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ANIMAL WELFARE SCIENCE UPDATE

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The aim of the animal welfare science update is to keep you informed of developments in animal welfare science relating to the work of the RSPCA. The update provides summaries of the most relevant scientific papers and reports received by the RSPCA Australia office in the past quarter. **Click here to subscribe.**

Use of videos on social media to uncover risk factors for feather-damaging behaviour in companion parrots

Analysing videos posted on social media (video mining) is a novel way to study the behaviour of companion animals in their home environment. Online videos posted by owners can purposefully or inadvertently capture behavioural pathologies in companion animals. Feather-damaging behaviour, the compulsive removal of their own or another bird's feathers, is a common behavioural pathology in companion parrots. Not seen in wild parrots, feather-damaging behaviour is thought to be the product of chronic stress associated with captivity.

This study mined videos posted on You Tube to investigate potential risk factors for feather-damaging behaviour. Inclusion criteria included videos where the entire parrot, plumage condition and the cage setup were visible. Matched control parrots (n=26) were identified using the same criteria. Where parrots with feather damage were identified (n=36 individual companion parrots from different owners), all subsequent videos of that individual were viewed. Videos (averaging 339 ± 37 seconds each in duration) were viewed and metrics recorded including: parrot genus, sex, age, other behavioural problems, owner type, human-animal interaction, cage location and size, presence of other parrots, presence of other companion animals, enrichment, interventions and plumage condition score.

The risk of feather-damaging behaviour appeared to be lower when companion parrots were kept in the presence of other companion animals and when they were provided with vegetables, fruits and foraging and chewable devices. Interventions for feather-damaging behaviour included rehoming, enrichment, drugs, collars and housing with other parrots. Parrots who received no intervention worsened over time. Rehoming was the most common and effective intervention, adding further weight to the case that this behavioural pathology is associated with risk factors in the home environment.

Acharya R, Rault J-L (2020) Risk factors for feather-damaging behaviour in companion parrots: A social media study. Journal of Veterinary Behaviour 40:43-49.

Can early prediction of dysfunctional human-dog dyads (relationships) assist dog and human welfare?

Dysfunctional human-dog dyads (relationships) can influence human and animal welfare. Early identification, intervention and prevention of dysfunctional dyads could benefit owners, dogs and the community.

This study, conducted in Portugal, aimed to develop the first model to predict dysfunctional human-dog dyads. Dog owners (n=255) undertook an Eysenck Personality Questionnaire Revised (EPQ-R) to evaluate their personality including degree of neuroticism, extroversion, psychoticism and lie/social desirability. They also completed a Canine Behavioural and Research Questionnaire (C-BARQ) to evaluate their dog's personality including traits such as owner-directed aggression, dog-directed fear, dog rivalry and energy level. Data was also collected about each dog (e.g., breed, sex, age, size, medical history) and husbandry choices (e.g., housing, where they purchased the dog's food).

The survey identified 59 dysfunctional dyads (23.1%) and 196 functional dyads (76.9%). The dysfunctional dyads were significantly more likely to involve owners who purchased their dog's food from an agricultural cooperative (less expensive) and housed the dog in a place that did not require specific investment (e.g., veranda). The authors suggest that there is a higher risk of dysfunction when people are unwilling or unable to invest in their dog. Humans in dysfunctional human-dog dyads had significantly higher levels of neuroticism and lower levels of lie/social desirability. Dogs in dysfunction dyads had significantly higher scores for owner-directed aggression, dog directed fear and dog rivalry, but these differences may be a product of how dysfunctional dyads were defined. Dogs in dysfunctional dyads had lower scores for energy level which the authors suggest may be due to these owners not interacting with their dogs in ways where they could assess energy level. Further research is required to refine the predictive models.

Canejo-Teixeira R, Almiro PA, Baptista LV et al (2020) Predicting dysfunctional human-dog dyads. Anthrozoös 33(6):743-758.

E-collars cause unnecessary suffering without improved training outcomes

Electronic collars (e-collars) that deliver an electric shock to a dog's neck pose numerous risks to animal welfare including physical and psychological damage. Animal welfare advocates contend that the use of electric shock is indefensible and positive reinforcement training is both more effective and preferable. E-collar users defend these devices by claiming that they are valuable training aids.

This study assesses the efficacy of dog training with e-collars. Sixty-three dogs with no prior experience with e-collars were referred for problem behaviours including chasing livestock and poor recall (come when called). The dogs were randomly allocated to three training groups. The e-collar (EC) group were trained by manufacturer-nominated trainers (ECMA). Control Group 1 (C1) were trained by the same ECMA trainers using positive and negative reinforcement. Control Group 2 (C2) received best-practice positive reinforcement training by members of the Association of Pet Dog Trainers (APDT UK). Control groups wore dummy e-collars. All dogs received two training sessions per day for five days focusing on "come" and "sit" commands in the presence of potential distractors (e.g., livestock). Randomised videos of the training sessions were viewed by blinded observers who recorded metrics including number of commands issued, type of signals, number of disobeys and delay to response (latency).

Positive reinforcement training was the most effective training method in every measure. Dogs receiving positive reinforcement training were faster to complete the response, had the highest proportion of obeys after the first command, required fewer multiple commands and had shorter latency as training progressed. There was no difference in the percentage of disobeys between training groups indicating that e-collars did not deter disobedience any more effectively than C1 or C2. ECMA trainers were just as effective when they did not use e-collars. Overall, this study demonstrated that e-collars cause unnecessary suffering without improved training outcomes.

China L, Mills DS, Cooper JJ (2020) Efficacy of dog training with and without remote electronic collars vs. a focus on positive reinforcement. Frontiers in Veterinary Science doi:10.3389/fvets.2020.00508.

Comparison of dogs' standardised behaviour assessment to their behaviour at home

A standardised behaviour assessment (BA) is part of the process used by RSPCA shelters to characterise the behaviour of dogs and match them to new owners. The BA comprises nine tests including room exploration, sociability, aggression and responses to a toddler doll, a stranger, other dogs and unusual stimuli. It is important to identify whether findings during a BA reflect the behaviour of dogs in the home environment.

A total of 107 owners and their dogs (variety of breeds, 52 males, 57 females, mean age ~5 years) were recruited from the general public via social media. Owners completed a Canine Behaviour Assessment and Research Questionnaire (C-BARQ) to evaluate their dog's behaviour at home including attachment, sociability, excitability and different types of aggression. Dogs were brought to RSPCA Queensland for a BA. Results of the C-BARQ were compared to the findings from the BA.

Findings during the BA reflected overall behaviours in the home environment such as friendliness, fear, energy level and some types of aggression. The most predictive components of the BA included exploration of the room and response to unusual stimuli. Dogs who eagerly explored the room during the BA were more likely to be energetic at home. The dog's reaction to a stranger and toddler doll during the BA predicted owner-directed aggression at home. Dogs demonstrating fearful reactions during the BA were significantly more likely to show fearful reactions at home. However, there were some discrepancies between the BA and C-BARQ. For example, it is difficult to predict separation-related behaviours and some types of aggression which are complex and multifactorial. The authors note that this study population may not reflect the shelter dog population (55.1% were not adopted from shelters). Nevertheless, the findings support the use of the BA in shelters particularly to evaluate overall behaviours.

Clay L, Paterson MBA, Bennett P et al (2020) Comparison of canine behaviour scored using a shelter behaviour assessment and an owner completed questionnaire, C-BARQ. Animals 10, 1797. [Author MBA Paterson is from RSPCA Queensland]

Simple screening tool for degenerative joint disease (DJD) in companion cats

Degenerative joint disease (DJD) is under-diagnosed and under-treated in companion cats. DJD screening tools have been developed in dogs and there are questionnaires available to monitor cats who have already been diagnosed with DJD. However, a simple checklist is required to help veterinarians and cat owners rapidly screen for DJD.

This study, conducted in the USA, evaluated existing questionnaire data to compile a simple checklist to rapidly screen for DJD in cats. Owners were asked to rate their cats' activity on a scale from normal to severely impaired. All cats were examined by a veterinarian to assess pain scores and x-rays of their joints were taken to score for the presence and severity of DJD. A total of 249 DJD cats and 53 non-DJD cats were included. The authors analysed owners' response to the questions and clinical findings to identify which questions most accurately predicted DJD associated pain.

Six yes/no questions identified around 99% of cats with clinically confirmed DJD: (1) Does your cat jump up normally? (2) Does your cat jump down normally? (3) Does your cat climb up stairs or steps normally? (4) Does your cat climb down stairs or steps normally? (5) Does your cat run normally? (6) Does your cat chase moving objects e.g. toys? If the answer is 'no' to any of these questions, the cat is likely to have DJD associated pain and further investigation is recommended e.g., video activity, x-rays. The authors acknowledge that the checklist has some limitations including the effects of other conditions/diseases. Nevertheless, this is a quick and simple checklist to help screen for and increase awareness of DJD in cats.

Enomoto M, Lascelles BDX, Gruen ME (2020) Development of a checklist for the detection of degenerative joint disease-associated pain in cats. Journal of Feline Medicine 22(12):1137-1147.

Can regular stroking sessions for cats in shelters encourage them to come forward in their enclosure and convey friendliness to potential adopters?

Friendliness is one of the main factors that people look for when selecting an animal to adopt from a shelter. Some shelter animals may be reluctant to interact with people and this may impede adoption success. Familiarising shelter animals with human contact and encouraging them to come forward in their enclosure may help convey friendliness to potential adopters.

This study, conducted at RSPCA Queensland, investigates whether gentling (stroking) improves cats' response to human interaction. In Experiment 1, cats were randomly allocated to one of five groups (n=12 per group): (1) control group receiving no gentling, (2) a single 6 minute daily gentling session, (3) three 2 minute daily gentling sessions, (4) a single 6 minute daily gentling session with the handler talking and (5) three 2 minute daily gentling sessions with talking. Gentling involved continuous stroking over the cat's back performed by the same individual for five days. In experiment 2, cats (n=15) received a single gentling session lasting 3, 6 or 9 minutes and were exposed to a stranger test involving 30 seconds of contact with an unfamiliar person. Cat behaviours were observed via video and faeces collected daily for stress hormone (cortisol) analyses.

Gentling had no effect on stress hormones but cats who received gentling for 6 minutes per day for five days without the handler talking, spent the longest time at the front of the cage. The authors described this as a classically conditioned response with cats soliciting gentling from a familiar person. In Experiment 2, a single session of gentling had no effect on cat behaviour and no effect on their response to a stranger. While accommodations must be made for individual differences, the authors recommend gentling be performed on shelter cats for several days for 6 to 9 minutes per day without the handler talking.

Liu S, Paterson M, Camarri S et al (2020) The effects of the frequency and method of gentling on the behaviour of cats in shelters. Journal of Veterinary Behavior 39:47-56. [Author M Paterson is from RSPCA Queensland]

Prediction of resource guarding in dogs in their adoptive home

Resource guarding (aggression when others approach or take away highly valued items e.g. food, toys) can be a risk to animal and human safety. As such, animal shelters routinely evaluate dogs for resource guarding during behavioural assessments (BA). It is important to identify whether resource guarding behaviours during a BA accurately predict those behaviours in the home environment.

This study, conducted at a US dog shelter, investigates whether resource guarding behaviours at BA is consistent with surrender profiles and behaviour post-adoption. A standardised BA was performed at the shelter to evaluate behaviour including resource guarding. A total of 139 adopters completed a Canine Behavioural Assessment and Research Questionnaire (C-BARQ) and additional questions about aggression (e.g., growling, snarling, snapping, biting) when toys, treats or food are taken away. Complete surrender profiles were available for 44/139 dogs and these were also interrogated for reports of resource guarding.

All three evaluations (BA, adopter survey, surrender profile) concurred in 29/44 (65.9%) of the dogs i.e., resource guarding yes/no. Identification of resource guarding at BA was significantly associated with adopter reports of guarding toys, bones or other valued items. However, the positive predictive power (PPV) of the BA was low, meaning that a half to three quarters of dogs assessed as resource guarders at BA were not so in their adopted home. Some dogs (5 to 11%) did not show resource guarding behaviours at BA but did so post-adoption. The authors urge shelters to exercise caution when guarding behaviour is identified in surrender profiles or at BA as dogs may not go on to display these behaviours in their adopted homes.

McGuire B, Orantes D, Xue S et al (2020) Abilities of canine shelter behavioural evaluations and owner surrender profiles to predict resource guarding in adoptive homes. Animals 10, 1702.

Brachycephalic dogs suffer from poorer physical health compared to non-brachycephalic dogs

Health problems directly related to brachycephalic or flat-faced breeds include respiratory disease, eye disease, birthing difficulties and heat stroke. Despite the known health risks and shortened lifespan related to the way they are bred to look, brachycephalic dog breeds (e.g., pugs, French bulldogs, Boston terriers) continue to be popular.

This study is the first to use a large-scale, big-data approach to compare the health of brachycephalic versus non-brachycephalic dogs. The authors analysed VetCompass data on 22,333 dogs (4,169 brachycephalic and 18,079 non-brachycephalic) presenting to veterinary clinics in the UK in 2016. They aimed to assess the risk of broad categories of health problems (e.g., heart, eye, skin disease) and more specific common conditions.

The results of this study provide strong evidence, based on a large sample size, that brachycephalic dogs have poorer health overall compared to non-brachycephalic dogs. Broadly, brachycephalic dogs are predisposed to heart, eye, upper respiratory, ear, skin and anal sac disease. They are at significantly higher risk of corneal ulcers, heart murmurs, umbilical hernias, pododermatitis (infection and inflammation of the paws), skin cysts, patellar luxation (displaced kneecaps), ear infections and anal sac impaction. While they were at lower risk of behavioural problems compared to non-brachycephalic dogs, this study confirms that brachycephalic dogs are less physically healthy based on total disorder counts and specific common conditions.

O'Neill DG, Pegram C, Crocker P et al (2020) Unravelling the health status of brachycephalic dogs in the UK using multivariate analysis. Scientific Reports 10, 17251.

FARM ANIMALS

Socio-ethical implications of virtual fencing technology

Virtual fencing (VF), a boundary without a physical barrier, is a new livestock containment system nearing commercial release. VF employs an audio cue which the animal has to learn to associate with a negative stimulus (electric shock) if the animal crosses a virtual boundary determined by GPS. According to Responsible Research and Innovation (RRI) principles, developers of new technologies such as VF should anticipate the technology's potential implications. However, RRI is rarely applied to agricultural technology. To date, the focus of VF development has largely been on technical features without sufficient attention to potential economic, social and environmental implications.

This study explores the views of 25 stakeholders in the New Zealand pasture-raised cattle industry including farmers, veterinarians, animal welfare experts and technology developers. Using the Delphi method, a panel of stakeholders anonymously answered three rounds of questions about the potential implications of VF. Between each round, the panel's answers were summarised and presented back to the stakeholders. In this way, the authors ranked the potential implications of VF including perceived benefits and barriers to adoption.

The stakeholders named environmental protection as the most important potential benefit of VF. This priority may be due to NZ environmental policy that requires farmers to prevent livestock accessing certain areas such as waterways. Efficient pasture allocation, labour saving and individual animal management were also perceived as potential benefits. However, these benefits may be limited by pasture management, additional tasks associated with VF and the number of shocks required to muster an individual animal. The main barriers to adoption were unreliability, insufficient return on investment and time involved. There were differing views on negative welfare implications, but the authors conclude that the ethical concerns of consumers are integral to the legitimacy of VF technology.

Brier D, Eastwood CR, Dela Rue BT et al (2020) Foresighting for responsible innovation using a Delphi approach: A case study of virtual fencing innovation in cattle farming. Journal of Agricultural and Environmental Ethics 33:549-569.

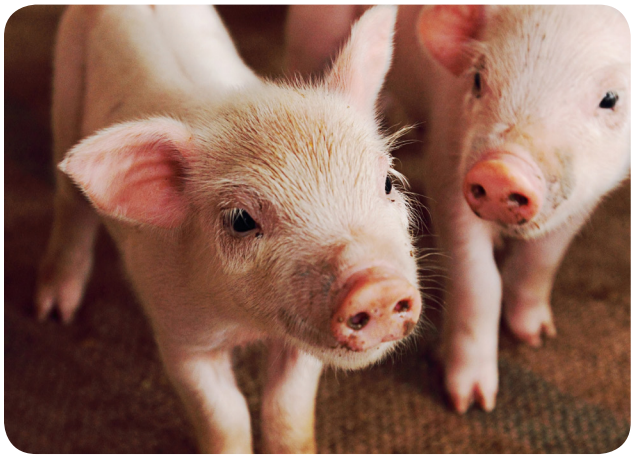
Free farrowing systems provide better welfare outcomes for sows and piglets

Traditional farrowing crates (TF) confine sows with the aim to reduce the risk of sows crushing their piglets. The extreme confinement of TF is associated with a range of animal welfare concerns including physiological and psychological stress and physical trauma. Alternatives to TF include loose housing, outdoor systems and Freedom Farrowing crates (FF).

This study aimed to investigate the financial and welfare benefits of FF compared to TF by comparing production and behavioural metrics. In a purpose-built barn in the United Kingdom, Large White Landrace sows (n=24) were confined in either FF (n=12) or TF (n=12) for five days before and after giving birth (n=average of 14-15 piglets per sow). Thereafter, FF sows were released and provided an area of 3.2m^2 while TF sows remained confined to 1.4m^2. Production metrics (piglet growth and mortality rate) were monitored. Behavioural observations of sows and piglets were undertaken six times a day for 7 days.

There were no significant differences in piglet mortality rates or weight gain found when comparing FF to TF. There were significant differences in the behaviour of sows and piglets between the two farrowing crate systems. FF sows spent more time nursing and socialising with their piglets. FF piglets spent more time feeding and playing while TF piglets spent more time away from sows and engaging in aggressive interactions with other piglets. Overall, the behavioural observations suggested that FF have welfare benefits for both sows and piglets compared to TF without compromising production measures.

Loftus L, Bell G, Padmore E et al (2020) The effect of two different farrowing systems on sow behaviour, and piglet behaviour, mortality and growth. Applied Animal Behaviour Science 232, 105102.



COVID-19 effects on livestock production: A One Welfare issue

The global COVID-19 pandemic is a One Welfare issue that threatens human well-being, animal welfare and the state of the environment. In particular, COVID-19 has highlighted the vulnerabilities in large-scale, industrialised, vertically integrated, livestock centred food production systems.

This review details the One Welfare concerns associated with livestock centred food production systems. Meat-processing workers have been identified as high risk for COVID-19 due to disadvantage, close proximity, low pay, inadequate health care and lack of leave entitlements meaning people continue to work while sick. Thousands of COVID-19 cases have been traced back to meat processing plants. Plant closures and back logs further impact public health and animal welfare. For example, US regulators increased the legally allowable speed of killing lines leading to reduced carcass condemnation and likely reduction in humane killing. Over-crowding and mass depopulation of 'surplus' animals is occurring on farms due to decreased processing capacity. Methods of mass depopulation (e.g., gassing with CO2, suffocation by foam, prolonged heat stress from ventilation shutdown) raise serious animal welfare concerns. Mass carcass disposal leads to further environmental, human and animal welfare risks.

Urgent changes are required in food production systems. At the production stage, the authors suggest that mass depopulation may be avoided with more flexible standards and asset registers to accommodate surplus animals. At the processing stage, they recommend surge capacity and protections for workers. At the retail level, the authors support a more 'direct-to-consumer' model and encourage consumers to help cover costs associated with improved worker and animal welfare. At the individual consumer level, they advocate for reduced overall meat consumption in favour of a plant-based diet. Overall, COVID-19 has revealed vulnerabilities in current food systems and highlighted the need for urgent changes to ensure global food security and safeguard the welfare of animals, humans and the environment.

Marchant-Forde JN, Boyle LA (2020) COVID-19 effects on livestock production: A One Welfare issue. Frontiers in Veterinary Science doi:10.3389/fvets.2020.585787.

Turkey farm welfare measures correlate with slaughterhouse data

Feasible animal welfare indicators are needed to monitor the welfare of turkeys raised for meat production. Data routinely collected such as birds being rejected at slaughter due to injuries and disease, may reflect poor welfare on farm. However, the relationship between slaughterhouse data and turkey welfare on farm is currently poorly characterised.

This study investigated the relationship between slaughterhouse data and turkey hen welfare on 16 commercial farms in Norway. All birds were sourced from the same hatchery. Animal based welfare indicators, included the frequency of lame and featherless birds and those with visible head, tail or wing wounds, were recorded by two observers using a transect walking method in each shed. Environmental based welfare indicators included litter quality, temperature, humidity and light intensity. All birds were sent to the same slaughterhouse where data on slaughter weight and the percentage of birds presenting dead on arrival and rejected due to illness (such as leg/joint issues and airsacculitis) was collected.

Slaughterhouse data for the percentage of birds rejected due to leg/joint issues and airsacculitis were associated with on farm bird welfare. Flocks with higher rates of rejection due to airsacculitis had more featherlessness and dirtiness detected on farm. Flocks with higher rates of rejection due to leg/joint issues had higher rates of lameness detected on farm. These results showed that routinely collected slaughterhouse data could be used as retrospective indicators to improve the welfare for future flocks on farm.

Marchewka J, Vasdal G, Moe RO (2020) Associations between welfare measures on farm and slaughterhouse data in commercial flocks of turkey hens (*Meleagris gallopavo*). Poultry Science 99(9):4123-4131.

Floor substrate preferences of chickens

The provision of substrate (litter and bedding material) is essential for the welfare of chickens. Substrate provides sensory and motor stimulation (enrichment), allows chickens to perform species-typical behaviour (e.g., dustbathing, foraging, pecking), absorbs moisture and contributes to air quality and health outcomes. A better understanding of chickens' substrate preferences is required to improve substrate provision and develop novel bedding.

This review aimed to explore chickens' floor substrate preferences. The authors examined ten papers that met their inclusion criteria for meta-analysis: conducts substrate preference tests in chickens, reports species-typical behaviours, investigates absorptive bedding materials and expresses amount of behaviour as a percentage.

The meta-analysis showed that chickens' preferred floor substrate is sand. Chickens spent more time on sand likely due the comfort and feel of it in comparison to other substrates such as wood. The birds dustbathed more on sand and peat moss possibly due to their similarity to dirt, the natural substrate for dustbathing. Chickens appeared to be equally happy foraging or pecking in different substrates possibly because these are generally exploratory behaviours. However, the authors noted that these conclusions should be interpreted with caution considering the small number of studies. Further research is still required to investigate chickens' preferences for specific substrate characteristics such as grain size, friability and lipid content.

Monckton V, Ellis JL and Harlander-Matauschek A (2020) Floor substrate preferences of chickens: A meta-analysis. Frontiers of Veterinary Science 7, 584162.

Health and welfare challenges in the marketing of male dairy calves

Millions of male dairy calves are transported and sold annually. The transport and sale (marketing) of dairy calves is associated with stress, poor health and welfare and mortality. Risks are particularly high where calves are unfit for transport, transport is prolonged, calves from multiple farms are mixed and insufficient food and water are provided.

Canada's National Farmed Animal Health and Welfare Council convened a panel of twenty people (including dairy farmers, veterinarians, regulators and researchers) to describe calf marketing practices, identify animal health and welfare issues and recommend improvements. The panel found that a range of marketing practices are in use across Canada ranging from auctions to direct sale. Calves are sold at a range of ages (1 to 55 days old) with most sold at 3 to 7 days of age. Transporters often collect calves from multiple farms resulting in extended transport time. Calf management prior and during marketing affected health outcomes.

The panel recommended improved calf management on farm, benchmarking of male calf health, clear fitness for transport criteria, improved traceability and reduced use of antimicrobials. For calves unfit for transport, clear on-farm euthanasia training and protocols are required. Uniform regulations and plans for their implementation are needed to safeguard the health and welfare of male dairy calves.

Wilson DJ, Canning D, Giacomazzi T et al (2020) Hot topic: Health and welfare challenges in the marketing of male dairy calves – Findings and consensus of an expert consultation. Journal of Dairy Science 103:11628–11635.

The impact of stocking density on the welfare and production of laying ducks

Duck egg production in China is intensifying due to increasing consumer demand. Consequently, laying ducks are being kept at increasing stocking densities (i.e. less space per bird). While much attention has been paid to the effects of high stocking density on chicken health and welfare, there are fewer studies investigating the impact on laying ducks.

This study, conducted in Sichuan, China, investigated the effects of increasing stocking density on egg production and quality, reproductive hormones and antioxidant capacity (i.e. ability to cope with oxidative stress) in laying ducks. Twenty-week-old Jinding ducks (n=720), a common laying breed, were randomly assigned to 40 pens; 8 replicates of 5 different stocking densities: 4, 5, 6, 7 and 8 birds per m^2 (12, 15, 18, 21 and 24 ducks per $3m^2$ pen). Ducks were monitored for 20 weeks with metrics on the number of eggs laid, egg mass, egg shell thickness and feed conversion efficiency (grams of feed per gram of egg mass) recorded. Plasma concentrations of anti-oxidant enzymes and reproductive hormones including estradiol-17B (E2), luteinising hormone (LH) and follicle-stimulating hormone (FSH), were also measured. Analyses of total anti-oxidant capacity (T-AOC) were conducted on liver samples collected post-mortem.

Increasing the stocking density significantly decreased concentrations of anti-oxidant enzymes and reproductive hormones (E2 and FSH), suggesting ducks at higher stocking densities likely suffer from chronic stress. Production measures were also negatively impacted at higher stocking densities including reduced egg production, egg mass, eggshell thickness, eggshell strength and feed conversion efficiency. The authors recommend that laying ducks should be housed at a stocking density of 4 birds/m^2 or less.

Xiong X, Yang Y, Jiang X et al (2020) Effects of stocking density on performance, egg quality, reproductive hormones and antioxidant capacity in egg-laying ducks. Journal of Applied Animal Research 48(1):454-459.

ANIMALS IN SPORT, ENTERTAINMENT, PERFORMANCE RECREATION AND WORK

A new survey instrument for evaluating horse behaviour and welfare

The Equine Behaviour Assessment and Research Questionnaire (E-BARQ), containing 215 items, was developed to quantitatively evaluate horse behaviour. E-BARQ can be used to investigate how changes in training and management influence horse behaviour and welfare but first it must be validated.

This study, conducted online with participants from 33 countries, aimed to assess construct validity (whether E-BARQ measures what it sets out to measure), inter-rater reliability (agreement between scores of the same horse by different people) and intra-rater reliability (agreement between scores of the same horse by the same person over time). A total of 1923 respondents answered subjective questions as well as E-BARQ questionnaires about their horse. To assess inter-rate reliability, pairs of riders (n=10 pairs) completed E-BARQ on a focal horse equally familiar to each person in the pair. To assess intra-rater reliability, 52 riders completed the E-BARQ each on a focal horse and were re-surveyed a month later.

For the purpose of evaluating horse behaviour, E-BARQ was found to be a valid questionnaire with high inter- and intra-rater reliability. Horses whose owners subjectively reported moderate to serious problem behaviours in the six months prior to the questionnaire, scored significantly worse on E-BARQ compared to owners whose horses had no or minor problems reported. Inter-rater reliability was high for 203 of the 215 items in the questionnaire. Items about the horse's behaviour away from home and how quickly the horse learns had lower agreement possibly due to different activities undertaken with the horse, the respondents differing beliefs and varying personal experiences with the horse.

Fenner K, Matlock S, Williams J et al. (2020) Validation of the Equine Behaviour Assessment and Research Questionnaire (E-BARQ): A new survey instrument for exploring and monitoring the domestic equine triad. Animals 10(11), 1982.

Steward reports reveal whipping racehorses doesn't improve safety or competitiveness

There is an entrenched belief in the Thoroughbred horse racing industry that the whip aids steering, reduces interference (one horse/jockey affecting another), increases safety and improves finishing times. However, to date, these beliefs have not been tested. "Hands and Heels" races where the whips are held but not used to hit the horses, provide an opportunity to test these beliefs.

This study compared official British Horseracing Authority stewards' reports from all 67 "Hands and Heels" races from January 2017 to December 2019 to 59 case-matched races where all variables were similar except whips were used to hit the horses. The stewards' reports covered a total of 126 races involving 1178 horse/jockey starters. Reports were interrogated for whether the stewards had anything to report, movement on course, interference and jockey behaviour (e.g., careless and/or improper riding), which would infer safety concerns. The finishing times in "Hands and Heels" and whip races were also compared.

There were no significant differences in stewards having anything to report, movement on course, interference, jockey behaviour or finishing times. Contrary to long-held beliefs in the industry, the results of this study indicate that whip use does not improve steering, reduce interference, increase safety or improve finishing times. The authors recommend that whip-free races be adopted internationally.

Thompson K, McManus P, Stansall D et al (2020) Is whip use important to Thoroughbred racing integrity? What stewards' reports reveal about fairness to punters, jockeys and horses. Animals 10(11), 1985.

Are racehorses 'thick skinned' when it comes to feeling pain from whipping?

The use of whips in Thoroughbred horse racing is an animal welfare concern. However, some in the racing industry claim that horses are immune to the pain of whip strikes because they are 'thick-skinned' in comparison to humans.

This study aimed to characterise the pain perceiving capability of horse skin and compare it with human skin. Full-thickness gluteal skin samples were collected from Thoroughbreds at an export abattoir (n=20; 11 females, 9 males) and from human cadavers (n= 10; 5 males, 5 females) at the Macquarie University Faculty of Medicine, New South Wales. Sections of skin containing the epidermis (outer-most layer) and dermis (deeper layer) through to the hypodermis (deepest layer) were measured for thickness. It is the epidermis where stimuli (e.g., a whip strike) make contact with pain detecting nerves. The number of pain-detecting nerves in the epidermis were also counted using a standardised European Federation of Neurological Societies protocol.

Analyses revealed that the skin of humans and horses has a similar anatomical structure. There were no significant differences between the epidermal thickness or epidermal nerve counts of humans and horses. While the dermis was thicker in horses, this layer does not play a major role in skin sensitivity to pain. The analyses could not account for the effects of horse hair but considering that whips commonly leave indents in underlying skin, it is unlikely that hairs offer any protection. Given that it is widely accepted that animals experience pain when struck, claims to the contrary are questionable and this study provides evidence to counter the assumption that horses are immune to the pain of whip strikes.

Tong L, Stewart M, Johnson I et al (2020) A comparative neuro-histological assessment of gluteal skin thickness and cutaneous nociceptor distribution in horses and humans. Animals 10(11), 2094.

ANIMALS IN RESEARCH AND TEACHING

Use of horseshoe crabs for endotoxin testing in medicines and vaccines

The Limulus Amebocyte Lysate (LAL) and Tachypleus Amebocyte Lysate (TAL) tests are used to test for the presence of endotoxins (bacterial toxins) in medicines and vaccines. Lysate used in these tests is derived from the blood of horseshoe crabs. Every year, in Europe and North America alone, these tests use blood collected from over 500,000 Atlantic horseshoe crabs. The use of horseshoe crabs for LAL and TAL represents an ethical challenge.

This detailed report synthesises the social science relating to use of horseshoe crabs for LAL and TAL. As per the 3Rs of animal use in research, there is an increasing need to explore alternatives to using horseshoe crabs (replacement), limiting the number of animals used (reduction) and refinement of methods to improve crab welfare. However, progress is hindered due to regulations governing medicines and because wild animals, particularly crustaceans, are not afforded adequate protection under most animal welfare legislation.

The authors of this report make several key recommendations to address the ethical challenge posed by using horseshoe crabs for endotoxin testing. Recommendations include further research into alternatives such as recombinant Factor C (rFC) and refinement of capture, transport and bleeding methods.

Gorman R (2020) Horseshoe crabs and the pharmaceutical industry: Challenges and alternatives: Project Report. Exeter: University of Exeter. [Author R Gorman is from RSPCA UK]

WILD ANIMALS

1080 feral cat baits pose high risk to non-target species on Kangaroo Island

Kangaroo Island, located off the coast of South Australia, is home to many endangered native animals. Poison baiting of feral cats has been proposed to protect these animals from predation. The only feral cat bait currently available in Australia (albeit under strict conditions) is Eradicat® containing 4.5mg of 1080 poison (sodium fluoroacetate). As 1080 may also kill native animals, the risk to non-target species must be evaluated prior to poison baiting.

Using Eradicat® baits containing a non-toxic marker (Rhodamine B) instead of 1080 poison, this study investigates bait uptake by animals on Kangaroo Island. A total of 576 baits were distributed over two seasons (288 per season) at a density of 60 baits/ km^2 at four sites in the Flinders Chase National Park and Ravine des Casoars Wilderness Protected Area. Motion-activated cameras were used to monitor the type and number of animals taking the baits. Two weeks after baiting, animal trapping was undertaken to collect whisker samples. Whisker samples were examined under a fluorescence microscope to identify Rhodamine B indicating that the animal had consumed bait.

Camera data revealed that only one bait was taken by a feral cat. The majority of baits (over 99%) were taken by ravens, brushtail possums and native bush rats. Native animals including the rare western pygmy possum, ate the bait as indicated by Rhodamine B in whisker samples. Many of the native animals on Kangaroo Island would need to eat less than one Eradicat® bait containing 4.5mg of 1080 for it to be lethal. Hence the authors suggest that Eradicat® may not be appropriate for broadscale feral cat management on Kangaroo Island.

Hohnen R, Murphy BP, Legge SM et al. (2020) Uptake of 'Eradicat' feral cat baits by non-target species on Kangaroo Island. Wildlife Research 47:547-556.

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Is enough being done to help prepare wild animals for climate change impacts?

Climate change poses a threat to wild animals globally. Planned climate adaptation (actions to address the current or predicted effects of climate change) is essential to help protect wildlife from negative impacts caused by climate change.

This literature review, conducted by scientists in the USA, synthesises papers published from 1995 to 2017 that make recommendations for terrestrial wildlife management in a changing climate. The authors aimed to identify patterns and gaps in wildlife management in response to climate change.

A total of 2,306 recommendations for climate adaptation were identified in 509 papers.

The most common recommendations related to habitat management including establishing and enhancing protected areas (n=596 recommendations, 26%) e.g., National Parks and areas outside reserves (n=276, 12%) e.g., agricultural land. In addition to safeguarding habitat cover (n=298, 13%), food (n=35, 2%) and water (n=107, 5%), the literature recommends that wildlife must be protected from other threats (n=119, 5%) in order to survive in a changing climate. Other threats include human-wildlife conflict, human disturbance and invasive species. Gaps in the literature were identified with fewer studies exploring genetics, health and reproduction in the context of climate adaptation. Recommendations tended to be broadscale leaving an unmet need for discrete, specific, evidence-based local solutions.

LeDee OE, Handler SD, Hoving CL et al (2020) Preparing wildlife for climate change: How far have we come? Journal of Wildlife Management 85(1):7-16.

MISCELLANEOUS

Social license and animal welfare: Developments from the past decade in Australia

Australian animal use industries (e.g. livestock farming, live export, racing) are under increasing animal welfare scrutiny. Poor practices that have been hidden by these industries are increasingly coming to light due to surveillance technologies and media exposés. Consequent community backlash can lead to these industries losing the community's tacit approval also known as social license to operate (SLO).

This commentary piece discusses the reasons why Australian animal use industries appear to be losing SLO. Animal welfare concerns including poor handling, heat stress and inhumane slaughter methods have contributed to the live export industry's waning SLO. Injuries and the killing of surplus animals (wastage) are among the animal welfare issues that have eroded the SLO of greyhound and horse racing. The SLO of kangaroo harvesting is being lost due to community concerns about non-fatal wounding and the killing of joeys. Dairy farming is losing SLO due to concerns including calf management, cow-calf separation, dehorning, lameness and 'mega dairies'. Mulesing (a painful procedure to remove skin from the tail and breech area of a sheep) has contributed to loss of SLO for the wool industry.

Animal use industries have typically responded to waning SLO with public relations offensives. However, this approach is increasingly being viewed as disingenuous. Unless animal use industries make genuine efforts to address contentious practices, increase transparency, engage stakeholders and facilitate and apply animal welfare science, they will lose SLO. When SLO is lost so too may market access and regulatory licenses.

Hampton JO, Jones B, McGreevy PD (2020) Social license and animal welfare: Developments from the past decade in Australia. Animals doi:10.3390/ani10122237. [Author B Jones is from RSPCA Australia]

2020 update to the Five Domains Model: Including human-animal interactions in assessments of animal welfare

The Five Domains Model, conceived in 1994, provides a framework to evaluate animal welfare. It is based on contemporary animal welfare science and centres around an understanding of animals' physiological and psychological needs. The Five Domains are: (1) Nutrition, (2) Physical environment, (3) Health, (4) Behavioural Interactions and (5) Mental State. These Domains account for the relationship between biological functioning and affective states (subjective experiences). For Domains 1 to 4, a five-tier scale (A=no effect to E=severe negative impact) is used to grade negative welfare and a four-tier scale (0, +, ++, +++) is used to grade positive welfare.

The Five Domains Model is being constantly updated and this review provides the latest update. The 2020 update includes guidance on how to use a scoring system to evaluate the impact of animals' interactions with the world around them. The 2020 update includes renaming Domain (4) 'Behavioural Interactions' due to an increasing appreciation of animals' agency to engage with their environment, other animals and humans. The updated Domain (4) explicitly considers human animal interactions such as handling, training and competition and the frequency, variety and duration of different forms of contact.

The updated Five Domains Model provides a way to systematically evaluate animal welfare. The authors encourage a wide variety of people to use the Model including those in the livestock and racing industries, veterinary staff, pet owners and wildlife professionals. The Model can be applied throughout an animal's lifetime (including end-of-life decisions) to assess whether the individual has "a life worth living".

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RSPCA

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