



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.

ANIMALS USED FOR SPORT, ENTERTAINMENT, RECREATION AND WORK

Welfare of captive dolphins housed in open and closed facilities

Bottlenosed dolphins are kept for purposes of entertainment and assisted therapy in many countries around the world. Although there is little information on the welfare of marine mammals in captivity, it is known that these animals are required to adapt to changes in their physical and social environment as a result of the design of these enclosures when maintained in captivity. This study used the technique of salivary sampling of cortisol, together with behavioural observation to examine the welfare of dolphins housed in closed facilities (where the dolphin is housed in a pool filled with treated water with no access to the sea) and open facilities (where the dolphin was contained within a fence and so lived in seawater and had access to the sea).

The study showed that dolphins kept in open facilities were more active than those housed in closed ones, and dolphins in the closed pools showed higher cortisol concentrations, indicating higher stress levels. It was also found that dolphins housed in closed pools spent more time swimming in a continuous circular pattern, whereas the dolphins in open pools spent more time swimming in a linear pattern, suggesting that the smaller closed pools influenced dolphins to swim in this circular manner. The dolphins in closed pools also showed lower levels of activity, again suggesting that this may be influenced by the quality of space and how the dolphin perceives it.



The study suggests that dolphins housed in open facilities, which will be exposed to more diverse stimuli in the space available and have more space to be able to swim linearly, experience better welfare than those in closed facilities. The authors suggest further research, including other welfare indicators such as social interactions and health measurements, is necessary.

Ugaz C, Valdez RA, Romano M *et al* (2013) Behavior and salivary cortisol of captive dolphins (*Tursiops truncatus*) kept in open and closed facilities. *Journal of Veterinary Behavior* 8:285–290.

Attitudes towards catch-and-release recreational fishing in New Zealand

Recreational angling (fishing) is a pastime practised around the world. Catch-and-release angling (CRA) is a form of angling where fish are released, either voluntarily, or due to regulatory constraints related to fish population numbers. With the assumption that most of the released fish will survive, CRA is thought to have limited effects on fish stocks and is argued to represent a sustainable method by which recreational fishing can be continued.

In recent years however, research in the area of pain in fish has grown, with the dominant viewpoint among the scientific community supporting the idea that fish are capable of experiencing pain, though there continues to be some debate on the topic. As a result of pain evidence, there is growing concern as to what

effects catch-and-release has on the fish and the ethics of performing this type of fishing. The general attitudes of the public towards fishing practices has been examined in the Northern hemisphere, but this study is the first of its type to examine the attitudes of the New Zealand public to fishing practices and their potential effects on the welfare of fish.

700 surveys were distributed to members of the general public across New Zealand asking respondents to indicate their feelings and perceptions on catch-and-release fishing and pain and survival in fish. It was found that, although perceptions varied widely, most respondents believed that fish had the capacity to feel pain. Younger respondents were more likely than older respondents to believe this was true, and

female respondents were more likely to show concern for fishing practices and their impact on fish than were male respondents. Respondents who participated in catch-and-release fishing showed less concern for pain and survival in fish than those who considered this pastime unacceptable. The majority of respondents (76.4%) felt anglers should have to follow welfare guidelines and regulations when angling.

The authors suggest that education about good angling practices may provide the best route by which fish welfare can be improved. The authors also suggest that based on the survey results, the general public of New Zealand may support the future development of

welfare regulations to ensure the welfare of fish during catch-and-release fishing.

Muir R, Keown AJ, Adams NJ *et al* (2013) Attitudes towards catch-and-release recreational angling, angling practices and perceptions of pain and welfare in fish in New Zealand. *Animal Welfare* 22:323–329.

New directions for zoo animal welfare science

Over recent years there has been growing public concern about the welfare of animals and the ethical implications of their use by society. One of the areas in which there remains a large amount of ethical debate is the keeping of animals in zoos and aquaria. In response to the growing societal concern, the World Association of Zoos and Aquariums has taken steps to encourage its members to adopt procedures that exceed the minimum legal standards and strive for the best welfare possible for their zoo animals.

This paper examines some of the approaches that have been taken to improve the welfare of animals housed in this way. The authors discuss evolving concepts that are being put in place in zoos and aquaria to improve animal welfare such as moving to animal-based assessments that focus on the needs of the individual animal and its specific requirements, consideration of positive affective states and the use of keeper knowledge to gain insight into the behaviour and welfare of the animals in their care. The implementation of a multifactorial approach to monitor animal welfare using both behavioural and physiological measurements, integrated together with other disciplines such as ecology, veterinary medicine and welfare epidemiology is discussed. New technology such as the development of new tools that will enable keepers to input data to monitor the well-being of the animals in their care over time is also explored and future directions described.



The paper discusses two strategies to facilitate the occurrence of positive affective states: 1) provide animals with stimulating opportunities to overcome challenges, make choices, and have some level of control over their environments, and 2) promote appropriate and beneficial keeper-animal relationships.

Whitham JC, Wielebnowski N (2013) New directions for zoo welfare science. *Applied Animal Behaviour Science* 147:247–260.

COMPANION ANIMALS

Dog breed predispositions to mast cell tumour in the United Kingdom

Mast cell tumours are common tumours in dogs and represent up to 20% of all skin tumours found in canines. Genetic factors play a major role in cancer formation. Breed predispositions have been reported for many different canine cancers including mast cell tumour development.

This study examined the oncology database of a veterinary teaching hospital and compared it with control populations. The incidence of mast cell tumours in each dog breed was compared in breeds exhibiting more than five mast cell tumours and for the ten most frequently seen breeds at the hospital. This enabled the researchers to assess if any particular breeds were more likely to develop this form of skin cancer.

It was found that Boxers, Labradors, Golden Retrievers and Staffordshire Bull Terriers were most likely to develop this disease. The English Cocker Spaniel, German Shepherd Dog, West Highland White Terrier and Cavalier King Charles Spaniel were all underrepresented, indicating that these breeds may be less likely to develop these skin tumours. The authors do note that this research was performed from a single referral population and so may not be representative of other countries or regions in the United Kingdom if the dog populations are genetically distinct.

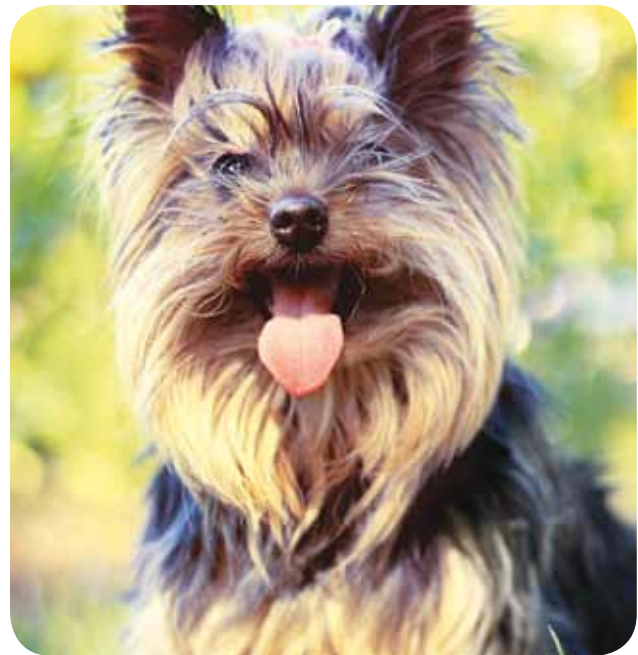
Warland J, Dobson J (2013) Breed predispositions in canine mast cell tumour: A single centre experience in the United Kingdom. *The Veterinary Journal* 197:496–498.

Personality match and pet satisfaction in dog owners

Dogs are the most commonly owned pet in the United States and 37% of households own a dog, most frequently for companionship. However, a large number of dogs are relinquished to animal shelters each year. There is therefore a need to reduce the number of dogs being relinquished to shelters and it was considered that this may be achieved by understanding the factors related to owner satisfaction with their pet.

This study examined the relationship between dog and owner personality and assessed if owners who select pets that are similar in personality to themselves may be less likely to relinquish their pets. 88 pairs of dogs and owners were examined. The first phase of the study used 20 books on dog training to identify those traits used to describe dogs and their behaviours. The second phase of the study used a structured interview to examine relationships in traits between dogs and owners. From this process, 45 traits were identified which were assigned to separate categories such as outgoing/shy, noisy/quiet, calm/anxious, playful/sluggish, affectionate/non-affectionate, creative-curious/not creative-not curious and dependent/independent.

The results of this study showed that the owner's satisfaction with their dogs is related to the extent to which owners and their dogs share certain traits.



People and dogs with an active lifestyle were found to complement each other and creative people appreciated the unique play activities that their dogs engaged in. The study suggests that a reduction in the number of dogs relinquished to shelters each year may be achieved by matching dog and owner traits to increase owner satisfaction.

Curb LA, Abramson CI, Grice JW *et al* (2013) The relationship between personality match and pet satisfaction among dog owners. *Anthrozoös* 26(3):395–404.

Intoxication of animals by plants

Plants are responsible for many poisoning cases of companion animals and ruminants and is common in Europe with plants being the second most common class of toxicants for these animals after pesticides. A wealth of information is currently available in relation to poisoning cases in humans and animals, although difficulties have been encountered in harmonising the data with the different databases providing different information. This paper presents information about those plants that are responsible for most cases of poisoning of animals in European countries, cases that have been reported and clinical symptoms that have been noted when animals have been poisoned.

It was found that livestock and horses are commonly poisoned in Europe by Jimson weed (*Datura stramonium*), ragworts and groundsels (*Senecio spp.*), oak (*Quercus spp.*), European yew (*Taxus baccata*), oleander (*Nerium oleander*), bracken fern (*Pteridium aquilinum*), black locust (*Robinia pseudoacacia*) and rhododendrons and azaleas (*Rhododendron spp.*). Poisoning of livestock by these plants may occur when livestock eat the fresh plant at pasture, but they can also cause harm when ingested if the plant becomes mistakenly integrated into hay or silage, causing contamination. Companion animals are at a greater risk of being poisoned as a result of eating house or



garden plants, such as sago palm (*Cycas revoluta*), castor bean (*Ricinus communis*), onions and garlic (*Allium spp.*), poinsettia (*Euphorbia pulcherrima*), lilies (*Lilium spp.*), firethorn (*Pyracantha spp.*), rhododendrons and azaleas (*Rhododendron spp.*), Chinaberry tree (*Melia azedarach*), European yew (*Taxus baccata*) and oleander (*Nerium oleander*).

The authors suggest that the development of a European database for the collection of all plant-related cases would help to support veterinarians and others in managing animals poisoned by plants.

Cortinovis C, Caloni F (2013) Epidemiology of intoxication of domestic animals by plants in Europe. *The Veterinary Journal* 197:163–168.

Using community partnering to improve live release rate in animal shelters

For almost the last 50 years, problems related to overpopulation have existed with companion animals and a variety of different techniques have been used in attempting to control the problem. The key indicators that intervention strategies have been successful are that both intakes of animals into shelters and the rates of euthanasia decrease. The root problems of overpopulation have been found to differ between communities with different intervention strategies having variable effects, dependent on the root cause of the problem. To enable efficient strategies to be applied to different communities in order to improve live release rate in animal shelters, the collection and analysis of accurate data is essential. To date, data collected in relation to this issue has been scattered and incomplete due to a number of factors such as limited resources, poor record keeping and lack of uniformity in record keeping across shelters.

A project was initiated in 2004 to attempt to develop a system that would enable efficient data collection across shelters in relation to live release rate of dogs, cats, puppies and kittens in the United States. Each partner community that was involved in the project submitted data into an online tool on a monthly basis, and, in response to the data collected, was encouraged to initiate intervention programmes that were best suited to the needs of the community, as identified from shelter statistics and shelter resources.

The project was successful in that the live release rate for all animals was improved for all shelters involved in the project, despite their geographical location, size of the shelter or number or mix of dogs, cats, puppies and kittens. This suggests that the collection of accurate data and application of appropriate intervention strategies are likely to have a broad application in improving live release rate from animal shelters.

Weiss E, Patronek G, Slater M *et al* (2013) Community partnering as a tool for improving live release rate in animal shelters in the United States. *Journal of Applied Animal Welfare Science* 16:221–238.

Sea hare toxicosis in dogs in Western Australia

Veterinarians along the coast of Western Australia have noted that dogs that have come into direct contact with the sea hare, *Aplysia gigantean* (by licking, rolling on or ingesting) can develop signs of nervous system toxicity, which in some cases has been fatal. Hundreds of dead sea hares, a type of marine sea slug, periodically wash up on the beach in this area. Dogs that have come into contact with the dead sea hares have been noted to develop neuroexcitatory clinical signs shortly after exposure with most dogs in this study presenting in the months of January to April.

This study set out to confirm the association between the exposure of dogs to sea hares and the development of neuroexcitatory signs and to further describe the clinical signs, treatment and outcome of the dogs that have been exposed. Medical records from four veterinary practices within the same region as the cases that had been observed were accessed and cases sought using a number of relevant keywords. 72 cases were found to meet the inclusion criteria. Further examination of the veterinary records for these cases concluded that



there is an association between exposure to these sea hares and neuroexcitatory signs (e.g. tremors, lack of coordination) in dogs and, in addition, some dogs also showed gastrointestinal (e.g. vomiting) and respiratory (abnormally rapid breathing) symptoms.

The veterinary treatments that were used are discussed in the paper and it was found that 10% of the dogs that had been exposed to these sea hares died or were euthanased as a result of worsening clinical symptoms.

Peacock RE, Hosgood G, Swindells KL *et al* (2013) *Aplysia gigantea* toxicosis in 72 dogs in Western Australia. *Australian Veterinary Journal* **91**(7):292–295.

Comparing behavioural, cognitive and physiological indicators of welfare in short and long-term kennelled dogs

A large number of dogs are housed in dog kennels for a proportion of their lives. Rehoming centres work to provide these dogs with a new owner with the ultimate aim of improving long-term dog welfare, but some dogs can spend months or years in this environment before finding their new home. The experience of being housed in kennels can be stressful for dogs as a result of factors such as the restricted environment, the noise and unsuccessful attempts to establish contact with other dogs or people.

This study examined the amount of stress that 28 dogs that had been housed in the shelter for a short time (more than one week, but less than 3 months) experienced when compared to 28 dogs that had been housed in the same environment long term (more than 6 months) using a cognitive bias test, as well as measurements of urinary cortisol, behavioural observation and staff assessment. It was found that, conversely to the author's expectations that dogs housed long term would experience a lower level of welfare, there was no difference between dogs that were kennelled for short and long-term periods. The authors discuss these findings and offer reasons why this may be the case. There were some behavioural differences noted between the two groups however, as identified by shelter staff, as dogs which had been housed for more than 6 months were less likely to play with unfamiliar people, were more likely to bark or growl at other dogs and play with objects when with dogs. The authors suggest that these may be reasons for failure of dogs to be homed, rather than consequences of long-term kennelling.

Overall, this study suggested large individual variation in measures of welfare and behaviour, but few differences between dogs housed for more than 6 months as compared to those housed for shorter periods. This may suggest that the welfare of dogs is influenced more by specific aspects of their individual kennel experience rather than the overall time spent in a kennel environment and the authors suggest further research to examine this in more detail.

Titulaer M, Blackwell EJ, Mendl M *et al* (2013) Cross sectional study comparing behavioural, cognitive and physiological indicators of welfare between short and long-term kennelled domestic dogs. *Applied Animal Behaviour Science* **147**:149–158.

A web resource on DNA tests for canine and feline hereditary diseases

Dogs, followed by cats, have the largest number of hereditary disorders and genetic predispositions to disease after humans. As many of these disorders are recessively inherited, they are easily passed from parents to offspring and so represent a serious health problem for companion animals. Some progress has been made in recent years to analyse the molecular make-up of these hereditary diseases as, if we know the structure, it offers the opportunity to understand the disease, help to screen animals at risk and identify those that are carrying genetic disorders so that they are not used for breeding in future.

To increase access of information between institutions and laboratories that are interested in hereditary disease in cats and dogs, and to enable public access to this information, a web application has been developed by the World Small Animal Veterinary Association. This resource contains comprehensive information about current hereditary diseases in companion animals, available DNA tests, and supporting information including gene and chromosome locations, mutations and research citations and allows users to search the database to obtain the information that they require. Users can search for specific diseases, species (dog or cat) and the breed that they are interested in. Specific mutations for diseases can also be selected for in the search if multiple mutations exist.

This web-based application will be kept up-to-date with current information and so will prove a valuable resource for veterinarians, researchers and owners and breeders who have animals that are affected or those at risk from passing on hereditary diseases. It is hoped that this resource will help to prevent the increase of hereditary disorders that are likely to cause welfare problems in cats and dogs in future generations.

Slutsky J, Raj K, Yuhnke S *et al* (2013) A web resource on DNA tests for canine and feline hereditary diseases. *The Veterinary Journal* **197**:182–187.

FARM ANIMALS

Egg production and societal demands in The Netherlands

The Netherlands is a major exporter of eggs, predominantly to neighbouring countries. The poultry industry in this country originally evolved at a time when the emphasis was on production efficiency, with any associated risks or effects to the environment, or on society, largely neglected. This paper describes a move in The Netherlands to introduce a sustainable laying hen system into this country which balanced production and societal demands. This project, which was developed originally in response to the anticipated ban on conventional cages in the European Union in 2012, was called 'Keeping and loving hens'.

The project aimed to develop a laying hen system with sufficient space and conditions that would provide a happy life for hens, including access to a range and maintaining a positive societal image whilst being resilient to market disturbances and animal diseases. A novel system, developed in close collaboration with stakeholders, was entitled the 'Roundel' and was designed to meet the needs of the farmer, the animal and society. It was found that this system compares favourably with other alternative systems in terms of animal welfare, and offers environmental

variation for the hens, with no requirement for beak trimming.

Although tensions remain regarding other aspects of the Roundel system including the impact on the environment and the willingness of the consumer to pay extra for eggs produced using this type of system, it has become an alternative egg production system in The Netherlands.

This project has been successful in realigning the key players in the layer hen industries including farmers, retailers, animal welfare organisations and government, which in the future can act together to maintain momentum in developing efficient and welfare friendly egg production systems.

Spoelstra SF, Groot Koerkamp PWG, Bos AP *et al* (2013) Innovation for sustainable egg production: realigning production with societal demands in The Netherlands. *World's Poultry Science Journal* **69**:279–298.



General principles for the welfare of animals in production systems

In 2012, the World Organisation for Animal Health (the OIE) adopted ten principles for the welfare of animals in livestock production systems which are based on half a century of scientific research relevant to animal welfare. Although early research focused on animal behaviour and stress physiology, recently the relevance of many other fields such as veterinary epidemiology, comparative psychology, nutrition, microbiology and others have been integrated to provide a more complex but balanced view of animal welfare in production systems.

This paper provides a comprehensive review of ten different aspects of the welfare of animals in production systems and discusses 1) how genetic selection affects animal health, behaviour and temperament; 2) how the environment influences injury, and transmission of disease and parasites; 3) how the environment affects the performance of natural behaviour; 4) management of animal groups to minimise stress and conflict; 5) the effects of air quality, temperature and humidity on animal health; 6) the provision of food and water for the animal's needs; 7) prevention and control of disease and performance of humane euthanasia; 8) prevention and management of pain; 9) formation of positive human-animal relationships and 10) ensuring handlers have adequate skills and knowledge to maintain animal health and welfare.

It is now recognised that the formation of animal welfare standards is strongly influenced by many factors and has many different political, scientific and ethical aspects. This paper outlines the need to use an integrative approach with the view that good animal welfare requires a complex balance between genetics, housing, handling and other elements of animal husbandry.

Fraser D, Duncan IJH, Edwards SA *et al* (in press) General principles for the welfare of animals in production systems: The underlying science and its application. *The Veterinary Journal*.

Identifying the underlying principles of feather pecking in hens

With the ban on conventional cages in the European Union in 2012 and the expected future ban on beak trimming in many European countries, feather pecking in commercial laying hens remains an important welfare issue. In large group-housing systems, such as furnished cages, but in particular, barn, free range and other non-cage systems, it is much more difficult to control than in conventional cages. Feather pecking exists in two forms, gentle feather pecking, which consists of hens performing gentle pecks to the tips of the feathers of another hen which does not cause the recipient to move away, and severe feather pecking which can cause the recipient loss of feathers, tissue damage and in severe cases, death, resulting from blood loss and tissue damage. It is also socially transmissible within flocks of hens, making it a significant welfare problem.

This paper examines the underlying causes of both gentle and severe feather pecking and focuses on those factors that may influence the development and continuation of severe feather pecking due to its potential effects on the welfare of the hens. Literature is reviewed in relation to the role of the floor litter, feeding and foraging behaviour of the hens, dietary influences, stress and the role of maternal hormones and individual genetic predisposition to developing this welfare problem.

The paper shows that there are a number of factors that influence feather pecking and that managerial strategies to prevent or reduce feather pecking in commercial flocks should take a multifactorial approach in controlling this problem. Stimulating feeding and foraging behaviour and controlling fear and stress levels appear to offer the best prevention strategy.

Rodenburg TB, Van Krimpen MM, De Jong IC (2013) The prevention and control of feather pecking in laying hens: identifying the underlying principles. *World's Poultry Science Journal* **69**:361–372.



Pathological observations in dead-on-arrival broilers

Broiler welfare is an area of increasing public concern. The new European Union broiler directive requires an increase in abattoir surveillance to assess the number of broilers that are dead on arrival at the facilities. In Denmark, 300,000 broilers die each year between the start of harvesting and shackling at the abattoir. The percentage of broiler chickens arriving in this way has been recognised to provide an indication of bird welfare and is also of economic importance as studies have shown that most of these animals arriving dead would have been fit for human consumption. Research to date has focused on risk factors associated with increased mortality, but the pathology of dead on arrival broilers has been less intensively studied. This paper examined the pathological lesions of 300 broilers (from 12 different flocks of hens) that arrived dead at a Danish abattoir and examined the pre-slaughter handling procedures to which these broilers were subjected to beforehand.

Mortality in the flocks arriving at the abattoir was 0.3%. It was found that the major pathological observations in these broiler chickens were severe pulmonary congestion (51.5%), lung congestion in combination with trauma (12.5%), trauma (10.2%), neuropathy accompanied by dehydration and/or discolouration (8.8%), morbus cordis (heart disease) (2.0%), septicaemia (1.7%) and suspected septicaemia (1%).



The pathological observations of dead on arrival broilers were divided into two main categories, lung congestion (a condition generally associated with smothering or suffocation) and trauma, and most broilers examined (74.2%) were thought to have died as a result of events during pre-slaughter handling and transport. This suggests that improvements could be made during pre-slaughter handling and aspects such as stocking density and thermal overload during transport in relation to suffocation and traumatic injuries should be examined in more detail to improve welfare in broiler chickens.

Lund VP, Kyvsgaard NC, Christensen JP *et al* (2013) Pathological manifestations observed in dead-on-arrival broilers at a Danish abattoir. *British Poultry Science* 54(4):430–440.

Effects of the climate on sheltering behaviour in pastoral beef cattle

The effects that the environment has on animals reared in non-sheltered outdoor conditions can be significant and animals living not only in hot climates, but also temperate climates, can be subjected to periods of heat stress which may affect their welfare. One of the strategies that animals use to cool their body temperature is to seek shade. As the reaction of an animal to seek shelter is often its first behavioural response to adapt to a warm environment, it does not necessarily indicate that the animal is experiencing stress or discomfort; the animal simply wishes to reduce the heat it is being subjected to.

This study investigated how a temperate climate can affect the behaviour of cattle and examined the effect of temperature, relative humidity, solar radiation and wind speed on shade use by 255 cattle kept on 28 different pastures in Belgium. Cattle were found to increase their use of shaded areas as the environmental temperature increased, and relative humidity was found to have the same behavioural effect. Solar radiation also increased shade use by cattle, but wind speed was found to reduce the need for shade. Below a temperature of 25°C, 16% of animals on a pasture were observed in a shaded area and this percentage rose to 23% when the temperature was above 25°C.

Variability was found in shade use between the different pastures and cattle made more use of shade when a greater percentage of the surface area of a pasture was shaded. Providing shelter on pastures can therefore help to protect cattle against thermal discomfort, even in a temperate region.

Rosselle L, Permentier L, Verbeke G *et al* (2013) Interactions between climatological variables and sheltering behaviour of pastoral beef cattle during sunny weather in a temperate climate. *Journal of Animal Science* 91:943–949.

The use of management packages to reduce injurious pecking in laying hen flocks

Injurious pecking is a welfare concern in laying hen flocks and is associated with feather loss, injury and mortality and so also has economic consequences. It is a significant welfare problem in non-cage systems due to the number and accessibility of hens and, at the present time, is commonly controlled by beak trimming. However, beak trimming causes pain and the Farm Animal Welfare Council has recommended a ban on beak trimming in the United Kingdom as soon as possible. There is therefore a need to identify other means of controlling injurious pecking on farms. This study aimed to assess the effectiveness of using a range of management strategies to prevent, reduce or delay the onset of injurious pecking.

334 publications were reviewed to identify a list of risk factors that could potentially be manipulated and implemented in commercial non-cage systems. They were then assessed for effectiveness together with their potential to be used in this study and the factors that were thought to be most effective on farm were developed into farm-specific management packages to control injurious pecking. The on-farm strategies covered rearing and transfer to the laying farm; litter quality and use; diet; range quality and use; perching and other environmental enrichment; and flock health. The management packages were applied to treatment flocks, which were compared with controlled flocks (on which no management package was applied).

It was found that the implementation of the management package reduced injurious pecking in commercial flocks of laying hens, and it was found that the more management strategies were employed, the more the beneficial effects on injurious pecking were obtained and levels of plumage damage, gentle and severe feather pecking, mortality and vent pecking reduced. Reduction in injurious pecking is beneficial for bird welfare but also for productivity and economic gain and this study has important implications for the egg industry.

Lambton SL, Nicol CJ, Friel M *et al* (2013) A bespoke management package can reduce levels of injurious pecking in loose-housed laying hen flocks. *Veterinary Record* 172(16):423.



Advice on practical strategies to reduce the risk of injurious pecking www.featherwel.org

The effect of castration and dehorning on the behaviour of Holstein calves

Cattle are routinely castrated to make them easier to handle and to prevent unwanted breeding, and dehorned to reduce the risk of them causing injury to other animals and to handlers. However, these procedures are known to result in cattle displaying both physiological and behavioural indicators of pain and distress. The administration of local anaesthetic and a nonsteroidal anti-inflammatory drug prior to performing both castration and dehorning separately has been shown to reduce these indicators of pain and distress. However, common management practices mean that cattle are usually subjected to both castration and dehorning at the same time. This study therefore aimed to examine the impact of performing both castration and dehorning on calves and whether the application of pain relief would reduce indicators of pain.

Calves of 3 months of age were subjected to either castration or dehorning or both procedures together with pain relief, and the same procedures without pain

relief, under controlled conditions. Castrated calves were seen to spend more time tail wagging and less time eating than controls, and dehorned calves spent more time head shaking, ear flicking, tail wagging and less time grooming and eating. Those calves which were subjected to both procedures displayed all behaviours, suggesting that the behavioural response to castration and dehorning is specific to the procedure performed and the performance of both procedures together exacerbated the symptoms.

Pain relief, in the form of local anaesthetic and a nonsteroidal anti-inflammatory drug reduced the indicators of pain, and so administration of pain relief is recommended when performing castration and dehorning procedures in young cattle.

Sutherland MA, Ballou MA, Davis BL *et al* (2013) Effect of castration and dehorning singularly or combined on the behaviour and physiology of Holstein calves. *Journal of Animal Science* 91:935–942.

RESEARCH ANIMALS

Use of statistical power to uphold welfare during animal experimentation

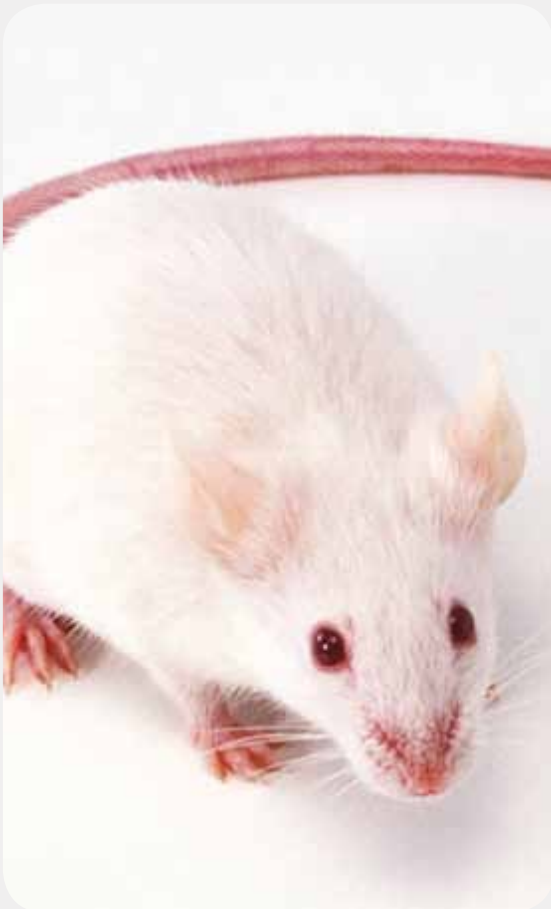
The concept of statistical power in animal experimentation is important to ensure that research is ethically viable. The power of a statistical test is a measure of how good a test is at detecting an effect or a relationship in the data. If a researcher designs a study with too little power they are unlikely to detect any pattern in the data even if there is one. The particular relevance to animal welfare researchers in this instance is that the animals involved in such a study will be subjected to observations or procedures that could impact their welfare negatively, although the findings have little chance of leading to improved animal welfare other than potentially through meta-analyses. Conversely, a study with very high power may lead to a waste of resources and, with regard to ethical considerations, may have an unnecessarily high impact on the welfare of the study species. The particular relevance to animal welfare researchers in this instance is that fewer animal subjects could have been used while still maintaining the statistical effectiveness of the study and its potential to lead to improvements in animal welfare.

This paper examined 45 papers published in *Animal Welfare* journal to assess if they followed the guidelines as stated in the instructions for authors of this journal and had provided sufficient information with regard to statistical detail and interpretation of results. It was found that

instructions for authors were generally, but not universally, followed. This paper discusses the potential effects of not following all instructions on the welfare of the animals used and the concept of performing experimentation to meet the 'reduction' principle of the 3Rs, where the number of animals used in experimentation procedures is minimised.

The authors make suggestions for improving the reporting of statistical procedures including more reporting of a priori power analyses, more comprehensive reporting of the results of statistical analysis and the explicit consideration of possible statistical power issues when interpreting P-values. They also advocate the calculation of effect sizes and their confidence intervals and a greater emphasis on the interpretation of the biological significance of results rather than just their statistical significance. This will enhance efforts to comply with the 3Rs, particularly the principle of reduction.

Hawkins D, Gallacher E, Gammell M (2013) Statistical power, effect size and animal welfare: recommendations for good practice. *Animal Welfare* 22:339–344.



WILD ANIMALS

Attitudes towards the control of non-native wild and feral animals

Lethal control is used extensively in New Zealand to control non-native mammals considered to be pests in New Zealand. Lethal methods involve trapping, poisoning, introduction of disease and shooting, although non-lethal methods are also available. Public awareness is growing about the control of non-native mammals and the impact that control methods have on their welfare. It has been shown that attitudes towards the control of non-native mammal species vary depending on a range of factors, which increasingly involve animal welfare.

The authors of this paper used a survey to examine how attitudes towards different control options for target and non-target species vary between interest groups and examined the attitudes of 1) the general public, 2) animal welfare protectionists and 3) conservationists, towards the control of eight different target and non-target species. It was found that conservationists scored the eight animals more severely as pests than did the other two groups, but there was a general agreement across groups that rats, possums, stoats and rabbits were considered the most severe pests. Conservationists were 5.7 times more likely to prefer lethal control methods than protectionists, and 2.6 times more likely to prefer lethal control methods than the general public. It was also found that the importance of animal welfare in relation to the control method declined the more severely the animal was rated as a pest.

The authors state that as public concern for the welfare of animals continues to grow, it becomes increasingly important to develop and utilise



control methods that take into account the public's considerations with regard to welfare and the humane treatment of all species, including those animals considered to be pests.

Farnworth MJ, Watson H, Adams NJ (in press) Understanding attitudes toward the control of nonnative wild and feral mammals: similarities and differences in the opinions of the general public, animal protectionists, and conservationists in New Zealand (Aotearoa). *Journal of Applied Animal Welfare Science* doi: 10.1080/10888705.2013.799414.

The effects of life history, island biogeography and mesopredator suppression on island mammal extinction

Islands play a critical role in conservation as they host many endemic species and can serve as the last refuge for populations of species that are otherwise extinct. The most important influence on species extinction on islands is introduced predators as these can cause the decline of mammals, birds and amphibians. Understanding the role of introduced predators in driving extinction patterns is therefore important in conservation of global island biodiversity. Recently it has been suggested that the pattern may not be as simple as was previously considered. Top predators on islands can affect the lower predators (mesopredators), suppressing their populations, and conversely, a reduction in these top predators can allow the mesopredator populations to flourish, thereby increasing predation pressure on prey populations. This is known as mesopredator release. Extinction patterns on islands can also be influenced by life-history traits and by island geography.

This study aimed to explore how these different aspects impact on mammal extinctions on islands. A database was developed which contained information about 934 island mammal populations on 323 Australian islands. A range of statistical tests were applied to determine interactions between small (black rat), medium sized (red fox and domestic cat) and large predators (dingos and feral domestic dogs) on the island.



It was found that, although introduced predators are an important driver of island mammal extinctions, the effects of introduced species act together with prey biology and geographic factors to determine the probability of extinction and mesopredator release can have severe effects on island mammal populations.

The study also showed that large mammals have a higher chance of becoming extinct than smaller species. As black rats are a major threat to native mammals, the eradication of cats, foxes or dingos (known as apex predators) from the islands could lead to an increase in the population of black rats, resulting in a decrease of island mammal diversity and even the extinction of some species.

Hanna E, Cardillo M (in press) Island mammal extinctions are determined by interactive effects of life history, island biogeography and mesopredator suppression. *Global Ecology and Biogeography* doi: 10.1111/geb.12103.

2014 Scientific Seminar Public Lecture Tour

In 2014 RSPCA Australia is adapting its usual Scientific Seminar format to host a series of public lectures and mini-symposia on the future of non-animal models in biomedical research and toxicology. We are very excited to announce that the 2014 series will be presented by Professor Thomas Hartung, current Director of the Center for Alternatives to Animal Testing (CAAT) and former Director of the European Centre for the Validation of Alternative Methods (ECVAM). Professor Hartung has devoted his career to promoting a paradigm shift in toxicity testing to drive the uptake of non-animal methods.

The provisional itinerary for this public lecture and symposium tour is:

- **10 Feb 2014** – Sydney – evening Public Lecture
- **12 Feb 2014** – Canberra - afternoon Seminar and Public Lecture
- **17 Feb 2014** – Melbourne - evening Public Lecture
- **18 Feb 2014** – Perth - afternoon Seminar and Public Lecture
- **20 Feb 2014** – Adelaide -afternoon Public Lecture

More details including venues and exact times will be available soon.

ARTICLES OF INTEREST

ANIMALS USED FOR SPORT, ENTERTAINMENT, RECREATION AND WORK

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