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. Email science@rspca.org.au to subscribe.
Causal factors of oral versus locomotor stereotypy in the horse

Stereotypic behaviours are thought to indicate suboptimal welfare in animals, and are characterised by movements that are repeated, unchanging, and appear to serve no purpose. The estimated stereotypy rate in performance horses is between 20-33%, and two common stereotypies are crib-biting and weaving. Crib-biting is an oral stereotypy that involves gripping a surface with the front teeth and pulling the neck back so that air is sucked into the upper oesophagus, making a grunting sound. Weaving is a motor stereotypy that involves shifting the body weight from foot to foot, and swaying the head laterally. Many horse owners view stereotypies as vices rather than symptoms of suboptimal welfare and physically try to prevent their performance. This review considers the causal factors leading to stereotypy development in horses.

Wild horses spend 16-18 hours every day grazing, which produces up to 40 L of saliva. When horses are stabled they are prevented from grazing and fed concentrates, which reduces the amount of saliva produced and increases acidity in the foregut. Crib-biting horses often experience gastric inflammation and ulcers, and it is proposed that exposure to environmental stressors such as thwarted feeding behaviour and gastric pain cause changes in the brain regions associated with habit formation. Thus the crib-biting behaviour that the horse initially performed in response to a lack of grazing develops into a habitual response pattern that is very resistant to change and does not cease even when the horse has consumed feed.

There are limited studies on weaving behaviour. However, this behaviour has been shown to increase when stabled horses are deprived of grazing, social contact and exercise, and decrease when they are able to participate in these activities. Thus weaving behaviour appears to develop when horses want a resource that they cannot access. The horse performs searching behaviours but cannot find the resource that it seeks, preventing it from satisfying the motivation and ceasing the behaviour. The searching behaviour continues in the confined environment until it evolves into the restricted stereotypic motor sequence of weaving. Providing the horse with the desired resources, such as feed or social contact, causes weaving to cease.


What does abnormal repetitive behaviour tell us about zoo management?

Abnormal repetitive behaviours (ARBs) are observed in many captive wild species, and are considered to be a method of coping with a suboptimal living environment. These behaviours can be compulsive goal-oriented behaviours, such as over-grooming, or simply a repeated motor function, such as stereotypic weaving in elephants. The performance of ARBs in zoo animals can provide an objective measure of how well different individuals are coping with captivity, and can help identify which species are not suited to a zoo environment. This UK article reviews the current research on ARBs in mammals, birds and ectothermic vertebrates (reptiles, amphibians and fish) and suggests methods of improving zoo housing environments for these taxa.

The majority of research on ARBs has focused on mammals, particularly on primates and large carnivores. Primates show a wide range of ARBs, including self-grooming, rocking and bouncing. Risk-factors for the development of ARBs in primates are early maternal separation and an inadequate rearing environment. Carnivores such as bears and big cats typically develop pacing in low-complexity environments with restricted space or hiding opportunities. Elephants show ARBs such as weaving, swaying, and head bobbing, while giraffes develop oral stereotypes in the absence of complex browsing opportunities.

ARBs are well studied in birds, and birds will show ARBs when housed in an environment that prevents them from performing species-typical behaviour or maintaining an appropriate flock structure. They will also show ARBs after a stressful event. More research is needed to recognise ARBs in reptiles, amphibians and fish, as little is known of these or species-typical behaviours that these animals may be motivated to perform. Behavioural changes in these taxa are less easily recognised, but can include rubbing against the glass, increased hiding and behavioural inhibition. In conclusion, ARBs can be used to identify problematic husbandry and the need for improvement. The quality of the environment is more important than the quantity, and animals should be able to exercise some degree of choice and control over their lives for optimal welfare in captivity.

The potential impacts of riding on breathlessness in horses

Horses have superior athletic capabilities, in part due to their exceptional cardiorespiratory responses during exercise. During periods of peak exertion, the respiratory airflow rate increases from 65-80L per minute at rest to 1800-2000L per minute at full gallop. This massive increase in airflow is facilitated by the horses’ large nasal passages, and the ability of the soft palate to form an effective seal across the back of the mouth to prevent air leakage and maximise the width of the nasopharyngeal passage leading into the trachea. This review focused on the negative impacts that some riding practices have on the ability of horses to maintain maximum airflow during periods of exertion, and how this may negatively impact on horse welfare by subjecting them to breathlessness.

Three types of breathlessness were identified. The first is the increased respiratory effort required to achieve a desired level of ventilation when airflow is restricted. The second type was labelled ‘air hunger’, which is the extremely unpleasant sensation of needing to breathe but being unable to fully ventilate to the extent needed. The third type relates to the experience of inflammatory chest tightness that can occur during asthma attacks or allergic responses.

Two riding practices were reviewed that are likely to increase the experience of breathlessness in horses under saddle. The first is the use of the Rollkur head position in eventing horses. This practice involves pulling the horses chin toward its neck to improve the appearance of the head angle. This position decreases the width of the nasopharyngeal region leading into the trachea, thus impeding airflow and increasing respiratory effort. The second practice is the use of the bit, which can break the airtight seal made by the lips, causing a loss of negative pressure in the mouth and resulting in the soft palate rising up into the nasopharyngeal region and impeding airflow. As well as causing breathlessness, this effect can contribute to the development of upper airway pathologies that further restrict airflow and exacerbate the negative welfare impacts. The use of bitless bridles and avoiding the Rollkur position is recommended to minimise breathlessness in horses.

Characteristics of ex-racing greyhounds and their impact on re-homing

A small proportion of greyhounds used in the racing industry are given to re-homing organisations so that they may live out the rest of their lives as pets. This practice is increasing in popularity, and greyhounds experience a high rate of successful adoptions with few dogs returned to the shelter after re-homing. Investigating the re-homing of greyhounds provides a unique opportunity to research factors associated with known pre-adoption histories of individuals from a single breed. This study investigated whether pre-adoption characteristics and management factors influenced the success of greyhound adoptions.

The records of 835 greyhounds from a greyhound adoption organisation in New Zealand were examined. These records contained information on the prior history of the dog, details of its age, sex, health status, foster status, and the results of a suite of behavioural tests referred to as the temperament test. Only dogs that passed the temperament test were able to be re-homed. Dogs that failed were humanely euthanized. The temperament test was graded on two-tiers based on the prey drive of the dog. Dogs that passed the behavioural tests but showed interest in chasing a cat were given a basic pass. Dogs that passed all tests and behaved in a friendly manner toward a cat were given a ‘pass with cats’, and were considered to have a lower prey drive. This data was used to determine the characteristics of greyhounds that were successfully re-homed.

Re-homing of greyhounds was generally successful, with 86% successfully re-homed. Greyhounds were more likely to pass the temperament test and be successfully re-homed than normal shelter dogs, but were just as likely to be returned after 6 months. Female greyhounds and those that displayed a low prey drive in the temperament test (a ‘pass with cats’) were most likely to experience a successful adoption. The authors suggest that the temperament test was reliable but would benefit from scientific validation to ensure accuracy.

Using different persuasive messages to encourage confinement of pet cats

Allowing cats to roam freely is undesirable for several reasons. They can be considered a public nuisance, act as vectors for disease, and create substantial negative impacts on biodiversity by predating on wildlife. In addition, free-roaming cats are also at increased risk of hazards such as traffic accidents. For these reasons there have been substantial efforts in some areas of Australia to confine cats indoors, either through legislation or educational campaigns. This study compared the effectiveness of campaigns that emphasise the benefits of cat confinement in terms of protecting wildlife or protecting cat health, and how this effectiveness was influenced by the strength of the cat-human bond.

A sample of 521 cat-owning households in Australia were surveyed online regarding their demographics, current cat management practices, and the strength of their bond with their cat. They then viewed a video that was randomly selected from one of three categories: ‘wildlife protection’, ‘cat benefit’ or a neutral ‘control’ video. The wildlife protection video emphasised the benefits of cat confinement in terms of reducing wildlife predation, whereas the cat benefit video emphasised the benefits of confinement in terms of reducing the risk of injury, stress and disease. The control video simply presented general information about the history of cats. The respondents were then surveyed about the effectiveness of these videos in motivating them to confine their cats. The respondents completed a follow-up survey 4 weeks later to assess the behavioural change that resulted from the intervention.

Both the wildlife protection and cat benefit videos increased the intentions of owners to confine their cats, and increased the actual adoption of cat confinement behaviours, compared to the control video. People who were more highly motivated by the videos showed increased rates of cat confinement behaviour. The cat benefit video was slightly more effective for owners that reported a strong bond with their cat. These findings emphasise the value of adopting approaches incorporating human behaviour and persuasive communication theory to design cat management interventions.

Prevalence and risk factors for canine dystocia

Dystocia is described as a difficult birth or the inability to expel the foetus without assistance. Due to the exhaustive, stressful and painful nature of dystocia, it can present a major welfare issue for female dogs. Dystocia occurs in about 5% of all births by domestic dogs, and results in the death of approximately 20% of the puppies and 1% of the mothers. Because dystocia often presents as an emergency situation at vet clinics, first-opinion emergency care caseloads offer a rich source of case material for epidemiological research on canine dystocia. This study aimed to improve understanding of the prevalence and risk factors associated with canine dystocia in the UK by analysing electronic patient records.

The medical records of 18,758 entire female dogs were examined, and 701 dystocia cases were identified. These data were analysed using logistic regression analysis to determine the risk factors for dystocia. The prevalence of dystocia was 3.7%. The breeds with the highest prevalence of dystocia were the French Bulldog (21%) and the Boston Terrier (19%). Crossbreeds had very low rates of dystocia (1.3%). The breeds with the highest risk of dystocia, in order, were French bulldogs, Boston terriers, pugs and Chihuahuas. Female dogs aged between 3-6 years were at greater risk of dystocia than dogs aged below 3 years.

These results suggest that dystocia may be of particular concern in brachycephalic breeds. The rates of dystocia reported here may be under-representative, as many of these brachycephalic breeds undergo elective caesarean and are thus less likely to present for emergency care whelping management. These findings may help veterinarians offer advice on breed choice to prospective dog owners, and assist kennel clubs to focus their resources on strategies that reduce dystocia in high-risk breeds.

**Brachycephalic breeds are predisposed to corneal ulcerative disease**

The cornea is the outermost layer of the eye, and it is both transparent and highly innervated. Defects in the surface of the cornea that expose the underlying stroma layer are known as corneal ulcers. Corneal ulcerative disease (CUD) is considered to be very painful, and can result in loss of the eye or interfere with vision. It is caused by a variety of factors, such as other ophthalmic diseases, trauma or corneal degeneration. Most of the research on CUD in dogs examines the records of patients that have been referred to ophthalmic specialists. This provides little information regarding the prevalence of CUD in the general canine population. This study investigated the prevalence, risk factors and management of CUD by veterinarians in the general population of dogs in the UK.

The electronic patient records of 104,233 dogs attending 110 veterinary clinics over 1 year in the UK were reviewed. This located 834 dogs that met the CUD inclusion criteria. The risk factors for developing CUD were investigated using data on breed, bodyweight, age, sex, neuter status and insurance status.

The prevalence of CUD in the general canine population was 0.80%. The large sample size used in this analysis provided strong evidence that purebred dogs within the population are more likely to develop CUD than crossbred dogs. Brachycephalic breeds are particularly susceptible, and are 11.18 times more likely to develop CUD compared with cross-bred dogs. Pugs, boxers and Shih Tzu breeds were most susceptible to CUD. The painfulness of this condition is emphasised by the fact that 69% of overall cases were specifically described as painful in the patient record, or had pain relief administered. 10 dogs were euthanased following the CUD diagnosis. It was also noted that insured dogs were slightly more likely to be diagnosed with CUD. This trend has been noted for other disorders, and may have been due to insurance providing greater opportunities for expensive testing procedures, or because dog owners who purchase insurance are more likely to be committed to providing the best healthcare for their pet. In conclusion, this study demonstrates the strong predisposition of brachycephalic breeds to developing CUD.


**A review of the human-cat relationship**

This article provides a review of the author’s research into the human-cat relationship over the last 30 years. The response of domestic cats to humans is influenced by the type of human contact that they had between 2-7 wks of age, the so-called ‘sensitive’ phase. Increased handling of a positive nature during this phase was associated with reduced fearfulness in adult cats. The genetics of the father also plays a role, with the friendliness of kittens consistently correlated with the friendliness of the father, even if the kittens had never met their father. A calm, socialised mother was more likely to reduce anxiety in the kittens. Bolder, more curious cats may initiate contact with humans more easily, and the act of feeding can facilitate the development of relationships between cats and humans.

When observing human-cat interactions in a laboratory setting, the author examined how the gender and age of the human influenced the reactions of the cats. Women tended to move down to the cat’s level on the ground and spoke more frequently to the cats, while men remained in their initial seated position. Children approached the cat directly and quickly, causing cats to retreat. In a survey of cat-owners, 76% of women were highly satisfied with their cats. When the bond between owners and cats was examined using the Ainsworth Strange Situation Test, cats did not show signs of secure attachment to their owners. This is consistent with the view that cats do not depend on humans for feelings of security and safety.

In terms of communication, cat’s meow more frequently to humans than to other cats, and use these vocalisations to solicit care from humans. Owners can differentiate between the vocalisations of their own cats, but not unfamiliar cats. Cats can show bold and shy personality types, and the behaviour of cats can vary between breeds. In conclusion, cats provide owners with a variety of benefits to health and social support, and despite the issues with wildlife predation that cats present, the benefits of keeping cats as pets outweigh the negatives.

The effects of using aversive training methods in dogs

Dog training methods involve either pleasant or unpleasant methods of encouraging behavioural change in the dog. Pleasant methods include rewards-based training, while unpleasant methods involve punishment or negative reinforcement, where performing the correct behaviour results in an unpleasant stimulus being removed. The author argues that for negative reinforcement to occur, an unpleasant stimulus must first be applied to the dog, and thus negative reinforcement also involves an element of punishment as well. This article reviews the impacts of different training methods on the behaviour and welfare of dogs, and the implications for dog welfare.

Research comparing different training methods consistently found that using training methods based on punishment and negative reinforcement were related to higher incidences of behaviour problems, aggression and fear in dogs. One study found that aversive training techniques were also associated with higher levels of dog-to-dog aggression. Importantly, there was no evidence that aversive training methods were any more effective than reward-based training. The use of electric-shock collars was also reviewed, with almost all studies showing that various types of shock collars pose risks to dog welfare. One study showed that dogs began to associate the shocks with the presence of the handler, and showed signs of stress during non-training activities.

In conclusion, the authors expressed concern for the welfare of dogs trained using aversive training methods, particularly when being trained by non-professionals who may implement the unpleasant stimuli inconsistently, or with excessive force. Aversive training methods were not shown to be any more effective than rewards-based, and in 3 studies were actually shown to be less effective. The authors also expressed concern about the impact that chronic stress due to aversive training methods may have on the physical health of the dogs. It is recommended that the dog-training community embrace reward-based training and avoid as much as possible training methods that include aversion.

Resilience and lessons from studies in the genetics of heat stress

Robustness, also referred to as environmental flexibility, is defined as the ability to function in the presence of internal and external challenges without major changes. Resilience can be defined as the ability to adapt to these challenges. The intense selection for production traits in farm animals has resulted in animals that allocate a greater proportion of their energy to production, and less energy towards body maintenance and disease-resistance. This reduces their ability to cope with environmental challenges, lowering their robustness and resilience.

A major challenge facing the animal production industries is that of climate change, with heat stress predicted to be a major component of this challenge. Producers can respond to this challenge by improving their management techniques to protect their animals, or genetically selecting animals that are robust and resilient to these changes. This article reviews whether producers should improve management or genetically select for improved tolerance to heat stress, using current heat-stress research in dairy cattle as an example.

Current heat stress research in dairy cattle shows that fertility is the production trait that is most susceptible to being affected by heat stress, followed by level of milk production and mortality rates. The effect of heat stress also increases markedly with parity. Intensively selected meat-animals such as pigs show decreases in growth and fertility during heat-stress, whereas extensively farmed animals such as beef cattle and sheep are less susceptible. Selecting animals for improved resistance to heat-stress has a number of challenges, such as defining heat-stress as a trait, and how to balance the genetic improvements with the associated reduction in productivity. Under climate change, the current selection strategies may be adequate if they 1) are accompanied by constantly improving management, 2) use commercial data, and 3) include traits important under climate change (e.g. mortality). The author concludes that a practical approach to address the issues associated with climate change is to continue current genetic selection, and rely on improved management to address short-term challenges.

The effect of bedding materials during transport on the welfare of lambs

Transport is a major stressor for farm animals, and it is imposed on animals being sent to abattoirs for slaughter. In addition to being a welfare concern, stress can reduce the quality of meat coming from these animals. To improve the welfare of animals being transported in Europe, it is a legal requirement to provide the animals with a non-slip floor and an appropriate bedding material that ‘guarantees their comfort’. The type of bedding is not specified. Materials such as straw, sawdust, rice husks, and woodchips all vary in their cost, availability, comfort and microbial environments. The current study aimed to investigate the effects of different bedding materials on the stress physiology of lambs after transport and the microbial quality of their carcasses.

Sixty Merino lambs were transported from a Spanish farm to an abattoir for approximately 5.5 hours on one of three types of bedding materials: saw dust, rice husks, or a double layer of sawdust. There was no control group. A blood sample was collected from each lamb on-farm and immediately after unloading at the abattoir to assess changes in stress physiology. On arrival at the abattoir, the lambs were placed in lairage with food and water for 18 hours prior to slaughter. After slaughter, each carcass was swabbed in three locations (neck, flank and rump) to assess microbial contamination levels.

In general, there was no effect of the type of bedding material on the stress physiology of the lambs, although the study did not assess behavioural measurements of stress. A decrease in creatinine was observed for lambs transported on the rice husks, but this result appears to be an anomaly. Other measures of stress physiology, such as cortisol and adrenaline, increased after transport, confirming that this is a stressful procedure for lambs. There was no effect of bedding type on the microbiological quality of the dressed carcasses. This may have been influenced by the long period in lairage. In conclusion, bedding type did not affect lamb stress physiology or carcass contamination, and thus cost and availability of the three different types of bedding tested should be used to select bedding for lambs during transport. Research on the behaviour of the lambs, and analyses of other bedding materials should be conducted.

Public concerns about dairy cow welfare: How should the industry respond?

Common practices on dairy farms are out of step with public values, and the dairy industry has become a target for public criticism, and farming practices are coming under increasing scrutiny from consumers. One source of information that gains particular attention in the media are exposés of animal abuse or other contentious practices, taken by undercover video footage. This footage often results in public outcry, which in turn can result in changes to legislation and industry practice. This article evaluates three approaches that the dairy industry could use in response to criticism of its farming practices.

The first approach is to ‘close the doors’ and prevent any further information about dairy farming practices to reach the public. This approach may work in the short term, but in the long term is likely to be counterproductive. This secrecy suggests that there is something to hide, and erodes public trust in the industry. The introduction of the so-called ‘ag-gag’ laws, that prevent the publication of undercover videos, actually caused the public to lose trust in farmers and rate farm animal welfare more poorly.

The second approach would be to educate the public about dairy farming practices in a bid to improve acceptance of these practices. This approach is also unlikely to work due in part to the new concerns which emerge when people learn more about common practices, distrust in animal industries, and public awareness of farming practices leading to increased criticism as people learn about practices they were previously unaware of.

The third approach, and that deemed most likely to succeed by the authors, is for the dairy industry to foster sustained engagement between animal industries and the general public. This will require the dairy industry to listen to the concerns of the public, and make changes to accommodate public expectations. Developing solutions to animal welfare issues will also require new research on animal welfare, including on the biological functioning, naturalness and affective state. The industry also needs to develop standards and demonstrate adherence to the standards, as well as developing a vision for what the dairy industry should look like a generation from now and use this as a basis in taking leadership to provide a good life for dairy cows.


Feather-pecking and injurious pecking in organic laying hens

Organic egg farms in Europe aim to provide hens with a higher level of welfare than conventional egg farms. European organic regulations require access to outdoor areas, increased space allowance, and adequate access to litter. Despite these regulations, organic flocks can experience health and welfare problems, and two of the major issues they face are feather-pecking and injurious-pecking. Feather-pecking involves the gripping and pulling-out of feathers, while injurious pecking involves pecking at the bare skin exposed by feather-pecking, resulting in wounds and potentially cannibalism. Feather-pecking is linked with stress and fear, and is thought to be redirected ground pecking caused by insufficient foraging opportunities. This study aimed to identify risk factors associated with feather-pecking and injurious pecking in organic laying hens.

Data were collected at 114 organic layer farms across 8 European countries. Each farm was visited twice, and data were collected on general risk factors relating to the farm, the flock, the husbandry methods used and the management of the range. The proportion of hens using the outdoor areas was measured, and parasitic burden was assessed. The prevalence of feather pecking was assessed by catching a random sample of 50 hens per flock and scoring their plumage condition and wounds. This prevalence was then compared to the risk factors documented for each farm.

Feather damage was present in 33% of brown hen flocks and 72% of white hen flocks. Feather damage in brown flocks was lower when the diet contained a high protein content, and when the hens had daily access to the outdoor range. This is in accordance with previous research. No model could explain feather damage in white flocks. In terms of injurious pecking, wounds were lower when hens had daily access to the range, and wounds were lower in white flocks when fresh litter was provided during the laying period. Interestingly, beak-trimmed flocks had similar rates of feather-damage to non-trimmed flocks. These results suggest that adequate protein content in the feed, daily access to the range and improved litter management may improve hen welfare.

Current use and limitations of poultry welfare assessments

In the United States, animal welfare has become a main driver for consumer demand and policy decision-making in agriculture. In the last year, the egg industry has been impacted by this consumer demand, with over 100 corporate customers pledging to buy only cage-free eggs over the next 5 to 10 years. However, there are many risk factors to hen welfare in cage-free systems. The development of quality assurance programs are often used to address this issue, but the measurements used to assess hen welfare may not be based on rigorous scientific evidence. This article reviews the current state of welfare assessments in North America and outlines how scientific assessment can be improved to allow industry benchmarking and facilitate welfare improvements.

Animal welfare assessment programs essentially use two types of measurements: environmental, which measures features of the environment such as stocking densities, litter quality and feeder space, and animal-based, which measures the health and behaviour of the animals, such as lameness, aggression, fear and stress. Environmental measurements are relatively quick, easy to measure objectively, and have a high repeatability between observers. Since animal-based measurements look at the state of the animal, they are often considered better indicators of welfare. However, they are more time-consuming and subjective to measure, and can lack repeatability.

The Welfare Quality Assessment protocol has been developed as a standardised method of assessing poultry welfare. This protocol includes both animal-based and environmental measurements, and has been widely adopted for use in North America. However, there are limitations to this assessment tool which need to be overcome by proper sampling design, training of observers, and more research on commercial farms to benchmark welfare measures.

The frequency of research on poultry welfare under commercial conditions in North America is still low. This is unfortunate, as commercial-scale research can provide ‘real-world’ assessments of poultry production, and could make use of the vast quantities of data already collected by farming companies, such as health and production data. By increasing the amount of research conducted under commercial conditions, an understanding of ‘normal’ conditions can be benchmarked and thresholds for acceptable practice set. This can pave the way for welfare standards to be implemented into legislation.

Trade-offs between litter size and offspring fitness in three lines of domestic pig

The overproduction of offspring is an ‘insurance policy’ against the high rates of early mortality often seen in piglets, and sows have the capacity to produce more piglets than they can rear. Humans have taken advantage of this capacity for farming purposes, deliberately selecting sows for larger litter sizes.

The selection for increased litter size has led to trade-offs between litter size and piglet fitness, and piglets in larger litters often have lower body weights and slower physical development. This study investigated the effects of litter size on sibling competition in three lines of domestic pig in Norway. Piglet behaviour during nursing was observed for one day after birth, when sibling competition was predicted to be greatest. The piglets were weaned at 35 days of age, when their body weights and cumulative mortality rates were calculated. These variables were then compared to the litter size and breed.

While increasing litter size resulted in more piglets surviving to weaning, piglets from larger litters had higher mortality rates due to crushing and starvation. They also had lower body weights, had less teats available for suckling, showed increased competition for milk, and spent longer massaging the udder (a way of signalling hunger to the sow). Sows with large litters also terminated nursing bouts more often, possibly due to the increased piglet fighting. These results suggest that further selection for increased litter size will be unsustainable in terms of piglet fitness and welfare.


Emotional contagion in pigs after a positive or negative experience

Because feelings and emotions cannot be measured directly, researchers rely instead on associated changes in cognition, physiology and behaviour. Recent evidence suggests that animals may continue to experience an emotion even after the stimulus has ended. In addition, the emotional state of one animal may be experienced by others in the group through a process called emotional contagion (a form of empathy). Animals exposed to a positive or negative experience may affect the welfare of the group by passing their feelings onto others. This study investigated the effects of positive and negative treatments on the emotional state of pigs after the treatment had ended, and how this affected the behaviour of their pen mates.

A total of 96 gilts were housed in groups of 6 at an experimental farm in the Netherlands. Each pen contained two ‘treatment’ pigs and four ‘naïve’ pigs. The treatment pigs were exposed daily to positive and negative treatments. The positive treatment involved four minutes of access to a pen containing foraging material and hidden chocolate raisins. The negative treatment involved four minutes of social isolation and negative handling (restraint, loud noises). The behaviour of all pigs was observed for five minutes after the return of the treatment pigs to the home pen following each treatment session.

The type of treatment clearly influenced the behaviour of the treatment pigs after the treatment had ceased. Following the negative treatment, both the treatment and naïve pigs spent more time lying and less time walking and exploring than they did after the positive treatment, possibly indicating a negative emotional state. The naïve pigs also showed signs of positive emotions following the positive treatment whereas the treatment pigs did not. This was attributed to the naïve pigs enjoying the smell of chocolate raisins on the snouts of the treatment pigs. In conclusion, pigs may experience an emotional response beyond the duration of the event, which can be transferred to others in the group, and may have implications for their welfare.

Environmental risk factors for leg disorders in meat chickens

Footpad dermatitis and lameness are major welfare concerns in meat (broiler) chicken farming. Genetic selection for fast growth is known to be influential on leg disorders. Footpad dermatitis is lesions on the underside of the feet of broiler chickens when they are kept on poor quality litter. This can lead to pain and lameness, and in serious cases may prevent the bird from accessing feed and water. The environmental conditions within the shed can influence both litter quality and thermal comfort, and this study investigated the relationships between environmental risk factors and leg disorders on European broiler farms, to develop an automated prediction system to detect lesions.

Animal welfare assessments had been conducted on 18 flocks using the Welfare Quality protocol. The presence of footpad dermatitis, lameness and litter quality were assessed on four flocks of commercial broiler chickens on four European broiler farms. The quality of the litter was rated, and the environmental conditions within the shed, such as temperature and relative humidity, were continuously measured. These data were compared to the optimal temperature-humidity index for broilers to determine the proportion of time that the birds were outside their thermal comfort zone.

Thermal comfort was an important risk factor, where the time spent outside the thermal comfort zone reduced the quality of the litter and was a high risk factor for the birds to develop severe lesions. As expected, footpad dermatitis also increased with stocking density, as higher densities of birds results in poorer litter quality. The association between automated control of environmental conditions and welfare assessments may enable models to automatically detect thresholds above which lesions are probable, and automation of the assessment procedure could improve the welfare of broilers.

The results of this study show that continuous monitoring of environmental conditions within the shed can be used to determine the risk of the flock developing footpad dermatitis and lameness. This opens the possibility of developing automated detection systems that will alert producers when the risk of developing foot lesions increases above an acceptable threshold.

HUMANE KILLING

Effect of age and gas delivery method on the carbon dioxide euthanasia of pigs

Current guidelines in the USA recommend exposure to carbon dioxide gas (CO₂) as one method of euthanasia for pigs. However, CO₂ forms an acid on contact with the mucous membranes, and causes breathlessness and fear in the animals. Due to the negative welfare implications of CO₂, there is a need to further evaluate the use of this technique. This study investigated the effects of age and CO₂ delivery method on the welfare of young pigs.

In Experiment 1, pigs from five different age classes (1-6 weeks of age, five pigs per age class) were placed into a CO₂ euthanasia chamber containing atmospheric air. CO₂ was introduced at a flow rate of 20% of the chamber volume per minute. The pigs were blood sampled prior to entry and again after death to assess changes in plasma cortisol concentration, and pig behaviour was observed using a video camera. In Experiment 2, five pigs were placed into the CO₂ chamber that had been pre-filled with 100% CO₂. The same physiological and behavioural measures were collected as for Experiment 1.

The behavioural response of the pigs to CO₂ at 20% flow rate was not affected by piglet age, although there was a tendency for younger pigs to show a reduced behavioural response. The pigs exposed to 100% CO₂ showed behavioural signs of stress earlier than the pigs at 20%, but also displayed loss of posture much faster, indicating a more intense behavioural response for a shorter period. The cortisol response to both methods were similar, but a greater proportion of time was spent trying to escape in the pigs exposed to the pre-filled chamber of 100% CO₂. The authors conclude that exposure to the pre-filled 100% CO₂ is likely to cause a similar if not greater degree of stress than the gradual-fill method, and that both methods cause stress.

Exposure to CO₂, regardless of method of induction or age causes an increase in cortisol and behavioural changes that indicate stress. There is a need to evaluate alternative methods of euthanasia, such as the use of alternative gases, or mechanically controlled blunt-force-trauma devices.


Meat from un-stunned cattle sold without appropriate labelling in Italy

A substantial portion of religious slaughter is conducted for the production of halal (Islamic) and kosher (Jewish) products, which require the animal to be conscious, healthy and whole at the time of slaughter. Animals must only be killed by a licensed religious slaughterer using a single cut to the neck (known as dhabiha for halal slaughter and shechita for kosher killing). Some Muslim authorities accept reversible stunning prior to slaughter resulting in an increasing number of animals being unconscious when slaughtered. However, this is not accepted for kosher killing which has stricter requirements for the slaughter technique and carcase inspection for signs of disease. Failure in either the throat-cutting technique or health inspection renders the carcass non-kosher (treif) and it is rejected. A further requirement of kosher meat is removal of the large blood vessels, fat and sciatic nerve from the carcass. Due to the difficulty in achieving this efficiently, this procedure is routinely forgone thereby rendering the hind quarters from these animals ineligible for the kosher market. The rejected hind quarters and carcases are then sold at non-religious retail outlets without labelling specifying that the meat is derived from un-stunned animals. This study aimed to quantify the amount of meat from animals that were slaughtered without stunning that entered the regular trade.

Data was collected from a small slaughterhouse in Tuscany, Italy over a one year period. It was found that none of the 538 cattle slaughtered using dhabiha methods were rejected, whereas 77% of the 118 cattle slaughtered using the shechita method were rejected. These carcases were all rejected on health reasons, with older cattle more likely being rejected.

All rejected carcases were sold at conventional retail outlets without ‘un-stunned’ labelling, which is concerning for consumers seeking to purchase welfare-friendly products. Despite almost half of the consumers in an EU survey stating that the stunning method should be included on the label, this requirement has not been made mandatory due to the likely drop in sales associated with this information, as well as a potential decline in consumer confidence in the meat supply chain.

Assessing animal welfare at the slaughter plant to indicate animal welfare on farm

In this review, the author outlines how slaughter plants provide an opportunity to assess large numbers of farm animals for indicators of poor welfare experienced on-farm or during transport. This has the potential to improve animal welfare on-farm through monitoring and auditing. There are two categories of animal welfare problems that can be assessed at the slaughter plant: acute conditions that occurred during loading or transport, and chronic conditions that were present prior to loading.

Acute conditions that can be assessed at the slaughter plant are the incidence of recent bruising, injuries and animals that are dead-on-arrival (DOA) at the plant, which can indicate poor transport conditions. The number of DOAs can also indicate poor conditions on farm. Chronic conditions that can be assessed include the ease with which the animals are handled, which may indicate fear of humans or the excessive use of beta-agonists to promote growth, and injuries that are indicative of poor housing. Lameness and swollen joints may indicate poor flooring and bedding for indoor-housed cattle, shoulder lesions may indicate poor body condition in sows, and breast, hock and foot lesions are associated with poor litter quality in broilers. Poor coat condition can indicate poorly maintained housing, parasites or behaviour problems. Thin body condition, debilitated health status, lameness, dirtiness and abnormal behaviour are also indicators of poor welfare conditions on farm.

Many of these conditions can be easily assessed using existing assessment tools that categorise the severity of each condition e.g. lameness scoring. If the assessments are to be reliably compared between slaughter plants, it is important that the same assessment tools are used, and assessors are trained to a comparable standard. In conclusion, despite there being some practical limitations, the assessment of welfare indicators at slaughter plants could greatly improve animal welfare. Charging producers per non-ambulatory animal has been shown to decrease their incidence, and showing producers how they rank in comparison to other producers can also change their practices.


RSPCA Humane Education Programme’s impact on young Australians and benefits to social workers

Research has shown that positive relations between humans and animals can benefit the social, emotional and cognitive growth of children. Further, humane education programmes have multiple benefits across different groups of children and young people, and help children to generalise empathy towards animals to humans. However, social work has been slow to incorporate this in Australia. This study highlights the benefits for social workers and the positive impact of a humane education program offered by RSPCA Victoria to young migrants living in Melbourne. A literature review confirmed the importance of empathic relationships in social work and that a lack of empathy can lead to a propensity for violence against humans and animals.

To assess the potential influence of interspecies empathy, letters from newly arrived adolescent migrants who attended the 2014 RSPCA Victoria CARE (Creating Animal Respect and Empathy) Program were reviewed. They had attended four sessions totalling six hours involving supervised interactions with dogs, guinea pigs and rabbits. A total of 11 unsolicited letters from the participants were analysed to identify main themes including attitudinal changes and greater empathy for animals, and the potential role of animals as healers, friends and therapists for children and young people.

The authors concluded that interspecies empathy should be acknowledged and incorporated more into social work because of the important role animals play in people’s lives, as well as the positive impact this may have on human and animal relationships. It was also noted that the well-being of animals used in empathy programs must be safeguarded at all times to ensure good welfare but also to demonstrate that these animals must not be exploited for such purposes.

Animal boredom and suggestions for its scientific investigation

The study of prolonged boredom in humans has shown that this state can be highly distressing, for example during imprisonment, and can be triggered by predictability, monotony and confinement. As the majority of captive and domesticated animals experience a life that is predictable, monotonous and confined, boredom may be a chronic and neglected animal welfare problem. The aim of this UK article is to stimulate biological research into boredom in wild and captive animals by reviewing the current research and characterising the behavioural and physiological manifestations of boredom that may be used to measure this state.

Boredom is defined as “an unpleasant emotion including suboptimal arousal levels and a thwarted motivation to experience almost anything different”. It is also associated with altered time perception (the sense of time dragging), sleep disruption and abnormal behaviour, and in chronic situations can lead to cognitive damage. Boredom is thought to be adaptive in that it motivates animals to explore and learn, allowing them to become more behaviourally flexible and innovative. An example of this may be the development of tool use seen in captive ravens and elephants, but not in wild ravens or elephants. However, when boredom is prolonged and inescapable it is no longer a beneficial emotion for the animal to experience, and is likely to result in animal welfare compromise.

Future research on animal boredom may consider measuring both the emotional state of the animal and other non-emotional qualities such as altered time perception, sleep disruption and abnormal behaviour. Practical indicators of boredom include observations that animals are trying to avoid or offset monotonous situations, or that they are experiencing excessive drowsiness interspersed with bouts of restlessness, indicative of an animal seeking to increase its level of emotional arousal and failing. Training animals to perform tasks that involve estimating time could be used to measure alterations in time perception, and observations of behaviour can be used to measure sleep disruptions and abnormal behaviours. In conclusion, there is a scientific and moral interest in further understanding animal boredom, as it is potentially a severe and highly prevalent animal welfare issue.

Applications of the Five Domains Model to the assessment and management of animal welfare

The Five Domains Model can be used to assess animal welfare by firstly considering the subjective experiences of an animal in terms of four physical/functional Domains: Nutrition, Environment, Health and Behaviour. The first three Domains relate to welfare-significant internal states, such as hunger or pain, which motivate animals to engage in behaviours that are beneficial to survival. These can be considered ‘survival-related factors’. The fourth Domain, Behaviour, relates to welfare-significant external circumstances, which can be considered ‘situation-related factors’. This includes aspects such as being housed in a barren environment, or being socially isolated. The subjective experiences arising from each Domain can be rated and then summed to determine the quality of the fifth Domain, the mental state of the animal. This Domain equates to the welfare status of the animals, and is the sum of the overall affective states experienced by the animal.

The aim of this article was to elaborate on the use of the Five Domains Model, and discuss seven different ways to apply the Model. These applications are 1) to specify key general foci for animal welfare management, 2) to highlight the foundations of specific welfare management objectives, 3) to identify previously unrecognised features of poor and good welfare, 4) to enable monitoring of responses to welfare interventions or maintenance activities, 5) to grade particular features of welfare enhancement or compromise, 6) to conduct prospective and retrospective welfare assessments, and 7) to assist with considering quality of life evaluations. The Five Domains Model can thus provide systematic, structured, comprehensive and coherent assessment of animal welfare. Limitations to the use of the Five Domains Model relate to the accuracy with which the affective states of the animal can be measured or inferred for each Domain.


A veterinary perspective on the connection between animal abuse and interpersonal violence

The link between animal cruelty and criminal behaviour was established in the 1960s, and since then animal protection groups and police agencies have encouraged further research into the link between animal abuse, domestic violence and criminal behaviour. Because veterinarians are most likely to encounter and be able to identify signs of animal abuse, they are well-placed to report cases of suspect animal abuse and possible cases of interpersonal violence. However, the rates of suspected violence reported by veterinarians is very low. This is due to lack of knowledge about this issue, ethical conflicts, fear of consequences, and confidentiality. The article reviewed research investigating the link between animal abuse and interpersonal violence, and outlines the role of veterinarians in identifying and reporting suspected cases of abuse.

This review covered 96 papers published since 1960, of which 94 papers found a relationship between animal abuse and violence against people. Of these, articles reported a link between intimate partner violence against women and abuse of companion animals. Perpetrators of violence may threaten or harm pets as a means of controlling their victims. This review found that between 18-65% of female victims of domestic violence delay moving to a shelter due to concerns for their pet’s welfare, and 35% returned to a violent home out of concern for their pet. Children were at risk of abusing animals if they themselves were victims of abuse, had witnessed animal abuse, or were exposed to parental alcoholism or family dysfunction. The link between animal abuse and criminal behaviour was less clear, but still supported by several studies.

The role that veterinarians play in the prevention and control of non-infectious public health problems, such as violence, has only been considered relatively recently. While many veterinarians are reluctant to become involved, this article states that they have a moral obligation to intervene against interpersonal violence by reporting suspected cases of animal and human abuse. Appropriate training should be given to veterinarians to allow them to be confident in recognising and acting upon suspected cases of abuse.

Measuring distress – What can we learn from stereotypies?

The Journal of Veterinary Behavior has compiled a ‘mini virtual symposium’ on stereotypic behaviour in horses and exotic species. This symposium reviews the most common stereotypies, and in this article the Editor summarises 13 papers presented for horses, exotic species, and other domestic species.

There were 2 papers submitted on horses. The first describes how stereotypic behaviour in horses can impair performance and selling price. The presence of stereotypies should flag that a need is unmet and welfare is potentially compromised. The second paper describes how horses that show the crib-biting stereotypy also show signs of reduced antioxidant capacity, indicating altered neuromolecular mechanisms in these horses. It is estimated that 20-35% of horses perform a stereotypy at some point in their lifetime, thus indicating poor welfare.

There were 3 papers submitted on exotic animals. The first paper reviews how the presence of stereotypies in zoo species can be used to raise welfare concerns for these species. The second paper investigates how zoo keepers rated the behaviour of big cats following the use of enrichment items. The third paper reviews the factors contributing to the stereotypic and self-injurious behaviour in African grey parrots.

There were 8 papers submitted on various aspects of the behaviour of other domestic species that did not involve stereotypies. The most common complaint about dog behaviour by Mexican dog owners was inappropriate reactions to unfamiliar people. Dogs are also being used for a wide range of olfactory detection uses, from air and mail safety, disease detection, and locating endangered wildlife. Cat owners must be trained to recognise signs of stress in their cats, and do not consider stress to be detrimental to cats. Tryptophan supplementation did not alter affective state in pigs, and the rearing environment of pigs alters their subsequent maternal behaviour during farrowing. Improved cognitive performance in meat chickens was associated with increased leptin. And finally, veterinary students feel that they need more training in animal behaviour and behavioural medicine.


Methods for testing the numerical abilities of fish

The ability of animals to discriminate numerical information has a number of benefits for survival, such as choosing the greater quantity of food, or joining the larger group when exposed to a predator. A variety of methods have been developed to test the numerical abilities of birds and mammals, but it is only recently that the numerical ability of fish has been investigated. Many of the tests used on terrestrial vertebrates cannot be applied to fish, but the two main methods that can be employed are spontaneous choice tests, and discrimination learning procedures. This article reviews the strengths and weaknesses of each method.

Spontaneous choice tests involve offering an animal a choice between a large and small quantity, under the assumption that if the animal can discriminate between the two quantities then they will choose the quantity that is most advantageous to them. An example of this is an individual fish in an unfamiliar tank that is given the choice of joining two shoals. It will consistently choose the larger shoal, as existing in a large group is the main anti-predator strategy of fish. Most species that were tested could discriminate between group sizes of 4 and 5, but no higher unless one group was twice as large as the other (e.g. 8 vs 16). The ability to discriminate larger group size can be related to non-numerical information such as the ability to discern a greater amount of movement, a larger surface area, and a greater density, and these factors need to be taken into account when designing a test methodology.

In discrimination learning procedures, fish must learn a numerical rule to receive a reward. This could include discriminating between group sizes using dots on a screen to receive a food reward. This method has demonstrated that mosquitofish can process discrete numerical information. However, it is only after fish have been further assessed using the same methodological approaches as those used for mammals and birds that a firm picture of their numerical abilities can be compared.

Public opinions on cat predation and management in New Zealand

Cats are the most popular pet in New Zealand, with 35-44% of households owning at least one cat. This causes an obvious conflict between the social benefits of cat owning and the devastating effects of cats on native wildlife. New Zealand is home to many native species that have evolved in an environment free of mammalian predators. This makes them particularly susceptible to predation by cats, and estimates of the number of prey animals killed annually are 18-44 million for companion cats and 14-33 million for stray cats. Estimates for feral cats are not available. To address this issue, a National Cat Management strategy has been suggested that could achieve balance between the benefits of cat ownership and their negative impacts on wildlife. This study investigated public opinions toward the cat management options for this strategy, and the demographic variables that influence these opinions.

The public were approached in central shopping areas and asked to participate in a face-to-face interview. This interview consisted of 62 questions divided into 3 sections: cat predation and management, cat ownership, and participant demographics. When discussing different management techniques, cats were categorised into 4 sub-groups: owned cats, managed stray cats, un-managed stray cats, and feral. A total of 1016 complete responses were obtained.

There was strong public agreement (78%) that New Zealand should have a National Cat Strategy. Participants expressed concern about predation, with the greatest level of concern about predation by feral cats and the least concern about predation by companion cats. The authors attribute this to the misguided belief that well-fed companion cats predate less wildlife than other cat types, a belief that is unfounded. Management techniques that received public support were the establishment of cat-exclusion zones, limits to cat ownership, and mandatory de-sexing, microchipping and registration. Trap-neuter-release (TNR) programs were the preferred management option for stray cat populations, and TNR and lethal methods were equally preferred for feral cats. These findings are useful for developing a Cat Management Strategy with targeted education for different demographic groups to improve compliance with cat management techniques in New Zealand.

The invisible harm: land clearing is an animal welfare issue

Land clearing involves the removal of some or all of the native vegetation from an area, and is usually undertaken for creating pasture, cropping, mining, forestry, or settlement. The vegetation is usually cleared using earth-moving equipment or by dragging a chain between two tractors. This article reviews the impact of land clearing on wild animals, specifically in terms of short and long term welfare and mortality rates.

Land clearing has immediate and catastrophic consequences for the welfare of wild animals, including death, traumatic injuries and entrapment for animals living in the vegetation when the vegetation is cleared. Animals present on the ground may be trapped, buried or crushed as vegetation falls or the soil is shifted. Some highly mobile species may be able to escape direct injury from the machinery and falling trees, but may suffer injuries by fleeing into fences or colliding with vehicles. The plant debris left after clearing is often burnt, transported or ground into woodchips, with consequent injuries, burns or death occurring for animals that are sheltering in this debris. The longer term consequences of land clearing on animal welfare involve the animals’ subsequent attempts to survive in the cleared landscape. These challenges can include lack of food and water, presence of injuries and subsequent infection, increased competition for resources, and exposure to weather extremes and predation. This suffering may continue for days or months as the animals attempt to survive in the cleared environment or disperse to a new habitat.

However, few animals are able to successfully establish in a new habitat, and the vast majority of animals will die rapidly after a land clearing event. Based on estimates of current land clearing practices in Australia, the authors estimate that approximately 50 million mammals, birds and reptiles are killed each year in New South Wales and Queensland due to land clearing. Land clearing negatively impacts the welfare of large numbers of wild animals by causing physical injury, psychological distress, pathologies, starvation and pain over prolonged periods. These impacts on welfare should be considered during environmental decision-making processes about land clearing practices.


Koalas do not appear to use canopy rope bridges

Roads create barriers for wildlife movement, and one method of reducing this impact is the installation of wildlife road-crossing structures. One Australian species that may benefit from road-crossing structures is the koala, as koalas are susceptible to traffic fatalities. Koalas will generally descend to the ground and walk to new trees, however they are also able to traverse branches to reach neighbouring trees. This study investigated the use of canopy rope bridges by koalas to trial their potential use as road-crossing structures.

Four different canopy rope bridges were suspended between trees in a forested area that was known to be inhabited by at least 5-6 koalas. The bridges were 8-11m long and consisted of the following designs: a flat rope ladder, a flat woven rope-mesh, a rope ‘sausage’, and a 3-sided rope bridge. Video cameras were placed at the ends of each bridge and on two nearby trees that acted as references for koala activity in the area. Video monitoring of the rope bridges and reference trees was conducted for 2.5 years.

Koalas were not seen on any of the rope bridges at any point during the 2.5 year study period. In comparison, koalas were seen approximately monthly in the nearby reference trees, confirming that they were active in the immediate area. Potential reasons for the lack of use of the rope bridges include unsuitable feeding trees at either end, difficulty accessing the rope bridges, inappropriate height of the bridges, or a lack of motivation to use the bridge. Animals exposed to road barriers may be more highly motivated to cross rope bridges to obtain resources that are unavailable on one side of the road. The koalas observed in this study were not subject to such pressures, and may have preferred to simply walk between trees. The authors conclude that rope bridges are unsuited to the behaviour and ecology of the koala, and that underpasses or overpasses that facilitate walking may be more appropriate as road-crossing structures for this species.

RSPCA Animal Welfare Seminar – 22 February 2018
Ensuring a humane death for farm animals
Alastair Swayn Theatre, 33-35 Brindabella Circuit, Canberra Airport

Recent advances in humane killing and slaughter have significant implications for farm animal welfare. The first event of its kind in the Southern Hemisphere, this one-day seminar will outline innovations and research in the field. Good farm animal welfare means giving animals a humane death, as well as a life worth living.

Seminar themes will include:

- New methods of stunning for slaughter
- Assessment of insensibility
- Use of technology to audit, monitor, enforce animal welfare at abattoirs
- Innovations in killing unwanted animals
- End-of-life decision making for on-farm euthanasia
- Depopulation and emergency killing

FOR SEMINAR INFORMATION PLEASE VISIT
ARTICLES OF INTEREST

ANIMALS USED FOR SPORT, ENTERTAINMENT, RECREATION AND WORK


COMPANION ANIMALS


FARM ANIMALS

Aquaculture


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General


HUMANE KILLING


MISCELLANEOUS


WILD ANIMALS


