouth bass welfare, particularly through increased fear-related behaviours and serum cortisol. These findings highlight the importance of considering both transport conditions and density in assessing fish welfare in commercial aquaculture.

Behavioural and environmental welfare conditions are the most critical for shelter dogs: Consensus of Taiwanese experts

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In regions like Taiwan, where public animal shelters (PASs) are frequently overcrowded and have limited care capacity, the welfare of shelter dogs is a growing concern. This study set out to identify and rank the welfare conditions impacting shelter dogs in Taiwanese PASs, shedding light on their effects at both the population and individual levels. An initial list of welfare conditions was compiled using prior knowledge, an extensive literature review, and direct observations at some PASs and categorised into each domain of the Five Domains model. Subsequently, a modified Delphi method was employed, engaging 14 experts who assessed 59 potential welfare conditions, scoring their prevalence, severity, and duration from 0 to 5, respectively. Any aspects with a median score of 3 or higher were considered critical. The impact on an individual dog's welfare was determined by multiplying the severity by the duration of each condition. Out of the 59 conditions examined, 48 were considered critical. The most prevalent conditions were "limited access to toys" (median = 4.00), "insufficient foraging opportunities" (median = 4.00), and "intermittent, excessive barking noise" (median = 4.00). In terms of individual impact, the conditions with the highest scores were "depressive disorders" (median product score = 16.00), "fear-related or anxiety disorders" (median = 15.00), and "limited space" (median = 15.00). Notably, the welfare conditions in the Physical Environment and Behavioural Interactions domains were found to have the most significant negative effects on dog welfare in Taiwanese PASs. This comprehensive list of welfare conditions for shelter dogs and the ranking of their prevalence, severity, and duration offers valuable guidance for future improvements and resource allocation strategies.

The sustainability of broiler chicken production: balancing emissions and animal welfare

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1. Compassion in World Farming

Broiler chicken production has a lower environmental impact than other farmed species. However, this efficiency comes at the expense of chicken welfare. Broilers in conventional systems are bred for rapid growth and high breast yield and are kept at high stocking densities resulting in a range of welfare issues including poor walking ability, higher mortality, inactivity and inability to perform highly-motivated behaviours such as perching or exploring. The Better Chicken Commitment (BCC) aims to address these concerns through a set of science-based requirements, including the adoption of higher welfare breeds and lower stocking densities. This study seeks to define a sustainable broiler production model that balances chicken welfare and environmental impact. Based on the available scientific literature, we summarise the environmental challenges and benefits (both at breeder and broiler levels) of lower stocking densities and adopting breeds with higher welfare outcomes and identify strategies to mitigate the environmental footprint in Europe and the United States (U.S.). Since over 70% of poultry emissions come from feed production, a key challenge is an increased feed requirement for BCC breeds due to longer grow-out times. The main mitigation strategies would therefore target feed. Shifting feed composition from soy towards locally grown ingredients in Europe or incorporating sustainable corn and food waste in the U.S. can help mitigate emissions. Additionally, some BCC parent stock require less feed, while BCC breeds tolerate lower-protein diets. BCC parent breeds also show better egg survivability, lower mortality, and fewer carcass downgrades, leading to less wasted feed. The increased energy and land use, and manure output in higher welfare systems can be offset by adopting renewable energy and converting manure into biofuel/biogas. Finally, increasing consumer demand for chicken, particularly breast meat, conflicts with typically lower outputs in BCC production. However, lower mortality, better meat quality and carcass downgrades decrease the meat yield gap with conventional production. Full carcass use should also be promoted to help mitigate any environmental concerns. BCC production also benefits other aspects of sustainability such as reduced antibiotic use and improved working conditions for farmers. Achieving sustainable systems involves more than just reducing emissions. It requires a holistic approach that equally balances environmental concerns with human and animal welfare.

The effect of chronic feed restriction on cognitive functioning in dairy calves

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Pre-weaned dairy calves are typically fed restricted milk allowances, but affective states associated with this practice remain poorly understood. Deficits in cognitive performance, such as reward learning, associated with negative affective states have been observed in humans and animals and may therefore be a useful marker of such states. For example, dairy calves demonstrate reduced cognitive performance during acute feed restriction (i.e., during weaning), but the effect of chronic feed restriction on cognition remains unexplored. We used a spatial foraging task (hole-board test) to determine whether dairy calves ($n = 20$) demonstrate reduced cognitive performance when fed a restricted milk allowance (6L/day) compared to calves fed an enhanced allowance (up to 12L/day). In this test, calves must remember the locations of 4 rewarded buckets among 15 possibilities. Calves were tested once per day for 20 days. Reward locations remained constant for 14 sessions (phase 1 – initial learning), and were then changed and kept constant for 6 sessions (phase 2 – re-learning). We expected that restricted-fed calves would demonstrate reduced performance during both initial and re-learning compared to enhanced-fed calves. We measured calves' ability to recall the reward locations between trials (reference memory), and remember locations already visited within trials (working and general working memory). We also measured play running, since we expected this behaviour to conflict with foraging behaviours during the tests. Using linear mixed-effect models, we determined the effect of milk allowance, trials, and their interaction, on memory scores and play behaviour, and whether milk allowance affected latency to visit the first bucket and session duration. Contrary to expectations, restricted calves had better reference ($t = 2.19$, $P = 0.042$) and working ($t = 3.14$, $P = 0.0057$) memory. They completed sessions faster ($t = -4.03$, $P < 0.001$) and had a shorter latency to reach the first bucket ($t = -2.04$, $P = 0.006$). Additionally, restricted calves played less than enhanced calves ($t = -3.58$, $P = 0.006$). Calves were housed in pens that provided little space for engaging in play, so we expected all calves to be motivated to play. However, our results may indicate that feed-restricted calves were more food-motivated and thus focused on finding food rewards, over-riding any competing motivation to play. Thus, feed-restricted calves may prioritize foraging and forego opportunities to engage in other important behaviours such as play.

Integument damage from agonistic behaviour in dairy herds: influence of horned cow proportions and farm compliance with practical recommendations

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Some dairy farmers choose to keep horned cows to respect the integrity of the animals and avoid disbudding. In these cases, and loose housing, it is particularly important that management and facilities are designed to minimize physical agonistic interactions leading to integument damage (ID). Corresponding practice guidelines have been developed, based on research findings and practical experiences, for instance in Switzerland, Austria and Germany. In the present study the transition from hornless to horned herds or from tethered to loose housing with horned cows was monitored. The objectives were (1) to relate the extent of horn-induced ID to varying proportions of horned cows in the herds and (2) to evaluate the impact of compliance with guidelines on the prevention of ID. Data were collected over three consecutive winter periods from 37 dairy farms keeping 2-100 % horned cows in loose housing systems. Horn-induced ID included hairless patches, swellings, older and fresh wounds on the entire body and excluded technopathies. A total of 54 guideline-related factors were recorded via interviews and observations. They were categorised as either recommendation fulfilled or not fulfilled. 'Overall compliance' and compliance in the specific areas 'milking' (e.g. type of milking system, waiting area space), 'feeding' (e.g. feeding gate type, cow:feeding place ratio), 'lying' (e.g. cow:lying space ratio, front exit from cubicle), 'walking/activity' (e.g. walking alley width, access to water troughs), and 'herd management' (e.g. integration or regrouping of animals) were expressed in percentages. Two linear mixed models were calculated with farm as random factor. The fixed factors included the percentage of horned cows and either 'overall compliance' or the five specific areas of compliance. Across farms and recording periods, horn-induced ID/cow ranged from 0.6 to 24.1, with medians per recording period of 5.7–7.8 ID/cow. Hairless patches accounted for most IDs (71–76%). The risk of ID was higher in herds with a higher proportion of horned cows (estimate 0.105, effect size $r=0.66$, $p<0.001$) and a lower 'overall compliance' with practice recommendations (-0.204 , $r=0.51$, $p=0.003$, $n=101$ observations from 37 farms). From the five specific guideline areas, only for compliance regarding 'herd management' a significant reducing impact on ID could be confirmed (-0.132 , $r=0.42$, $p=0.004$). These results indicate that the more fully existing practice recommendations for the keeping of horned dairy cows are implemented, the lower the risk of injurious interactions, with careful herd management playing a particular role in the prevention of ID.

Teat quality traits, nursing and suckling behaviour expression in Nigerian West African Dwarf goats

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Teats are crucial for milk production, reproduction, and offspring survival in mammals. In goats, teat quality directly have impacts on nursing efficiency and kid growth. This study assessed the relationship between teat quality traits and nursing/suckling behaviours in Nigerian West African Dwarf (WAD) goats. A total of 150 lactating does were randomly selected from 37 smallholder farms and households across three production systems: extensive, semi-intensive, and intensive. Teat traits were evaluated using visual assessments and subjective scoring. Traits recorded include teat shape (funnel, bottle, balloon), number (two or supernumerary), edema (present/absent), placement (lateral, vertical, medial), teat-end hyperkeratosis (ring formation), teat depth, length, and size (small, medium, large). Behavioural data were collected through direct focal sampling, with each doe observed twice daily (morning and evening) for 15 minutes per session over three days. Behavioural data recorded include suckling bout duration and frequency, number of butts per session, and maternal rejection (refusal to allow suckling). Data were subjected to descriptive statistics, correlation and ANOVA. Most goats (68%) had funnel-shaped teats, 89% had two teats, 91% showed no edema, and 85% had no ring (absence of teat-end hyperkeratosis). Medium teat length and size were found in 63% and 58% of the does, respectively. Teat depth positively correlated with teat length ($r = 0.52$, $p < 0.001$) and size ($r = 0.47$, $p < 0.01$); length and size were also strongly correlated ($r = 0.61$, $p < 0.001$). Teat traits significantly influenced suckling behaviour ($p < 0.05$). Goats with funnel-shaped, supernumerary, non-hyperkeratotic, and medium-sized teats had longer suckling bouts (43.6 ± 6.2 sec), more butts per bout (5.3 ± 1.1), and fewer rejections. Conversely, goats with edema and teat-end hyperkeratosis showed higher rejection rates (3.2 ± 0.8 /day and 2.9 ± 0.6 /day, respectively). Suckling intensity was rated as mild, moderate, or vigorous based on kid effort and persistence. In conclusion, teat quality traits significantly affect nursing and suckling behaviours in WAD goats. Although kid growth was not directly measured, enhancing teat traits through selective breeding may improve nursing success, kid survival, and overall productivity.

How do dog behaviour knowledge sources affect ability to interpret dog emotional and motivational states?

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1. Dogs Trust

Interpreting dog emotional and motivational states is important for human and dog welfare and safety. Past studies have addressed the relationship between “experience” with dogs and accuracy of perception, but the absence of consistent definitions across studies makes comparing and interpreting studies difficult. Exposure to dogs (e.g., living with dogs) is often not differentiated from active pursuit of knowledge on dog behaviour (e.g., attending training classes), making it difficult to identify what aspects of experience may be related to performance. Here, we used hierarchical agglomerative clustering to categorize UK public participants ($n = 3,488$) into “knowledge groups” based on the sources of knowledge on dog behaviour they reported using. We then assessed how well participants scored silent videos (up to five videos per participant, 23 videos total) for each of eight qualitative behavioural assessment (QBA) terms. Each participant’s accuracy was summarised as a value between zero and one for each video they viewed. This represented the proportion of QBA terms they scored correctly when compared to the responses of 11 dog behaviour experts. We compared participants’ accuracy across knowledge groups, accounting for participant age, gender, attitudes towards dogs, dog training beliefs, and passive exposure to dogs. We selected these variables using a causal inference approach. Clustering resulted in four different “knowledge groups” which could broadly be characterised by whether participants reported not having used any of the listed knowledge sources, primarily having used hands-on sources (e.g., attended dog training classes), primarily theoretical sources (e.g., books), or a mix of hands-on and theoretical sources. We found participants from the group characterised by a combination of hands-on and theoretical sources tended to do best, performing significantly better than those who reported using only theoretical sources ($p = 0.01$, contrast estimate = -0.09 , 95% CI: $-0.16, -0.02$) or none of the listed sources ($p < 0.0001$, contrast estimate = -0.18 , 95% CI: $-0.27, -0.08$). This was followed by those who reported using hands-on sources, who performed significantly better than those who had selected none of the sources ($p = 0.003$, contrast estimate = -0.12 , 95% CI: $-0.21, -0.03$). No significant differences were found between hands-on sources versus theoretical sources or between theoretical sources versus no selected sources ($p > 0.05$ for both). Our findings emphasize the importance of hands-on learning and attendance at training classes for dog owners and demonstrate the importance of clearly defining the different aspects of “experience” being studied.

Conventional space density impairs night resting, feeder access, and pen hygiene in fattening pigs

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Conventional husbandry systems often involve housing pigs with a relatively high stocking density, which may impair several of their behaviours, especially in the fattening period. This study investigated the effect of space density on three aspects of finisher pig welfare: resting at night, feeder access, and pen fouling. The experiment, performed as part of the mEATquality project (European Union grant no. 101000344), included pens with densities of 0.7 m² (18 pigs/pen, n=6, CON), 1.4 m² (9 pigs/pens, n=6, SP9), or 2.1 m² (6 pigs/pen, n=6, SP6) per pig. Each pen consisted of a solid, partly slatted, and slated area, and featured a feeder with 3 head spaces. The pigs were enrolled from 30 kg until slaughter at approx. 110 kg, equivalent to 11 experimental weeks. On weeks 2, 5 and 10, scan samplings of video recordings were performed every 10 min for 9h for one night to determine the proportion of pigs resting in different areas of the pen and the proportion of solid floor covered by pigs. In addition, for 2h for one day each week, the proportions of feeder spaces being used or obstructed (e.g., by a pig laying in front) were observed every 20 sec. Lastly, the occurrence of pen fouling was recorded every weekday throughout the study. At the start of the period (week 2), CON pigs already showed a higher probability of resting outside the solid floor than SP9 and SP6 (47% vs. 17% and 9%, $p < 0.01$). By the end of the period (week 10), over 80% of the solid floor was covered by pigs at night in the CON pens, leading to a significantly higher probability of pigs resting in the slatted areas of the pen compared to SP9 and SP6 (60% vs. 37% and 25%, $p < 0.01$). The prevalence of feeder space obstruction was also notably higher in CON than in SP9 and SP6 that week (40% vs. 18% and 7% of feeder spaces). Pen fouling was a significant issue as well in CON with almost 10% of cumulated observations, whereas SP9 and SP6 had respectively scare and no events of pen fouling. These results confirm that a conventional stocking density does not provide pigs with sufficient space to maintain the functional areas of the pen, which impairs resting at night, feeder access, and pen hygiene. Lowering space density by reducing the number of pigs per pen helps alleviating these issues.

Alignment of multiple actors towards improving animal welfare through breeding: the HenTrack model

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The welfare of laying hens within cage-free housing systems (CHS) stand to greatly benefit via focused efforts to develop effective interventions, including selection of genetic material within breeding programs. Despite advances in technology, desire from consumers and governments for better welfare, and industry partners eager to meet market demands, there are substantial challenges towards improvement. While many of these problems can be resolved through fundamental research, there is a *misalignment of interests and institutional infrastructure* for the actors who exist within the relevant communities that prevent coordinated movement. Although most actors share the belief that improvements in breeding are possible and beneficial, they have interests and are embedded in institutions which collectively impede advancement. For instance, while national and regional governments may desire improved breeding that prioritizes welfare, the actual genetic material is held by private companies abroad, limiting the influence of these government institutions. Those private companies, while eager to meet the demands for improved welfare of hens in CHS, must also consider that the majority of the world's laying hens are housed in cage housing systems. The selection of phenotypic traits within CHS are more costly and complicated to assess than traditional traits (e.g., feather pecking vs. egg weight) using small groups or individual hens, resulting in a disincentive to develop needed methodologies. Additionally, given the phenotypic correlation between traits of interest, inclusion of additional traits are likely to have unintended effects that are difficult to predict. As a consequence of these misaligned interests and institutional infrastructure, advances in breeding hens for CHS can only proceed haltingly. As an alternative model, a recently developed collaboration (HenTrack) between researchers at the University of Bern and the two leading providers of laying hen genetics, may provide a partial solution to bring these interests into alignment. Spearheaded by a financial donation from a charity to fund and assume the large financial risks to develop and evaluate needed methodologies, the collaboration also required trust and unified long-term objectives (or alignment) between various actors in the process, including researchers, governments, and other parties. For instance, the site where the work would be conducted (the Aviforum) needed to reserve the barn for the six-year effort with the Swiss federal government contributing the rental payment. We believe this framework could serve as a model to address other problems within animal agriculture and will use this presentation to provide basic suggestions and pitfalls.

The effect of creep forms on creep interaction and blood iron status of pre-weaned piglets

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Weaning is stressful for piglets, especially for fast-growing piglets who may show signs of anemia. Providing creep diets to suckling piglets is a recognised practice that can reduce weaning stress and improve health, but pellet size may affect piglets' interactions with creep. This study investigated the influence of providing different forms of creep to suckling piglets on creep interaction and blood parameters. A total of 283 piglets from 21 litters were randomly assigned to one of four diets: 1. Standard creep (SC, crumble starter diet), 2. Pellet creep (PC, E17 horse feed), 3. A mix of SC and PC (MC), and 4. No creep (Control: NC). Creep diets were selected based on a pilot preference test. Starting at 10d of age, litters were provided 1400g of their respective diet daily until weaning (28d). Live behavioural observation occurred between 16-28d where the proportion of piglets/litter interacting with creep (except NC) was recorded at 1/2/3/30/60 minutes post delivery. Creep wastage (Y/N) was evaluated based on if creep remained 24h post-delivery. At 27d, blood samples were collected from one small and large male piglet/litter (n=42) to evaluate iron status. Mixed models were used to assess behaviour/blood outcomes with diet (day, time and interactions where applicable) as main fixed effects, random effects of replicate and pen and repeated effects of day and time for behaviour outcomes only. Creep interaction was influenced by day of observation and time within day. Of the 6 observation days, fewer piglets interacted with the diets on day 1, and the highest proportion interacted on day 4 (day 1:35±0.07%, day 4:54±0.07%, $p<0.01$). The first minute post-delivery showed the greatest interaction, with each consecutive time after attracting fewer piglets (min 1:61±0.05%, min 60:16±0.05%, $p<0.001$). Piglets more frequently did not consume all PC diet compared to MC. Creep diet had no effect on blood iron parameters. Large piglets showed greater signs of anemia compared to small (lower iron, hemoglobin, hematocrit, and mean corpuscular volume; higher unsaturated and total iron binding capacity, and red cell distribution width; $p<0.001$). Although preference tests were conducted to learn which creep forms were attractive to piglets, they had no effect on creep interaction or blood iron status, while piglet size significantly affected iron status at 27d of age. Further research is needed to develop creep diets which are nutritionally beneficial for reducing anemia and promote creep interaction and consumption to reduce stress at weaning.

Longitudinal owner reported use of chemical interventions for undesirable behaviours in dogs

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Undesirable behaviours (UB) in dogs, such as separation-related anxiety and aggression, are frequently reported by dog owners. There are multiple options for treating UBs such as amending the dog's environment, engaging in behaviour modification, and using chemical interventions (CI), comprising prescribed and/or non-prescribed agents, to modify behaviour. Despite increased reports of UB in the United Kingdom (UK) dog population, data on the use of CIs are sparse, particularly regarding variation in their use in individual dogs over time. In this study we used owner submitted survey data from Generation Pup, a unique longitudinal study designed to understand the lifelong health, welfare, and behaviour of dogs from the age of 12 weeks within the UK and Republic of Ireland. We aimed to quantify reported UBs and sources of treatment advice, with specific focus on the use of CIs (both prescribed and non-prescribed) over time in this population of dogs. Data submitted between 2017 and 2025 showed that UBs were reported by 28.3% (1431/5048 surveys) of owners when their dog was 6 months of age, 34.5% (959/2782 surveys) at 15 months, and 27.1% (487/1795 surveys) at 2.5 years. On average, 38.4% of owners reporting UBs sought help for the UB, with 7.1% of owners consulting a veterinary professional. Owners also reported the use of prescribed CIs, over the counter CIs and dog-appeasing pheromone (DAP) products specifically. For owners who completed surveys at all three timepoints of 6 months, 15 months and 2.5 years of age; prescribed CIs were reported by 1.2% (16/1302), 1.5% (20/1302), and 1.3% (17/1302), non-prescribed CIs were reported by 1.6% (21/1302), 3.3% (43/1302) and 3.7% (48/1302), whilst DAP products were reported by 5.2% (68/1302), 2.9% (38/1302) and 3.9% (51/1302), respectively. These data indicate that non-prescribed CIs are used more frequently than prescribed CIs despite the high reported levels of UB. This may have been influenced by the low level of veterinary professional involvement, meaning prescriptions were not obtained. Higher reported levels of DAP and non-prescription CIs may reflect owner perceptions of CIs, whereby a perceived 'hierarchy' of treatment types mean that non-prescribed options are pursued before prescribed CIs. Similarly, factors such as cost, safety and ease of administration may prevent more owners from utilising CIs as part of UB treatment. Further work will analyse longitudinal data from dogs up to nine years of age to assess for any within-individual changes in the types of CIs used over time.

Is water bathing in chickens a neglected comfort behaviour?

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Birds are known for their comfort behaviour through dust and water bathing. Some use both water and substrate to clean their plumage, whereas other species are known to exclusively use one environmental substrate for body care. In chickens, dust bathing has been well-described, but the use of water as bathing substrate has not yet been investigated. Given the habitat of the jungle fowl, it is possible that chickens use water to perform comfort behaviour. We examined whether hens use water for bathing, and if so, whether water bathing behaviour differs from dust bathing. In a flock of 283 Lohman Brown laying hens kept in a mobile barn with access to an outdoor run three round plastic trays (41cm diameter, 4cm deep) were presented in the free-range area. Each tray contained either water, sand, or nothing (empty control), of which the location was systematically alternated daily. The three treatments were intended to see whether additional resources offered were used (sand), whether trays alone were particularly attractive (empty control), or whether it was specifically the water availability that made the tray attractive (water). Both direct observations (twice daily for 15min each with 30s intervals) and video recordings (motion-detected video, totalling 3110 video clips) were used to assess resource use over a period of 18 days. The number of hens being in each tray type was analysed with a linear mixed-effect model in R studio. We found a significant interaction between daytime and treatment ($p < 0.0001$). In the morning, more birds were found at the water tray over the observation period (mean 18.2 hens) followed by sand (9.1) and empty controls (0.4). In the afternoon, however, usage was in general lower, and almost only apparent at the trays containing sand (mean 4.3; water 0.4; empty 0.2 hens). This suggests that water was preferred over sand, but surprisingly no chickens were observed to actually perform water bathing or pseudo-bathing, although sand bathing was observed. Instead, the layers intensively used the water tray to drink, generally depleting the water trays early in the day, often within less than 30 min. In conclusion, we found no evidence of water bathing in chickens. Instead, we observed a high drinking motivation, even though the birds had ad libitum access to nipple drinkers in the barn and a normal water consumption from those nipples. This suggests that drinking from open water may be a behavioural need that necessitates further investigation.

Pig-ture this: Teaching scientific assessment of animal welfare using digital 3D pigs

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There are several challenges associated with teaching scientific animal welfare assessment to tertiary students and new researchers. Firstly, increasing biosecurity threats have led to producers restricting visitors on farms. Secondly, even when students are permitted on farms, their interactions with animals are typically limited due to ethical considerations. Thirdly, when there is access to University or institution-owned animals, the animals typically receive a high quality of care, resulting in excellent health and welfare with little variation observed, which is not representative of animals in commercial settings. Furthermore, obtaining non-live animal resources such as photos and videos to illustrate situations of poor welfare is challenging due to the concerns of animal carers and industries in sharing sensitive content. To address these challenges, we developed a novel and interactive learning tool featuring a set of digital 3D pig models. Each of our 15 virtual pigs represent a different position on the spectrum of animal welfare, based on visual indicators including injuries, tear staining, body condition, skin condition, tail posture and lameness. We have recently embedded the virtual pigs into interactive animal welfare workshops at both undergraduate and postgraduate level, where students use published methods to measure these welfare indicators, analyse connections between them, and interpret the findings to draw conclusions about the welfare state of each pig. Through this process, students can assess intra- and inter-observer reliability, think critically about the validity of each indicator, and consider the practicality of applying the indicators in research and industry settings. Overall, interacting with 3D pigs offers the opportunity for critical discussion about welfare assessment methodology. Beyond tertiary student education, the 3D pigs also have application in training researchers. By practicing welfare assessments on virtual models, new researchers can improve consistency and refine their skills. This approach has the added benefit of reducing reliance on live animals for training purposes, aligning with the principles of replacement and refinement in animal use. We are currently evaluating the effectiveness of the 3D pig models by investigating student engagement, experience and learning outcomes for students enrolled in animal welfare, veterinary science, and agriculture programs. Early feedback suggests virtual animal welfare assessment is enjoyable and enhances the confidence of students to make judgements about welfare. By integrating innovative digital resources into education, we aim to enhance learning experiences, foster critical thinking on welfare assessment, and inspire the next generation of animal welfare scientists.

Unraveling social heritability in feed intake: Insights from beef cattle

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Understanding genetic and social influences on cattle feeding behavior is essential for improving feed efficiency and animal welfare. This study estimated direct and social heritabilities of dry matter intake (DMI) per feeding event in Nelore cattle under different competition scenarios. Data from feed efficiency trials conducted between 2013 and 2023 at the Institute of Animal Science, São Paulo, Brazil, were used, encompassing records from 1,174 Nelore males with 288 ± 45 days old. Data from all years were included, with recordings occurring under similar management and seasonal conditions. Animals were housed in collective pens (1,844 m²), averaging 42.9 ± 14.7 animals per pen, with access to Vytelle SENSE electronic feeders that allowed only one animal to feed at a time. A total mixed ration (60% corn silage, 25% dry corn grain, 13% soybean meal, and 2% urea and mineral mix) was provided at 08:00 h and 15:00 h daily, aiming for an average daily gain of 1.1 kg/day. Trials lasted 83 ± 12 days, including at least 21 days of adaptation. Feeding behavior was continuously recorded using electronic feeders equipped with load cells (10 g resolution) and RFID readers, which recorded tag IDs every second. Two competition scenarios were defined based on the interval between consecutive feeder visits: ≤ 7 seconds (competition; 2,733,782 events) and > 120 seconds (non-competition; 374,553 events). Two models were implemented: an animal model and a social model. Fixed effects included contemporary group, animal age at trial, and linear and quadratic effects of dam age. Variance components were estimated using Bayesian inference via Gibbs sampling (500,000 iterations; 50,000 burn-in; thinning = 50). Direct heritability estimates were low and similar across scenarios (0.03 ± 0.005 in competition; 0.02 ± 0.004 in non-competition). Social heritability was 0.01 ± 0.001 in competition and 0.003 ± 0.001 in non-competition. The genetic correlation between direct and social effects was negative under competition (-0.17 ± 0.05) and positive under non-competition (0.22 ± 0.07), suggesting that animals with higher direct genetic merit reduce pen mates' intake under competitive conditions but may enhance it when competition is reduced. Despite low heritability estimates, this study is the first to assess social genetic effects on DMI per visit in beef cattle. Future research should explore alternative models to refine these estimates and improve selection strategies that could optimize both feed efficiency and welfare in group-housed cattle.

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Behavioural lateralisation in the domestic pig

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Millions of pigs are kept in captivity across the globe, and the welfare of these intensively farmed animals is of cause for concern. Finding ways of assessing and improving their well-being is of key importance. Studies on other species suggest that lateral bias, as an indicator of hemispheric dominance, may harbour potential as a tool for assessing welfare risk. However, the lateral preferences of pigs have been subject to extremely little scientific attention. This work aimed to explore the most useful measures for assessing laterality in pigs, and identify their individual lateralisation patterns. Observations of side preference were recorded in fifty pigs across five measures: a snout-manipulation task, step-up task, detour task, tail-curling and lying-side. Snout-use, step-up and detour side preferences were observed twice (3-and 6 weeks-of-age) to evaluate their consistency over time. Binomial z-scores revealed if pigs showed a significant side bias, while a directional handedness index (HI) quantified each pigs' lateral bias on a continuum from strongly left- to strongly right-sided. Absolute HI scores (ABSHI) indicated their strength of laterality. Pigs were significantly more likely to be ambilateral than lateralised for snout-use (3 weeks: $p = 0.03$; 6 weeks: $p = 0.003^*$) and lying-side ($p < 0.001^*$, binomial tests). However, lateralised behaviour was displayed for a significant majority of subjects in the detour task at 6 weeks ($p < 0.001^*$) and tail-curling ($p = 0.03$). There was no significant sex difference in HI and ABSHI scores for any of the measures ($p > 0.05$, Mann-Whitney U tests). A Friedman test showed that the strength of the pigs' side preferences differed significantly between the measures ($p < 0.001$), unlike laterality direction ($p > 0.05$). Significant positive correlations in HI scores between timepoints for all of the tasks revealed consistency over time ($p < 0.001^*$). K-means cluster analysis using combined step-up and detour laterality (at 6 weeks) identified pigs' lateralisation patterns across functions and thus their potential hemispheric dominance (LL: $n = 20$, RR: $n = 11$ and LR/RL: $n = 19$). Overall, the findings point to the existence of individual-level side preferences in pigs, although lying side and snout-use were not found to be particularly useful indicators of lateral bias. What remains to be determined, and is currently under analysis, is whether pigs' lateral biases are correlated with any welfare measures and can therefore reveal their welfare risk.

* denotes significant result after Bonferroni corrections.

Breed-specific maternal behaviours in chickens: implications on poultry welfare

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Providing maternal care in chickens is a promising niche in poultry production, having welfare benefits for the chicks both in the short and long term. The hen serves as a role model and controls the behaviour of their chicks before they become independent. Studies on maternal care have adopted different fostering types without paying much attention to how (cross-)fostering influences hen-chick behaviour. This behavioural study investigates the brooding and maternal care behaviours of two chicken breeds (silkie and bush fowl) subjected to two fostering types (in-fostering and cross-fostering, i.e., hens with chicks of the same and different breeds, respectively) and two maternal durations (chicks stayed with hens for either 3 or 6 weeks). The behaviours of the hens were recorded (05:00-17:00), twice a week throughout the three-week brooding period, and, after hatching, the behaviours of the hen and their chicks were recorded (10:00-14:00), twice a week for either 3 or 6 weeks. Principal components extracted from the behavioural data were analysed as outcome variables using linear mixed-effects models. During brooding, bush fowl hens displayed more extended activity in the 1st week, while silkie hens displayed more extended activity in the 3rd week, respectively ($F_{2,50}=5.78$, $P=0.006$). Both breeds reduced foraging and preening activities by the 3rd week ($F_{2,50}=11.95$, $P=0.0001$). After hatching, silkie hens consistently warmed chicks up for three weeks, whereas bush fowl hens warmed chicks predominantly in the 1st week ($F_{1,23}=21.28$, $P=0.0001$). Bush fowl chicks received more warmth ($F_{1,23}=8.48$, $P=0.008$) and mobile care ($F_{1,23}=58.19$, $P<0.0001$) than silkie chicks. Bush fowl hens walked together more with their six-week-old chicks, whereas silkie hens walked together more with their three-week-old chicks ($F_{1,23}=6.36$, $P=0.02$). As bush fowl chicks grew, they followed their mother less, but Silkie chicks continued walking with the hen ($F_{1,81}=13.48$, $P=0.0004$). When raising chicks for six weeks, silkie hens foraged more with bush fowl chicks in the 1st week and with their own in weeks 3-4, while bush fowl hens foraged equally with both chick breeds in the 3rd week ($F_{1,81}=4.78$, $P=0.03$). In conclusion, this study highlights distinct maternal care strategies in the bush fowl and Silkie hens. The activity levels of the hen breeds differed with the week of brooding. Bush fowl hens encouraged early chick independence, whereas Silkie hens encouraged long-term chick attachment. Silkie hens adjusted their foraging activities to meet the needs of Silkie chicks, but bush fowl hens were consistent with foraging with both chick breeds.

Effects of different farrowing systems on farrowing and piglet growth and survival

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Farrowing crates are widely used for farrowing and lactating sows on commercial farms although they have a negative impact on sow welfare and behaviour. The aim was to investigate the effects of different farrowing strategies on piglet mortality, piglet growth, farrowing duration, and average piglet birth interval. The study consisted of three farrowing treatments on two farms: free farrowing (FF), free nest-building and crated farrowing (FNB) and temporary crating (TC). FF sows were not crated around farrowing. FNB sows were free during nest-building period but crated when farrowing started, and for three days. TC sows were crated from 2 days before expected farrowing until 3 days after farrowing. On farm 1, sows were studied in two farrowing batches and allocated to all three farrowing treatments: FF (n = 39), FNB (n = 34) and TC (n = 36). On farm 2, sows were in three farrowing batches and allocated two treatments: FF (n = 24) and FNB (n = 23). Farrowing treatment tended to affect the number of stillborn piglets on farm 1 (Kruskal-Wallis test, $p = 0.09$). The median of stillborn piglets in FF was 0 (range 0 – 4), in FNB 1 (0 – 6) and in TC 0 (0 – 4). Farrowing treatment had no effect on mortality on farm 2. On farm 1, farrowing treatment had no effect on piglet growth. On farm 2, FNB sows had better piglet growth compared to FF sows (Linear mixed model (LMM), estimated mean (EM) FNB 324 g/day vs. FF 298 g/day, $p = 0.03$). On farm 1, farrowing treatment had no effect on the farrowing duration or the piglet births intervals. On farm 2, farrowing treatment affected the total duration of farrowing (LMM, $p = 0.01$), average birth interval between 1st – 5th piglets (LMM, $p = 0.04$) and 1st – 10th piglets (LMM, $p < 0.01$); the total duration of farrowing was shorter for FF sows (mean 3h41min) compared to FNB sows (5h6min) and both birth intervals similarly shorter (1-5; FF 16min vs. FNB 22min, 1-10; FF 12min vs. FNB 21min). In conclusion, farrowing strategies have different effects depending on the farm. These results might partly be due to both farrowing pens were designed for TC. Furthermore, farm 1 normally uses TC for all sows and farm 2 FNB.

Dog behavior and stress biomarkers offer insights into shelter outcomes and length of stay

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The shelter environment contains inherent and often unavoidable stressors for dogs. To protect animal welfare, shelters seek to identify dogs that are at risk of non-live outcomes and long shelter stays for rapid intervention. The goal of this study was to explore the utility of kennel behavior, fecal cortisol and fecal immunoglobulin A (IgA) concentrations as early indicators of shelter outcomes and length of stay. Using an observational study design, 224 dogs were enrolled from three animal shelters in Pennsylvania between October 2023 and July 2024. Data was collected 0-48 hours and 7-9 days after shelter entry. Fecal samples were obtained from dogs' enclosures and analyzed for cortisol and IgA concentrations using ELISAs. Videos of in-kennel behavior were recorded for five minutes, followed by a 30-second period of human-interaction, and then coded using continuous sampling and a published ethogram. Shelter outcomes (adoption, transfer, euthanasia, return-to-owner) were recorded directly from the shelters' electronic records. Kruskal-Wallis Tests were used to compare differences in canine behavior by outcome, and Spearman's correlation for length of stay. Biomarker concentrations were analyzed using repeated measure ANOVAs. P-values <0.05 were considered statistically significant. Aggressive or stereotypic behaviors were associated with non-adoption outcomes, including an association between growling and euthanasia ($X^2=18.72$, $p<0.01$) and digging at the enclosure and transfer to a rescue facility ($X^2=8.91$, $p=0.01$). After one week, the importance of human-directed behaviors appeared to increase. Adopted dogs spent more time standing with their front paws on the enclosure ($X^2=7.95$, $p=0.02$) and tail wagging ($X^2=6.57$, $p=0.04$) than dogs with other outcomes. Dog-to-human gaze was correlated with shorter shelter stays ($r_s=-0.27$, $p=0.04$). Somewhat unexpectedly, fear-related behaviors were negatively correlated with length of stay, including trembling ($r_s=-0.23$, $p=0.01$) and flattened ears ($r_s=-0.21$, $p=0.02$). Log cortisol concentrations were significantly higher among adopted dogs after shelter entry compared with dogs who were euthanized or transferred ($F(2,78)=4.05$, $p=0.02$, partial $\eta^2=0.09$). After one week, cortisol increased among non-adopted dogs, resulting in comparatively high concentrations. IgA concentrations were not significantly related to shelter outcome, but were positively correlated with length of stay at baseline ($r_s=0.18$, $p=0.01$). Our findings suggest in-kennel behavior may provide the most useful insights for shelter staff. Encouraging dogs to demonstrate social behaviors at the front of their enclosures may help to promote adoptions. Stress biomarkers did not offer clear insights into shelter outcomes but raised an interesting question about what constitutes an appropriate physiological stress response after entry to the shelter environment.

“If you don’t know what you’re missing, are you missing out?”: exploring UK pig industry perspectives of ‘a good life’ and strategies to fulfil it on farm

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There is emphasis on providing animals with a ‘good life’, but within livestock farming stakeholders often hold different perspectives regarding positive welfare, and may have difficulties accessing, understanding, and implementing research about higher-welfare practices. This study aimed to explore industry viewpoints regarding ‘a good life’ for pigs, how well it is fulfilled, and what may help provide it on future farms. The one-day workshop (10th January 2025, Harper Adams University, England) had varied attendees (33); 11 farmers, 10 industry representatives, 5 assurance scheme employees, 5 veterinarians, and 2 researchers. Presentations introduced the concept of ‘a good life’, and the three spheres (Biological functioning; Affective states; Natural living - Fraser et al., 1997) welfare framework. Attendees ranked the three spheres based on importance (24 responses); 54% of respondents ranked ‘Biological functioning’ as of highest importance whereas ‘Natural living’ was most likely to be ranked middle (46% of respondents), and ‘Affective states’ was chosen as of least importance by 46% of respondents. Opinions on current systems demonstrated conflicts between welfare spheres. Outdoor systems were considered best at fulfilling natural living but worst for biological functioning. Indoor slatted-floor systems worst for natural living and affective states, whereas indoor straw systems were considered best for biological functioning and to mostly fulfil affective states and natural living. When asked ‘If you were a pig what would you want to live a good life?’, participants struggled to consider the pigs’ perspective and ‘wants’ focused on needs such as adequate nutrition, health, and environments. Good stockmanship was considered important, and choice, natural behaviours, enrichment and ‘fun’ were mentioned. Stress, mutilations, disease, and aggression were proposed as important to avoid. A key theme was providing social contact in stable, family groups to avoid wider social mixing and associated issues. Findings agree with research that mixed stakeholders hold different perspectives regarding positive welfare, which may reflect the nature of their roles and/or backgrounds. Some struggled to separate legal standards from positive welfare required for ‘a good life’, and not to consider practicalities and demands such as profitability, biosecurity and environmental pressures, suggesting that research should take a holistic approach that addresses multiple concerns and/or provides multiple benefits to varying stakeholders. Critical views of the levy board and legislation - particularly with regards to a lack of financial support or incentive for investing in ‘a good life’ - suggest the importance of co-designed policies and rewarding mechanisms to motivate action.

Digging behaviour in production rabbits: is it a true behavioural need?

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Some behaviours of rabbits are so strongly motivated that they can be considered a behavioural need. Digging behaviour is often mentioned in this regard, but it is unclear whether it truly classifies as a behavioural need in production rabbits. In the wild, digging has a clear purpose: to create warrens as protection from predation and weather extremes and as an important component of nest building by the doe. However, shelter is commonly readily provided in captivity, raising the question whether digging behaviour is still of importance to production rabbits. Here we set out to investigate through a literature study what the evidence is for digging behaviour being a behavioural need in growing production rabbits (i.e., excluding does). An initial search was performed in Scopus, using the search string “rabbit” AND (“digging” OR “dig”) AND “behaviour”. This resulted in 32 publications, of which 22 were considered irrelevant (i.e., not about rabbits, not in (close) captivity, using hormonal or surgical interventions, not recording digging behaviour or focusing on pygmy rabbits). The remaining 10 publications mostly provided a general description of (pet) rabbit behaviour (n = 4) or focused on maternal behaviour (n = 4). One study investigated laboratory rabbit behavioural time budgets and included digging within a cluster of abnormal behaviour and one study investigated the addition of enrichment for digging (a dig bin). Given this low number of relevant studies found, we subsequently non-systematically searched for additional literature on rabbit behavioural time budgets to gain more insight into the frequency of digging behaviour in captivity. Overall, it appears that digging behaviour has a low frequency in captivity, and is often considered to be abnormal behaviour. As far as we are aware, only a single study - in laboratory rabbits - aimed to assess the effects of adding digging enrichment on the occurrence of digging behaviour, and no increase in digging behaviour was observed in that study. Therefore, we conclude - albeit based on very limited evidence - that digging is likely not a behavioural need or rewarding in itself in growing rabbits but an instrumental (functional) behaviour instead, although this requires further investigation. It is important to note that our conclusion does not imply that opportunities for digging behaviour should not be provided where possible: it is important to strive for housing systems that provide rabbits with behavioural opportunities, even when these may not be considered ‘true’ behavioural needs.

Locomotor stereotypic behaviour in the domestic horse (*Equus caballus*) may be associated with a heightened response to social stimuli

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Our recent cross-species analyses of stereotypic behaviour (SB) suggest that the different forms (e.g. oral and locomotor) are heterogeneous in their causal mechanisms. In ungulates, there are indications that some forms of locomotor SB may be linked to social factors. Using the domestic horse as a model species within this clade, we investigated whether individuals displaying the locomotor stereotypy box-walking demonstrated greater sociality than crib-biting and non-stereotypic horses (controls), using a stable mirror as a social stimulus. Mirrors have previously been successfully utilised as a social stimulus to reduce stress and SB in horses. Testing took place in horses' home stables. After a 24hr baseline phase, horses ($n=16$) were provided with a 1 x 1.5 m stable mirror for 24hrs. This was followed by a 24hr post-mirror phase. Sociality was quantified using measures of behaviour, stable orientation, and head/neck movements using two sampling methods: 1) scan sampling at 10-minute intervals over the entire 72-hour period, 2) continuous sampling during the first 10 minutes of each phase. Box-walkers spent significantly more time alert towards the mirror than crib-biters ($z = 2.77, p < 0.05$) and controls ($z = 3.50, p < 0.01$) over the 24hr mirror phase. Time spent facing the mirrored wall during the 24hr mirror phase was greater than baseline and post-mirror phases across all groups, however this increase was larger in box-walkers than crib-biters ($z = 3.14, p < 0.001$) and controls ($z = 3.51, p < 0.001$). Box-walkers spent significantly more time with their head lowered, a position associated with social investigation, than crib-biters in the first 10 minutes of the mirror phase ($z = 3.11, p < 0.01$). Interestingly, during the first 10 minutes with the mirror, ears flattened was only observed in crib-biters, implying that these animals may be less tolerant to the introduction of an unknown individual. Taken together, results suggest that box-walkers may have greater motivation to observe and interact with a perceived social companion than non-box-walking horses. An alternative explanation could be that box-walkers were more interested in the mirror as a novel object, rather than perceiving it as a social stimulus. We therefore cautiously propose that it is the increased frustration of the behavioural need to perform social behaviours experienced by these individuals that acts as a driver for the development of locomotor SB. Future work should examine whether this is true of other locomotor SBs across the ungulate clade.

Comparing reaction scores, latencies, and heart rate as measures of fear in Icelandic horses

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Accurately assessing fear responses in horses is essential for evaluating temperament and management practices. Previous studies have used various behavioural and physiological responses in horses, with reaction scores and latencies commonly used to quantify the behavioural reaction. A key factor in ensuring reliable assessments, is the consistency of behavioural scoring between and within observers. This study investigated interand intra-rater reliability (IRR) in evaluating fear reactions in Icelandic horses (n=46) in two fear-eliciting tests, alongside how two behavioural parameters (behavioural reaction scores and latencies) aligned with the physiological response (maximum heart rate; HR). In a Bridge test (BT), fear of crossing a white tarp was assessed using a reaction scale, while latency was measured from the start of the test until the horse placed both front hooves on the tarp. In the Startle test (ST), a plastic bag was pulled away while the horse was eating from a bucket. Horses' fear reactions were measured on a scale, and the latency to resume eating after the bag was pulled was recorded. HR was recorded during both tests. To compare behavioural and physiological responses, correlations between maximum HR and scores, and maximum HR and latencies, were assessed using Spearman's Rank Correlation. Interand intra-rater reliability tests assessing the consistency between the two observers and the consistency of the primary observer's scoring across two sessions, were done using Cohen's weighted kappa. The results revealed a tendency towards a weak positive correlation between reaction scores and maximum HR for BT ($r_s=0.34$, $P=0.07$), and no significant correlation between latency and maximum HR ($r_s=0.21$, $P=0.27$). A strong positive correlation was found between reaction scores and maximum HR in ST ($r_s=0.65$, $P<0.001$), but no significant correlation was found between latency and maximum HR ($r_s=0.28$, $P=0.14$). The preliminary analyses of inter-rater reliabilities (n=10 horses, 22% of total sample) showed nearly perfect agreement (BT and ST: $\kappa=0.92$, $P=0.003$) between the two observers. The analysis of intra-rater reliability confirmed high consistency (BT: $\kappa=0.923$, $P=0.003$, ST: $\kappa=0.97$, $P=0.002$) within the repeated scoring of the primary observer. The correlations showed that scores aligned better with HR than latencies, and the strong IRR indicated that behavioural scoring was consistent within and between observers, collectively suggesting that reaction scores may be a more reliable behavioural measure than latencies. Additional HR measures, e.g., increase from baseline and HR recovery, may be beneficial in providing a more comprehensive assessment that also accounts for individual variation.

Improving dairy cow welfare with flexible neck straps while maintaining hygiene

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Neck rails, straps, or chains are commonly used in cubicle housing systems for dairy cows to position them within the cubicle in a way that limits bedding soiling by faeces and urine. However, rigid neck rails are associated with animal welfare concerns such as painful collisions, injuries, and atypical behaviours. Flexible neck straps offer a potential alternative, but their positioning relative to cow body size remains unexplored in terms of effectiveness in reducing soiling and their impact on cow behaviour. This study aimed to determine how flexible neck strap positioning affects rising and lying down behaviours, and defecation behaviour in lying cubicles. Two experiments were conducted in a research barn with two pens, each housing 20 non-lame dairy cows (Brown Swiss and Swiss Fleckvieh) in deep loose bedded cubicles. The first experiment tested different neck strap heights (105, 120, and 135 cm), while the second varied the distance of the neck strap from the curb (155 and 170 cm). Due to variation in the cows body size, this resulted in ratios of neck strap height to withers height (NSH ratio) of 0.65–0.96 and neck strap distance to diagonal body length (NSD ratio) of 0.85–1.11. Atypical rising and lying down behaviours and defecation behaviour were assessed from video and statistically analysed with respect to NSH and NSD ratios. Atypical behaviours were rare, except for sideways head lunging. A higher, less restrictive NSH ratio reduced the odds of cows crawling backwards on their carpal joints during rising (odds ratio and 95% CI: 0.59, 0.43–0.79). However, other atypical behaviours were not affected by the neck strap positioning. Regarding defecation, a higher NSH ratio was associated with increased odds of faeces landing in the cubicle within a 120 s window around a rising event (odds ratio and 95% CI: 2.16, 1.47–3.43). Similarly, the odds of faeces landing in the cubicle increased with higher, less restrictive NSD ratios (odds ratio and 95% CI: 2.44, 1.11–6.07). These results suggest that flexible neck straps can accommodate cows of different sizes without considerably impeding natural movements during rising and lying down. However, the effectiveness of reducing soiling within the cubicle is improved by positioning the neck strap at lower NSH and NSD ratios, providing more restrictive placement relative to cow body size. Flexible neck straps thus represent an effective piece of equipment to position the cow in the cubicle, balancing animal welfare and cubicle hygiene.

Welfare and Physiological Resilience of Gaddi Goats Across Altitudinal Zones and Reproductive Stages: Insights for Sustainable Transhumant Pastoralism

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Gaddi goats managed under traditional transhumant pastoral systems in the western Himalayas face dynamic environmental conditions linked to altitude, coinciding with distinct reproductive stages due to seasonal migration. These overlapping factors substantially influence welfare and physiological resilience, yet their combined impact remains underexplored. This study evaluated welfare status and physiological adaptability of Gaddi goats across altitudinal zones and reproductive phases, informing sustainable herd management strategies. We assessed 200 healthy does from four transhumant flocks (50 per flock) in Himachal Pradesh, India. All 200 goats were evaluated repeatedly at three distinct altitude-stage combinations reflecting traditional seasonal migration patterns: high hills (>1800 m, mid-pregnancy), mid-hills (651–1800 m, post-kidding), and low hills (350–650 m, mid-lactation). All goats were evaluated for welfare indicators: body condition score (BCS), FAMACHA© anemia score, integument cleanliness, coat quality, and lameness. Biochemical and hematological parameters (serum cortisol, NEFA, blood profiles) were measured in 10 randomly selected goats per flock (n=40). Due to inherent synchronization of altitude and reproductive stage in traditional pastoral migration, separating these factors analytically was impractical; thus, one-way ANOVA was conducted to detect differences among combined altitude-stage groups. Pearson correlations assessed relationships among welfare and physiological indicators, and linear regression included physiological parameters significantly correlated ($p < 0.05$) with welfare indicators. High-altitude, mid-pregnant goats showed the best welfare status with higher BCS (2.85 ± 0.04), lower FAMACHA© scores (1.61 ± 0.07), lower cortisol levels (10.98 ± 1.49 ng/mL), and better energy balance (NEFA: 7.91 ± 0.32 ng/mL). Mid-altitude, post-kidding goats exhibited intermediate responses, notably elevated white blood cell (WBC) counts ($16.73 \pm 0.83 \times 10^9/L$), indicative of heightened postpartum immune activity. Minimal variation occurred in integument cleanliness, coat quality, and lameness across groups. Pearson correlations revealed strong negative relationships between cortisol and BCS ($r = -0.72$) and mean corpuscular hemoglobin concentration (MCHC; $r = -0.51$). NEFA positively correlated with BCS ($r = 0.58$) and negatively with FAMACHA© ($r = -0.53$). Regression analysis identified WBC and MCHC as significant predictors of BCS and cortisol ($p < 0.05$). These findings highlight the complex interplay of environmental and physiological factors influencing goat welfare. Given the inherent synchronization of altitude and reproductive stage in transhumant systems, adaptive, zone-specific management strategies are essential. Tailoring interventions to the physiological needs of each reproductive stage and altitudinal environment can enhance animal resilience, improving long-term sustainability of extensive pastoral goat production.

Automated video analysis for monitoring of sow behavior: Identifying key maternal traits for improved piglet survival

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In 2023, 6.7% of piglets were stillborn and 11.5% of piglets died before weaning (Ingris, Annu. Rep. Norwegian Meat & Poultry Res. Ctr., 2023). Piglet mortality is a significant welfare issue as well as an economic loss for the farmers. It is well-known that maternal ability has a significant impact on the piglet survival (Ocepek et al., J. Anim. Sci. 95:4708, 2017). Measuring behavioural traits that reflect maternal ability is often done manually, which represents a challenge. Manual observations are time-consuming, subjective, disturbing for the animals, and only provide a snapshot of the situation. This study aimed to automatically measure maternal ability from video data to improve piglet survival. The study identified the following behavioural traits as relevant for improving piglet survival during the suckling phase: (i) nest-building behaviour, (ii) restlessness during farrowing, and (iii) nursing behaviour. To automate trait extraction, deep learning models, for real-time object detection and classification from video data, were deployed. A YOLOv8-based sow posture segmentation model detected the sow and classified its posture into standing, sitting, kneeling, sternal lying, or lateral lying. This model further enabled automated detection of nest-building activity and farrowing restlessness in post-processing by analyzing the frequency of posture change, duration and transition patterns. A YOLOv8-based piglet detection model was trained to detect all piglets within a frame. It counts the total number of piglets in the given frame, along with identifying the stillborn or inactive piglets. For nursing behaviour assessment, a YOLOv11-based sow nursing detection model was developed to extract nursing frequency and duration. This model detected maternal interventions during nursing, by analysing the sudden posture changes along with nursing. Our models are currently achieving the accuracies of approximately 92% for piglet detection, 86% for sow posture classification, and 96% for nursing detection, as part of an ongoing project with continuous efforts to enhance these results. These prediction models provide a scalable solution to phenotyping behaviour traits that influence piglet survival. This approach is important for improving maternal ability through genetic selection, as well as increasing knowledge about piglet and sow behaviour during nursery in order to improve management and support.

Therapy dog's hormonal and behavioural responses during a simulation of animal assisted interventions

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Dogs engaged in animal-assisted interventions (AAIs) can offer valuable support to individuals experiencing physical or psychological challenges. The behaviour and emotional state of these dogs, as well as the functioning of the dog-handler dyad, represent pivotal factors in determining the efficacy of the intervention. This study aims to analyse hormonal and behavioural responses of therapy dogs during a simulation of AAIs. A total of 23 certified Italian dog-handler dyads participated in a 16-minute session consisting of pre-determined activities including walking, petting, reading, and a 'still face' test. The dogs performed the same activities with their handlers (handler phase) and with an unfamiliar experimenter acting as a patient (experimenter phase). They were 16 females and 7 males of various breeds and their mean age was 6.00 ± 2.47 years. Saliva samples were collected from the dogs before (T0) and after (T1) the entire AAI simulation in order to analyse, through validated methods, cortisol (CORT), oxytocin (OT), and vasopressin (VP) concentrations, to explore the hormonal responses in canines. Throughout the AAI simulation, dogs' behaviours were video-recorded and successively coded by one observer using an ethogram to capture both state and point data, which were then analysed to compare the handler and experimenter phases. Inter-rater reliability was calculated by double-coding for 26% of the sample (Cohen's kappa ≥ 0.73). A partially overlapping t-test and Wilcoxon signed rank test were applied to evaluate differences between hormone concentrations and behaviours, respectively. Median concentrations of hormones decreased from T0 to T1 ($\Delta\text{CORT} = -0.31$ nmol/L, $\Delta\text{OT} = -77$ pg/mL, $\Delta\text{VP} = -21$ pg/mL), although the change was not statistically significant. During the walking activity, the exploratory analysis of stress behaviours and motor synchrony between the two phases revealed no significant differences. However, the doghandler spatial distance (median=47.52 cm, interquartile range—IQR=24.83 cm) was significantly shorter than the dog-experimenter distance (median=66.39 cm, IQR=49.28 cm; $W=48$, $p\text{-value}=0.009$). Furthermore, during the petting activity, dogs spent significantly more time looking at the handler (median=51.79 sec, IQR=35.45 sec) than at the experimenter (median=14.24 sec, IQR=14.26 sec; $W=276$, $p\text{-value}<0.0001$). Despite the behavioural differences observed during the handler and experimenter phases, the simulation did not exert a significant influence on the dogs' stress behaviours or the hormones investigated. Subsequent analysis will explore potential associations between behavioural and hormonal responses. The overarching objective of this research is to elucidate the factors that contribute to the effectiveness of AAI teams and ensure animal welfare through hormonal and behavioural assessments.

Grief in horses after the death of an companion equid

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It might be expected that horses, as a social mammal, would show behaviours toward their dying/dead conspecifics. However, there is very little information on this subject. The aim of this research was to explore behavioural changes in horses who have experienced the loss of a companion equid. An online questionnaire was designed to collect data on the housing and management of the equids, the passing of the deceased equid, and the type and duration of immediate and sustained behavioural changes in the surviving horse. It was advertised via social media. The retrospective survey was completed for 325 surviving horses/ponies. Within 24 hours after companion death, the vast majority of owners reported several behavioural changes relating to arousal (88.96%), behaviour directed towards other equids (77.67%) and people (77.64%), alertness to stimuli (72.92%) and vocalisation (68.63%). Multiple logistic regressions indicate that horses who had shared a friendly or parental-dependant relationship were more likely to change their behaviour towards humans (friendly vs. mutual tolerance: $p=0.029$; parental-dependant vs. mutual tolerance: $p=0.026$) and their excitement to interact with others or at feeding time (friendly vs. mutual tolerance: $p=0.023$; parental-dependant vs. mutual tolerance: $p=0.006$) than horses who simply tolerated each other. Horses still had changes in their behaviour 6 months after the death of the companion. Moreover, horses who had witnessed the death of their companion were more likely to be reported to have changed their time spent feeding ($p=0.030$) and sleeping ($p=0.028$) within 24 hours of the companion's death. These surviving horses were typically reported to have a change in vigilance ($p=0.016$) and in excitement towards interacting with others and/or around feeding time ($p=0.004$). Whether they had spent time with the dead body did not affect their behaviours in the first 24 hours of the companion's death. However, within 6 months after the passing of the deceased companion, it was reported that horses who were not able to spend time with the body were more likely to have a change of arousal ($p=0.038$) and/or vigilance ($p=0.033$). By contrast, horses who did spend time with the body of the deceased were more likely to have no changes in these characteristics at this time. These results indicate that horses may express grief-related behaviours. It can give owners a better understanding of how horses react to the death of a companion. Limitations about this research will be discussed in the poster.

Resting during day- and night-time in slower growing broiler hybrids (*Gallus gallus domesticus*)

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The ability to express natural, strongly motivated behaviours is essential to maintain good animal welfare. Resting and sleeping are one of these strongly motivated, essential behaviours. In the nature chickens, like the Red Junglefowl, either rest under their mother's wings or perch high up in trees. Recently the use of slower growing broiler chickens has increased, and therefore welfare challenges associated with fast growing strains have been alleviated. However, the resting behaviour of slower growing broiler chickens has not been fully investigated. The aim of this study was to compare the resting behaviour of two slow-growing hybrids during daytime as well as during the night. We studied a batch of 175 Rowan Ranger birds and 175 Hubbard birds, respectively, and reared them under conditions following organic certification for 10 weeks. Perches were available so all birds could perch simultaneously. Ten straw bales were additionally provided for enrichment. For the daytime records of behaviour, direct observations was performed on nine occasions. Scan sampling of the whole flock was performed ten times per occasion. Night-time observations were scan sampled from video recordings made during six nights (day 46, 51, 60, 62, 66 and 71, respectively). Bird of different hybrids was not possible to visually distinguish during the night-time. Data was analysed separately using a general linear model in SAS adjusting for weight at the observation occasion. Hubbard birds were using the perches significantly more than Rowan Ranger during daytime ($p=0.012$), but no significant difference was found in the use of straw bales. For night-time resting there was significantly higher use of floor and perches compared to bales ($p=0.002$). There was a larger variation in use of perch for resting, than in using floor or bales for resting. The most obvious pattern was the tendency of the birds to sit tightly together on both perches and bales. This pattern suggests that enough perches should be provided so the birds can perform proper resting behaviour, and thereby promote their welfare.

Assessing (dis)liking: subtle post-consummatory behaviour may reflect satisfaction with reached states in minipigs

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Mood as a long-term affective state may be most relevant for the welfare of an animal. Mood is thought to depend on how the animal assesses, i.e. (dis-)likes (“prediction error”), the outcomes of their behavioural actions. These post-consummatory moments are typically low arousal states and, accordingly difficult to observe. Here, we observed the behaviour of minipigs when they returned to their home pen after engaging in either a cognitive or physical task. We investigated whether behavioural differences would allow interpreting how the animals assessed the two types of tasks. The seven pair-housed female Göttinger minipigs (4-7 years) were observed by one rater for an hour directly after returning from the tasks to their outdoor home pens as well as during time-matched hours on control days from video recordings assessed in a random order. The behaviours observed were merged by a PCA. The PCA scores on the experimental days minus the scores on the control days were then evaluated as outcome variables in linear mixed-effects models. The type of the tasks was used as the fixed and animal ID as the random effect. The first three principal components could be interpreted as “foraging” (exploration with drinking and feeding and without resting; explaining 57% of the total variance), “exploration” (exploration without feeding; 28%), and “recovery” (drinking and lying without exploration; 12%). The minipigs had higher values of foraging after the physical (model estimate [95% confidence interval]: 0.56 [-0.82-1.97]) compared with the cognitive task (-0.71 [-2.16-0.66]; $p = 0.23$). The amount of exploration was similar after the two tasks and to control days (physical: -0.67 [-1.73-0.45]; cognitive: -0.45 [-1.54-0.63]; $p = 1.00$). Finally, recovery was again higher after the physical (0.90 [-0.52-0.76]) than the cognitive task (0.11 [-0.52-0.76]; $p = 0.12$). Although none of the results could be statistically supported given the small sample size, the average differences observed were suggestive. Pigs had higher values of foraging and exhaustion after the physical than the cognitive task and compared with control days indicating the need for caloric input. In contrast, minipigs showed less foraging and similar amounts of exploration and recovery after the cognitive task than on control days. These two patterns could be tentatively interpreted as “exhaustion” and “relaxed leisure”, respectively. The procedure presented here including detailed observations of behaviour may allow for assessing subtle postconsummatory low-arousal (dis-)liking reactions in future studies. These short-term reactions could, in turn, help assess longer-term mood.

Qualitative feed restriction has limited effects on home pen behaviour in Ross 308 broiler breeder cockerels

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Restricted feeding during the rearing phase leads to a prolonged sensation of hunger and chronic stress, which may be mitigated by providing qualitative feed restriction rather than the standard quantitative restriction, where fibres of low nutritional content are used to dilute the concentrated feed. A combination of diluted feed together with roughage appears to be a promising approach. However, previous studies have been done using breeder pullets, and little is known about the effects in broiler breeder cockerels. Therefore, the aim of this study was to investigate the effect of a qualitative feed restriction using feed diluted with insoluble fibres combined with roughage on the home pen behaviour of broiler breeder cockerels. In this study, a total of 200 Ross 308 broiler breeder cockerels were housed in 12 pens (6 pens/treatment), 17 birds/pen from 5 to 10 weeks of age. The treatments were standard feed (Control) and feed diluted with 20 % insoluble oat hulls and 150 g of lucerne roughage daily/pen (D+R). The D+R birds received 20 % more feed per day. Observations of home pen behaviour were performed in week 6, 8 and 10 during three different periods of the day relative to feeding time: 1 h prior to feeding, 1 h during feeding and 4 hours after feeding. Effects of treatment, age, time of day and their interactions on behaviours were analyzed using the mixed model in SAS. There were no differences between treatments with regards to behaviours such as time spent standing, foraging, locomotion, oral behaviours or aggression. Differences between treatments in drinking and comfort behaviour were found, but the direction of these effects were not consistent across age or time of day. Foraging in the litter and standing (without eating) was the most commonly observed behaviours across ages in both treatments, while resting was only observed in 2% of scans, which is lower than reported for pullets at the same age. Further studies of the time budget of cockerels under adlib and restrictive feeding are needed to understand the welfare consequences of restrictive feeding in these birds. In conclusion, only limited effects of a qualitative feed restriction on home pen behaviour in Ross 308 broiler breeder cockerels were found, and our hypotheses that a diluted feed would affect behaviours indicative of hunger, such as locomotion and resting was not confirmed.

The Sheep Appeasing Pheromone (SAP) can help ewes to cope with stressful events

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Some farm animals, such as sheep are traditionally managed under extensive conditions, living in social groups in outdoor fields. This is particularly true in the south of France, where there is a long tradition of pastoralism. If the benefits of living under extensive conditions on the ability of sheep to express their natural behavioral repertoire are clear, this flock management may have some deleterious effects on individuals. Sheep may be at risk of predation. Heart attacks, abortions, and panic behavior have been observed in sheep that have witnessed a predator attack. Appeasing Pheromones are produced by the mothers at parturition and during lactation, and they favorize adaptation processes in young, we hypothesize that the Sheep Appeasing Pheromone (SAP) could help sheep to cope better with a stressful event. A total number of 102 1-year-old Merino ewes were included in this study: a parallel group design, blinded procedure. All animals were habituated to enter by trio in an arena (5x5m) where a fake life-size wolf was hidden behind a tarp. After two days of habituation, animals received their respective treatment, a cutaneous application of 5mL of SAP or Placebo according to their group. The following day, they were brought to the arena for the third time. Animals entered the test in groups of three, each group receiving the same treatment (17 placebo trios and 17 SAP trios). A few seconds after entry, the figure of the wolf was revealed by removing the tarp. The sheep's behaviors were then analyzed for 5 minutes. Statistical analysis included the trio and the order of passage as random effects. For continuous variables, General Linear Mixed Models (GLMM) were used, while Generalized Linear Mixed Models (GzLMM) were applied to discrete data. For latency measures, a Cox frailty survival analysis was performed. We observed that SAP-treated sheep were quicker to adopt a relaxed posture ($p < 0.0001$), were less vigilant ($p < 0.05$), and ran less during the test ($p < 0.05$). Moreover, they spent less time looking at the fake wolf ($p < 0.05$), and the number of looks was significantly lower ($p < 0.001$). The use of the appeasing pheromone facilitated a more rapid return to a state of calm following exposure to stressors. Overall, these findings confirm the efficacy of SAP in aiding sheep to cope with challenging situations. This highlights the potential of pheromonal treatments as a way to mitigate in sheep the negative impacts of husbandry practices on animal welfare.

Risk factors associated with keel bone damage and comb injuries in laying hens kept in mobile housing systems

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Mobile housing for laying hens have increased in Germany, with public expectations of a high level of animal welfare. Though space allowances are similar to stationary systems, mobility demands and lower group sizes pose limits on the design of the mobile houses, sometimes leading to narrow aisles. These could increase the risk of collisions with housing equipment, leading to keel bone damage, and of social stress, reflected by comb and wattle injuries. This study aimed to identify risk factors for keel bone damage and comb injuries in mobile housing systems. From 2022 to 2024, a total of 86 flocks (200–2059 birds each) in 48 mobile houses across Germany were visited once to four times, resulting in 170 visits in total. During each visit, 50 randomly selected hens were weighed and a broad number of welfare indicators assessed, among them keel bone damage (via palpation) and comb injuries using a scoring system from 0 (no damage) to 2 (severe damage). Management and resource data were also collected. To identify risk factors, separate multivariate analyses for keel bone damage and comb injuries were conducted using linear mixed models. Average flock prevalence was 45.2% for keel bone damage (scores 1–2; range 0.0–94.0%). This level is close to reports from stationary systems while a higher average prevalence of severe comb injuries (score 2) was found, namely 18.1% (range 0.0–74.0%). Keel bone damage increased with hen age ($p < 0.001$), likely from repeated impacts during lay, aligning with previous studies. A higher proportion of lightweight birds was associated with higher keel bone damage prevalence ($p = 0.029$). This could be due to affected birds experiencing movement restrictions that limit their access to feeding facilities, or because lightweight birds, due to lower muscle mass, might be more susceptible to keel bone damage. Comb injuries also increased over time ($p = 0.007$). No further risk factors related to housing or management could be identified. Further research is needed to clarify the relationship between comb injuries and factors such as resource availability, free-range access and design of the range. For keel bone damage, the results emphasize the importance of adjusted feeding strategies, which require special attention in mobile housing systems, particularly when the free-range is well utilized.

Effect of a sensory functional feed additive on the behaviour and feed consumption of piglets at weaning

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At weaning, piglets experience various challenges which can lead to reduced feed intake. The aim of this trial was to investigate the effects of a new functional feed additive on piglets' behaviour and feed intakes at weaning. The trial was conducted in a French commercial farm. A total of 528 weaned piglets (27 days old) from 4 batches were divided in 2 experimental treatments: 1) Control, standard pre-starter feed, 2) Control feed + a novel feed additive (blend of functional aromas and a novel core) included at 350 g/tonne of feed from weaning (day 0) to day 14 post-weaning. Piglets were blocked by sex and weight at weaning. Piglets were housed in pens of ~33 pigs and were monitored according to the farmer's practices. Piglet feed intakes were recorded by pen from weaning to day 14 post-weaning. Four pens per treatment and per batches (16 pens in total) were filmed from weaning to day 1 post-weaning. The cameras used were GoPro® and the videos were analyzed using BORIS free software with a blind observer. Behaviour was analyzed for 6 hours (4 hours after weaning and 2 h at 24 hours after weaning) every 30 seconds via a group scan sampling using a previously established ethogram. A total of 720 behaviours were scored per pig per pen. Data were analyzed using a Chi-square test and Anova in Jamovi free software. Time budgets were made on pigs' activity period. Time budgets were significantly different between the two groups (P -value<0.05). The differences were as follows: during the 6 hours of observation, piglets receiving the additive spent a lower percentage of time lying down compared to control piglets (48 vs 56%, P -value<0.001), piglets receiving the additive spent a higher percentage of time eating and rooting compared to control piglets (26 vs 17%, P -value<0.001 and 2.1 vs 1.8%, P -value<0.05, respectively). Time budgets were not significantly different for the following parameters: fighting, walking and interacting with an object or other pig (P >0.05). In addition, additive supplementation increased the average daily feed intake per pig from weaning to day 14 post-weaning by 4.2% compared to control piglets. In conclusion, supplementing weaned piglets with a feed additive based on functional aromas and a novel core can increase feed intake post-weaning and feeding behaviours during this challenging time.

Sensor-based analysis of behavioural time budgets in young Warmblood stallions during preparation for licensing

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Appropriate preparation for future handling and riding is essential to equine welfare. Daily activity patterns and time budgets are commonly used to assess well-being of horses. Activity sensors provide an objective means to track movement and automatically recognise behavioural patterns. This study investigates how the age at onset of preparation for licensing affects the daily activities of young warmblood stallions. Warmblood stallions were categorised based on their age at the start of preparation for licensing: Group [A] 24 months (n=19); [B] 30 months (n=10). Each stallion wore an activity sensor (GT9XLink, ActiGraph, Pensacola, FL, USA) on a collar for 24 hours per week during the first three months of standardised preparation for stallion licensing ([A]: June to August, [B]: October to December). Behavioural analysis was conducted using a deep neural network trained to classify 15 distinct activities, including sternal and lateral recumbency, standing, walking, trotting, galloping, and feeding. Time budgets were then evaluated for each month, and activities were compared between groups. In both groups, feeding times during the first month of preparation for licensing were significantly lower and time spent in lateral recumbency significantly higher compared to the second and third months (feeding: 10.2 ± 0.3 vs. 10.9 ± 0.2 and 10.8 ± 0.2 h/day, $p < 0.01$; lateral recumbency: 2.0 ± 0.2 vs. 1.7 ± 0.2 and 1.6 ± 0.2 h/day, $p < 0.05$). Furthermore, horses that began preparation at 24 months of age spent more time feeding than those that started at 30 months (11.3 ± 0.2 vs. 9.9 ± 0.4 h/day, $p < 0.01$). No significant differences were observed for other activities. The reduced feeding time and increased resting period during the initial month of preparation for licensing may reflect an initial mental adjustment. The significant difference in feeding time between age groups may be linked to seasonal variations, as group [A] was observed during summer and [B] during winter. Overall, the age at which preparation for licensing begins appears to have minimal impact on the overall daily time budgets of young Warmblood stallions. Future research should further explore the interaction between handling-related stress, feeding behaviour, and rest patterns. The HorseWatch project is financially supported by the German Federal Ministry of Food and Agriculture (BMEL) based on a decision of the Parliament of the Federal Republic of Germany, granted by the Federal Office for Agriculture and Food (BLE; grant number 2820HS017).

Global Good Life Standards for farmed animals that contribute to an Equitable, Humane, and Sustainable food system

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1. World Animal Protection

World Animal Protection is taking a globally conscious approach to our work towards a better life for animals, people and planet. We are committed to creating a world where respect for animals sits at the heart of our food system. There are few standards globally that go beyond “a life worth living”, and fewer that attempt to achieve a “good life” for farmed animals. Standards that are designed to achieve incremental improvements often fall short of meaningful industrial or policy change that result in animals living a good life. Furthermore, standards that only consider animal welfare outcomes while ignoring people or the environment are often underutilized or deprioritized by industry and policy makers. A common issue with current evidence-based standards designed to achieve higher welfare is that they are based on industrial monoculture systems established in the Global North. Implementing standards globally, that are based on a specific range of social, cultural, economic, and environmental backgrounds has challenges that could result in no, or negative, net change for animal welfare in the global food system. This may be due to compromises in standards based on availability of resources, environmental context, or cultural differences, as well as increasing industrial, single species, animal production. World Animal Protection has developed draft *Good Life Standards* for meat chickens and pigs that are designed to be utilized as a tool for the global food system. In developing the standards, the authors considered three key principles: 1) Equitable, promoting fairness and social justice; 2) Humane, promoting positive animal and human welfare; and 3) Sustainable, promoting responsible resource use. The standards were developed by reviewing positive animal welfare opportunities and negative welfare consequences of animal farming practices. We utilized the Five Domains framework to format and translate scientific evidence into digestible and actionable policy. The standards support World Animal Protection's advocacy actions to transform the way the world protects animals. Our Good Life Standards will be presented as a poster at ISAE 2025. We aim to generate discussion and input from ISAE delegates from around the globe that test our standards, ensuring that they: challenge the reliance on intensive animal production in our food systems; are evidence-based and are likely to result in animals living a Good Life; contribute to a global Equitable, Humane, and Sustainable food system; and, can be effectively used to influence global policy makers and industry.

Effects of early life socialization on social preference and behaviours towards familiar and unfamiliar conspecifics in pigs

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Early life socialization in pigs, by comingling with other litters before preweaning, might improve their social skills in later life, especially when they encounter social challenges. We assessed the effects of early life socialization on pigs' social behaviours and social preferences using an adapted three-chamber social test. Piglets (N = 12 litters) were either comingled from 14 days of age till weaning by removing the barrier of two farrowing pens or not, resulting in a socialized (SOC) and control group (CON). Pigs (N = 96) were weaned at 28 days of age and regrouped in groups of eight balanced for sex. At 40 days of age, pigs were individually placed in an arena with one pen mate and one unfamiliar pig of the same sex kept in two corners behind a fence, dividing the arena into three zones (pen mate, stranger and middle zone). Behaviours (exploring the environment, exploring the fences, social contact, aggression, urinating, defecating and standing alert) and time spent in each zone were observed for 8 min. Generalized linear mixed models with treatment and sex as fixed and pen as random effects were used for all behaviours, except for the occurrence of aggression, which was analysed with a Fisher's exact test. Pigs generally spent less time in the middle zone ($p < 0.001$), suggesting a preference for social interaction. Males (88.2 ± 5.4 sec) spent less time in the middle zone than females (94.5 ± 5.6 sec, $P < 0.05$). Time spent in the pen mate and stranger zone were influenced by the treatment $\times$ sex interaction ($P < 0.05$). Treatment did not affect time spent in these zones in females, but CON-males (211.6 ± 15.4 sec) spent more time in the stranger zone than SOC-males (169.8 ± 10.6 sec) and CON-females (186.1 ± 12.6 sec). Conversely, SOC-males (211.2 ± 12.4 sec) spent more time in the pen mate zone compared to CON-males (181.3 ± 14.6 sec) and SOC-females (188.4 ± 12.4 sec) and also tended to explore the fence of the pen mate for longer ($P < 0.10$). Aggression was rare, but more frequently towards unfamiliar pigs, with less SOC pigs (10.4%) showing aggression towards strangers than CON pigs (27.7%, $P < 0.05$). Other behaviours were not significantly affected by treatment or sex. In conclusion, early socialization reduces aggression towards unfamiliar conspecifics in pigs at a later age. The effects of early life socialization on social preference and behaviours were only found in males.

Assessing the attitudes of Ghanaians regarding farmed chicken welfare, higher welfare egg-labeling, and willingness to pay

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This study investigates public attitudes toward farmed chicken welfare in Ghana, a context where rapid urbanization and economic growth are increasing demand for poultry products. Despite growing global attention to animal welfare, it remains underexplored in many developing countries. Understanding these attitudes is critical for guiding policy and industry practices. A cross-sectional survey of 1,275 participants was conducted in three major cities in Ghana, namely Accra, Kumasi, and Tamale, using face-to-face questionnaires. The sample represented diverse socio-economic and cultural contexts. Participants responded to a structured questionnaire adapted from validated instruments to assess their perceptions of farmed chicken welfare. A perceived welfare level assessing attitudes of participants was categorized on a composite score (range 9–45). Attitudes were scored based on responses to nine key questions covering aspects such as consideration of animal well-being in purchasing decisions; prioritization of low meat prices over animal welfare; the impact of caged housing on chickens; beliefs about animal pain; support for corporate and government roles in promoting welfare; and perceptions of societal and industry concern for farm animal treatment. A nine-point Likert scale closed questions with scores assigned from 1 to 5 based on the direction of the statement were asked. Participants scoring 1–34 ($\leq 75\%$) were classified as having poor perceived welfare levels, while scores of 35–45 ($> 75\%$) indicated good perceived welfare levels. Results show that 69.1% of participants scored a poor perceived welfare level toward farmed chicken welfare, characterized by low awareness of welfare standards and indifference toward animal treatment. The majority of participants (53.7%) supported government interventions to improve animal welfare, suggesting that policies promoting farmed animal welfare could be well-received by the public. As regulations on animal welfare are scant and date back to the 1960s, this implies the public looks to the government to lead in policy setting and improving the legislative framework on animal welfare. However, about 52% were unwilling to pay a premium for higher welfare eggs, reflecting economic constraints and price sensitivity. Producers could adopt higher-welfare systems without significant economic disadvantage and improve profitability through product differentiation, especially if supported by consumer education initiatives. The study also explored consumer preferences for egg-labeling systems, revealing that over two-thirds of respondents favored labels indicating welfare conditions, highlighting demand for transparency. By clarifying public attitudes and willingness to support welfare initiatives, this research provides valuable insights for policymakers, producers, and advocacy groups aiming to improve farmed chicken welfare in Ghana.

Monitoring cattle brushing behavior using video activity index

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Cattle are often provided mechanical brushes for grooming, and the use of these devices has been suggested as a promising welfare indicator. Brushing is rewarding for cows but more sensitive to welfare changes than core behaviors such as feeding or lying. However, practical tools for on-farm brush use monitoring are lacking. Mechanical brushes start rotating when a cow comes in contact with them and stop shortly after contact is ceased; brush rotation is thus a good proxy for group-level brush use. We aimed to develop a cost-effective, computationally efficient video-based method to detect brush rotation through frame-by-frame pixel intensity analysis using computer vision. We evaluated our approach using video recordings from two farms with different brush types and lighting systems. At Farm A (~300 cows in 3 groups), five horizontally oriented mechanical brushes (Lely) were monitored using Dahua DH-IPC-HFW1320S-W cameras at 30 FPS during both nighttime (00:00–02:00) and daytime (15:00–17:00) sessions. Lights were set to automatically turn on during darker periods. At Farm B (~80 cows), two vertically oriented mechanical brushes (DeLaval) were continuously video-monitored over 24 hours using Hyundai HYU-668 cameras at 25 FPS. Lighting here was generally low at night. On Farm B, for one brush we used RGB imaging throughout, while for the other we enabled automatic infrared (IR) switching during low-light conditions. The computer vision algorithm defined a region of interest (ROI) over the brush and calculated pixel intensity changes between consecutive frames. Adaptive, rule-based thresholding was then applied to determine brush rotation events. The output (per-second rotation status) was compared against manually annotated brushing periods (i.e., brush was rotating and a cow was in contact with it). Overall, the algorithm achieved 0.90 precision, 0.91 recall, and 0.91 F1-score in determining brush rotation status per second. At Farm B, performance declined slightly to an F1-score of 0.89 under low-light RGB conditions, but improved to 0.92 (precision: 0.89, recall: 0.95) with IR imaging. Results indicate the method's robustness across brush types and lighting setups, with only ROI adjustments required due to variation in brush position among different video sources. Future deployments will standardize camera positioning and parameters to enable consistent detection thresholds. Compared to more complex object-detection approaches, our method uses only raw video input and requires no training data, making it computationally efficient and scalable for real-time, on-farm use. Future work will incorporate cow identification to detect individual brushing behavior and refine IR-based detection methods.

Using precision technologies to measure novel movement, feeding and social behaviours in calves for the detection of health and welfare status on farm

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The developments in precision livestock technologies have enabled the collection of behavioural data with high resolution for large numbers of animals. Using sensors to quantify behaviours can help identify early disease signs and develop automated detection tools. Here we measured a range of behaviours in dairy calves, which had not been quantified before, to detect associations with health and welfare. From the location sensors we extracted the coordinates and smoothed them over a 10s-moving average. We then derived movement behaviours including the daily distance travelled and used a novel classification and quantification algorithm applied to movement features to detect play behaviour based on speed and turning angle. We also used the location data to determine when calves were in proximity to each other and derived social network metrics. Additionally, we used the data from the automatic feeders to extract the feeding behaviours and used an algorithm based on the time between visits by different calves to detect displacements at the feeder. Using a variety of behaviours including movement, feeding and social network measures in 172 we were able to develop an algorithm which used the behaviours on the day to detect bovine respiratory disease with high performance (F1-score=0.7) compared to clinical health assessments carried out by researchers. This highlights the potential of using automated behavioural data to detect disease in intensive farming systems and provide timely treatment to improve animal health. Although quantifying animal welfare is challenging, play behaviour is often seen as a measure of positive welfare. In calves we were able to detect play with an algorithm that achieved great performance (F1-score=0.9) compared to visual observations and showed that play decreased significantly with disease ($\beta = -0.27$, $SE = 0.02$, $p < 0.01$, $N = 226$) and increased when calves were provided with enrichment ($\beta = 0.43$, $SE = 0.11$, $p < 0.01$, $N = 226$). Furthermore, the presence of enrichment decreased the number of displacements at the feeder, which may be an additional indication of improved welfare, which has not been previously investigated. Overall, these results highlight that using precision technologies allows for the detection of a wide range of behaviours, with the potential to create an automated system for the monitoring of farm animal health and welfare. This type of monitoring, which can be applied to large numbers of animals and for extended periods of time, is essential to develop a better understanding of the effects of management interventions on farm animals.

Aquatic animal welfare in Nigeria's aquaculture: A review of ethical, environmental, and policy perspectives

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Aquaculture is one of the fastest growing industries in Nigeria. However, despite this growth it is faced with numerous challenges like high cost of fish feeds, lack of technological advancement, lack of species diversification and most importantly unethical standards in the aquaculture production which often results to negligence or lack of knowledge on welfare standards of cultured fish species. Animal welfare in Nigeria is recently gaining interest and attention among the government actors which resulted into creation of Animal Welfare Technical Working Group, a responsibility saddled for the formulation of relevant policy and framework on Animal Welfare practices (with the exclusion of aquatic animals) in Nigeria. Despite this development, lack of awareness on animal welfare among farmers and stakeholders still remained a national concern and therefore hinders implementation of animal welfare policies in the country. Aquatic animal welfare is a critical but underexplored aspect of Nigeria's aquaculture industry, influencing sustainability, productivity, and ethical considerations. Fish welfare is important for the sustainability of the sector as it underpinned best management practices and ethical standards in aquaculture operations but still remained undervalued among Nigerian aqua-practitioners. Thus, this review examines the current state of fish welfare in Nigeria from three key perspectives: ethical treatment, environmental management, and policy frameworks through the systematic review of Nigeria's aquaculture laws and legislation, stakeholders' consultation and farmers' interactions on aquatic animal welfare considerations. It explores issues such as stocking density, water quality, disease management, and humane handling, highlighting the impact of poor welfare practices on fish health and farm productivity. The review also assesses global fish welfare standards and adopting them to Nigeria's regulatory landscape to foster policy development and implementation. Despite increasing global awareness on fish welfare, challenges such as limited farmer education, economic constraints, and policy gaps hinder widespread awareness and adoption of fish welfare-friendly practices in Nigeria. To address these concerns, this study proposes integrating scientific welfare assessment tools, farmer training programs, and policy reforms into Nigeria's aquaculture sector. A structured Fish Welfare Training Guide is recommended to support farmers and policymakers in improving fish welfare practices. In conclusion, this review proposes the need for a multi-stakeholder approach involving researchers, industry players, and regulators to ensure ethical, sustainable, and economically viable fish aquaculture in Nigeria which will focus on species-specific welfare indicators cost-effective welfare interventions, and strategies for embedding welfare principles into national aquaculture policies.

Validation of positive animal welfare indicators in a commercial fattening pig farm

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There is a growing research interest in measuring and validating positive animal welfare (PAW), and there is no exception to studying it on domestic pigs. A research collaboration between a national project (PigLF) and two European projects (COST Action LIFT and European Partnership on Animal Health and Welfare, EUPAHW) is formed to validate PAW indicators agreed in EUPAHW, and to investigate potential PAW indicators using sensor technology. Six commercially available sensors have been installed in a commercial Duroc fattening unit (10 pens of 12 pigs per pen) to monitor the environment and the behavior and welfare of pigs. This includes sensors that can automatically measure environmental-based parameters, including temperature, humidity, and CO₂ and NH₃ concentration, as well as animal-based parameters such as feeding, drinking, and resting behaviors, space use, activity level, posture, and growth performance using a computer vision camera, an automatic feeding station, and a flow meter. Apart from parameters collected from sensors, behaviors including exploratory, play, and social behaviors will be observed live, and saliva will be sampled to measure cortisol and oxytocin. A preferred environment for pigs is created in five pens to compare the animal-based parameters with another five pens that are reared in commercial conditions. This preferred environment is an environmental enrichment strategy that involves periodic renewal and rotation of different enrichment materials, aiming to provide pigs with regular new stimuli and fulfill pigs with their exploration need. The enrichment materials will be destructible, investigable, manipulable, and based on the literature screening results conducted by a group of pig experts in EUPAHW. In this ongoing study, the aims are: (1) to validate the PAW indicators agreed in EUPAHW, including exploratory, play, and social behaviors and salivary oxytocin, by studying the change of behaviors and physiological biomarkers, when pigs are exposed to a preferred environment; (2) to investigate potential PAW indicators that can be measured by sensor technology, by linking PAW indicators agreed in EUPAHW with the animal-based sensor outputs. Preliminary results on the development of PAW indicators will be presented.