

animal welfare science update

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.

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companion animals

Canine aggression towards familiar people

When a pet dog attacks its owner, it is common practice to explain such behaviour in terms of 'dominance aggression'. In this scenario, the dog's human family takes the place of its pack, and the dog (usually an intact male), as it matures, tries to become the dominant leader of the pack by 'disciplining' the other pack members through aggression. The authors of this paper disagree with this explanation, and begin by pointing out that although such phenomena regularly occur in wolf packs, the dog and wolf lineages diverged over 12,000 years ago, with the result that the two species now exhibit fundamentally different behaviours. Moreover, dogs that exhibit aggression do so from a young age, are often neutered males, seem 'remorseful' after the act of aggression, and exhibit a range of other behaviours that are inconsistent with the dominance hypothesis. The authors' alternative explanation is that many factors can contribute to owner-directed aggression, including genetic predisposition (such as greater excitability), chemical imbalances in the brain and, very frequently, fear and anxiety caused by an inconsistent living environment. The authors suggest a range of strategies to cope with aggressive dogs, such as using rewards instead of punishment to prevent unwanted behaviours (as rewards are perceived by the dog as a predictable, and therefore controllable, outcome of an action), regular feeding times, regular exercise off the property, training (especially clicker training and highly structured obedience exercises) and behavioural modification techniques such as systematic desensitization. In some cases pharmacological therapies, such as fluoxetine (a serotonin uptake inhibitor), may also prove effective, in treating aggressive dogs.

Leuschner, A. and Risner, I. (2008) Canine aggression toward familiar people: a new look at an old problem. *Veterinary Clinics – Small Animal Practice*, **38**: 1107-1130.

Canine aggression towards unfamiliar people and dogs

As mentioned in the previous article, several genetic, neurochemical and social factors can cause a dog to display aggressive behaviour; these factors also apply to the aggressive behaviour directed at unfamiliar people and strange dogs. The resulting aggression may be fear-related, protective or territorial, depending on the context. For example, a fearful dog being walked on leash may become anxious upon seeing an unfamiliar dog at a distance, and react by becoming more aggressive as it approaches. The fact that the dog is constrained to a leash may increase its stress levels, as the dog perceives its escape options to be limited. To make matters worse, if the owner chooses to scold or punish the dog at this stage, it could cause the dog to associate unfamiliar people or dogs with punishment and fear, thereby reinforcing the anxiety-related aggression. As in the previous article, exercise, mental stimulation and training are essential tools in combating aggression; these can be used in conjunction with other 'management tools', such as humane muzzles (those that allow the dog to pant and accept food treats) and head collars. It could also be useful to train the dog in owner-focused interactions (e.g. through maintaining eye contact), and in calming techniques that can be practiced in safe, familiar surroundings.

Haug, L. (2008) Canine aggression toward unfamiliar people and dogs. *Veterinary Clinics – Small Animal Practice*, **38**: 1023-1041.

Canine anxieties and phobias

Separation anxiety and noise-related phobias are two common complaints identified by dog owners. The causes of separation anxiety are numerous, and include the animal being left home for extended periods of time, periods of kennel or shelter housing, family move to a new house or apartment, urban housing, the loss of another pet and homes with a single adult owner. It may therefore be called a lifestyle disorder, as single individual households, long owner work days, restricted inter-dog social opportunities, and limited exercise are becoming increasingly more common in our society. Often, separation anxiety is a continuation of the

normal anxiety experienced by all puppies at the time of weaning. This can cause the dog to become emotionally attached to its owner to an abnormally high degree. Treatment can take the form of environmental management (e.g. dropping the dog off at a kennel, instead of leaving it at home), behavioural management (behavioural modification training) and medication, by means of various anxiety-reducing drugs.

Noise aversion is sometimes related to separation anxiety, and one can often be mistakenly diagnosed for the other. For instance, a dog may 'learn' to be afraid of loud noises, if it first hears a thunderstorm while the owner is away. Treatment can take the form of behavioural, CD-based therapies (where the dog is exposed to, and hopefully taught to overcome, loud noises), pheromone-based approaches (which are thought to calm male dogs), and training the dog in the use of 'safe havens' (calming, comfortable areas associated with pleasant experiences) to which it can retire in the event of a stressful stimulus.

Sherman, B. and Mills, D. (2008) Canine anxieties and phobias: an update on separation anxiety and noise aversions. *Veterinary Clinics – Small Animal Practice*, **38**: 1081-1106.

Feeding enrichment toys for kennel dogs

Dogs kept in captivity, e.g. in kennels, shelters or laboratories may not have all their behavioural needs met, and hence experience less than optimal welfare conditions. Dogs kept in non-stimulating housing, in particular, often show signs of chronic stress, such as excessive fear or aggression, increased self-grooming and barking/whining, increased passiveness, the manipulation of enclosure barriers, repetitive locomotive behaviour (stereotypies) and coprophagy. This pilot study therefore investigated the effects of providing a feeding toy (filled with either peanut butter flavoured paste or dog biscuits) to a group of eight kennel housed dogs. Nine other control dogs were given no toys. The researchers observed various aspects of the dogs' behaviour before, after and during the period that the dogs were given access to the toys.

The researchers found that providing food enrichment toys led to an increase in the time spent on feeding behaviour, higher levels of activity (less time spent sitting and lying down and more movement and exercise) as compared to the control animals, and a decrease in the frequency of barking. These effects only lasted as long as the toy was present. The authors conclude that the provision of food toys can lead to greater variability in dogs' behaviour, and result in better welfare outcomes.

Schipper, L. *et al.* (2008) The effect of feeding enrichment toys on the behaviour of kennelled dogs (*Canis familiaris*). *Applied Animal Behaviour Science*, **114**: 182-195.

The mental health of pets

The authors of this paper note that veterinary practitioners have traditionally made a clear distinction between physical and mental health, with the result that the physical problems of patients become the focus of attention, while mental well-being is largely ignored. For instance, a survey in the United States has shown that only 25% of veterinarians regularly inquired about pet behavioural issues with their clients, and veterinarians in small animal practices ranked 'knowledge about animal behaviour' quite low (sixteenth, in fact) on a list of important skills that a new veterinary school graduate should know. On the other hand, a survey of owners of cats that engaged in vertical urine marking showed that 26% of those surveyed did not contact their veterinarians about the problem because many believed that the veterinarian could not help with the problem, and 93% of owners reported consulting with nonveterinary sources instead of, or in addition to, their veterinarian.

There are many ways in which physical (medical) and mental (behavioural) issues are inextricably linked. For example, a dog suffering from a painful ear infection or an itchy skin infection might be less likely to obey, and might even show aggressive behaviour. During the course of a painful urinary tract infection, a cat might learn to associate the litter tray, litter material or the location of the tray with the pain, and avoid it even after the physical symptoms have subsided. The authors suggest that veterinarians should be holistic in their approach, and treat both the physical and mental issues of their patients using a range of techniques, including behavioural modification, medications and alternative therapies.

Seibert, L. and Landsberg, G. (2008) Diagnosis and management of patients presenting with behavior problems. *Veterinary Clinics – Small Animal Practice*, **38**: 937-950.

Introducing dogs and cats to children and new pets

Pets already in the home should have certain general 'skills for living with others'. Pets should 1) be willing to be confined or separated from family members for short periods of time as the need arises, 2) be willing to sleep apart from their owners, 3) not be aggressive or protective around feeding time, 4) enjoy being handled on most parts of their bodies, and 5) not be too demanding for attention. Ideally, these skills should be learnt by the pets before any new additions are made to the household. Particularly in the case of infants, pets should be prepared for the new arrival as early as possible, and introductions should be made gradually, in a calm and controlled manner. Often, owners/parents may need to use physical barriers, such as cribs, playpens and screen doors, to separate their pet from their infant in the initial stages. As children grow up, parents should start teaching them about the appropriate ways to handle and interact with pet animals.

A new dog should be introduced to a pre-existing one in a neutral location such as a park, or while on a walk. Cats should be safely separated initially, until they become accustomed to one another's scent and territory. Each can then be introduced to a separate room of the house in turn. In both cases, owners should be careful to give each pet enough space, as overcrowding is a common cause for inter-pet aggression.

Bergman, L. and Gaskins, L. (2008) Expanding families: preparing for and introducing dogs and cats to infants, children, and new pets. *Veterinary Clinics – Small Animal Practice*, **38**: 1043-1063.

Fear and anxiety in cats

Although stress is a normal physiological response that helps animals to cope with difficult situations, long-term stress caused by constant fear and anxiety is detrimental to a pet's well-being. It is important for both pet owners and veterinarians to identify and effectively deal with chronic stress in pets: owners must be able to describe their pet's stress-related behaviour and reactions to the vet, while the vet should be able to prescribe a suitable course of action to improve the animal's mental health. Cats normally have home ranges of varying sizes, which they will defend from outside cats. Unfortunately, many indoor housecats nowadays are unable to express their natural instinct of maintaining and defending home ranges, and also have limited exposure to many of the 'normal' stimuli present in the world around them. As a result, they are often fearful of visitors to the house, or of loud noises, and may display unwanted behaviours such as aggression and urine spraying. Inter-cat aggression can often be treated through behavioural modification techniques, such as teaching one cat to associate the other with pleasant events (e.g. food treats or playing with the owner). Other strategies include the provision of multiple feeding and resting places around the house, providing refuges for the victim cat, fixing a bell to the aggressor cat's collar, and the use of various medications.

Levine, E. (2008) Feline fear and anxiety. *Veterinary Clinics – Small Animal Practice*, **38**: 1065-1079.

Managing pet behavioural problems

Behavioural problems in pets, if left untreated, can lead to considerable distress to both the pets and their owners, and to the eventual relinquishment or euthanasia of the animals in question. While there are many behavioural, mechanical and pharmaceutical solutions available to vets and pet owners to deal with most behavioural problems, it is easier and safer simply to avoid situations that provoke the undesirable behaviour in an animal. This is particularly true if the bad behaviour is predictable, and can be managed in some way; e.g., if a dog becomes aggressive while guarding an object that is of no value to the family, it is probably best to not try to retrieve that object. If the object needs to be retrieved, however, the owner can try to lure the dog away into an adjoining room using the animal's favourite treat. Once the dog is a safe distance away from the object, it can be picked up by someone else.

Owners should be willing to broach the topic of behavioural issues with their vet, and, if asked to elaborate, be able to provide useful information, such as the posture of an aggressive animal, the contexts in which bad behaviour occurs, and a detailed description of the behaviour itself. Sometimes, it might be useful to get the animal out of the home, either with day boarding or 24-hour care. If the problem is aggression, and injuries have occurred, removing the animal from the home may allow decisions to be made, and provide safety for people who would have come in contact with the dog. If the problem is separation anxiety with destruction to property and/or injury to the animal, day boarding allows all parties to become calm and perhaps reach some sort of equilibrium.

Horwitz, D. (2008) Managing pets with behavior problems: realistic expectations. *Veterinary Clinics – Small Animal Practice*, **38**: 1005–1021.

Choosing a new dog

Unwanted pets are often relinquished to animal shelters, often due to behavioural problems that the owners were unaware of at the time of adoption. Studies have shown that relinquished dogs are more likely to be under two years old, to be of mixed breeding, to have been obtained at little or no cost, or to have been obtained from a shelter, a friend, or a pet store. Moreover, people relinquishing dogs tended to lack important basic information about dogs. It is therefore important to consider several crucial factors when choosing a new dog, in order to minimize the possibility of owner-dog incompatibility in the future.

Future owners should consider whether to get an adult dog or a puppy – while the former will not display any problematic juvenile behaviours, the latter gives the owner more control over the kinds of experiences it is exposed to from an early age. Male dogs have a reputation for being more aggressive, although the authors believe that these are merely broad trends, and not sufficient reason for avoiding males. However, when bringing a second dog into the household, it may help to choose a dog of the opposite gender to the pre-existing one, as this seems to reduce inter-dog aggression.

The authors acknowledge that it is difficult to obtain useful, objective information regarding the temperament of, and behavioural problems associated with, different breeds of dog. They recommend that future owners consider their current and future lifestyle and living conditions while choosing a breed, and that they also consult a veterinarian for scientific advice. The place where a new dog is to be obtained from is of utmost importance, and trade-offs may need to be considered when making a decision. Highly invested breeders will have carried out genetic testing on the pups on offer, and would have detailed knowledge of the parents and other relatives of the pups. These dogs tend to be quite expensive. Pups from 'casual' breeders might be more affordable, but the breeders would be able to offer none of the information mentioned above. Finally, reputable shelters may be an appropriate place to obtain adult dogs, as long as prospective owners are given useful information regarding any problems that shelter staff may have noticed.

Warder, A. and Duxbury, M. (2008) Obtaining a pet: realistic expectations. *Veterinary Clinics – Small Animal Practice*, **38**: 1145–1162.

Preventing behavioural problems in puppies and kittens

Studies have shown that among the dogs surrendered to animal shelters, a clear majority had never attended obedience training. The major behavioural reasons for surrender included boisterousness and aggression towards people or towards other dogs. In many cases, such issues can be avoided, or their impact minimized, by taking some simple precautions at the time of choosing a dog (see the article Choosing a new dog above), or soon after it has been brought home. Once in the home, puppies and kittens need to be socialized, i.e. taught how to get along with other people, children and pets. The animals should be taken to socialization/training classes at an early age, where they are exposed to other animals of a similar age, and taught basic obedience and 'politeness' skills. Within the home, both puppies and kittens must be given sufficient mental and physical stimulation, in the form of walks, toys and play interactions with family members. Housetraining is another important matter to be dealt with as early as possible, as elimination inside the house can lead to the surrender or euthanasia of pets. New pet owners should seek advice from their veterinarian regarding the best way to housetrain their pet. Aggressive behaviours directed towards people or other animals can also be corrected through appropriate strategies (see the above articles on Canine aggression).

Seksel, K. (2008) Preventing behavior problems in puppies and kittens. *Veterinary Clinics – Small Animal Practice*, **38**: 971-982.

Vet training at animal shelters

The author of this opinion piece argues that veterinary teaching hospitals are gradually becoming more specialised in response to market forces, with the result that veterinary students only get exposed to a small range of complex cases that are difficult to diagnose, and which do not adequately reflect the needs of running a real-life veterinary practice. The author therefore suggests that teaching hospitals allow their students to obtain research and training opportunities at local animal shelters. This would give students valuable experience and technical skills in fields as diverse as temperament testing, population health, legal and regulatory issues, shelter management, public education and pet overpopulation control options, along with experience in more mainstream domains such as surgery, anaesthesia and the diagnosis and management of a wide range of common ailments. Ohio State University has a training program in which students, accompanied by faculty members, travel to local shelters. Such a program can be cost-effective, and still allows for faculty control of the real-world learning experience. However, such a course of action has

its own issues and challenges, which need to be discussed with the shelter management and staff before the commencement of the program.

Smeak, D. (2008) Teaching veterinary students using shelter animals. *Journal of Veterinary Medical Education*, **35**: 26-30.

farm animals

Aggression in entire pigs

Traditionally, piglets are castrated without anaesthesia to improve meat quality – this practice is now considered cruel and will shortly be banned in some countries. However, entire males are considerably more aggressive towards one another. The practice of slaughtering only those animals that have reached a particular weight also means that not all animals will be removed from a pig pen at a time, leading to a considerable disruption to the social hierarchy among those left behind, and possible aggressive interactions.

This study investigated the effects of such a scenario, comparing six groups of entire males to six groups of females. The researchers found that the entire males had higher levels of aggression and skin lesions (injuries from fights) even before any individuals had been removed. After the removal of a few of the largest individuals (which also tend to be the highest ranking individuals), the rate of fighting doubled to around 10 fights per hour for each pig. This represented a considerable amount of antagonism within a pen over the course of a day. The authors suggest that banning piglet castration might lead to further welfare issues for adult male pigs and that further research is needed to examine how fighting can be reduced.

Frederiksen, B. and Hexeberg, C. (2008) The effect of removing animals for slaughter on the behaviour of the remaining male and female pigs in the pen. *Research in Veterinary Science*, in press.

Genetics in animal welfare

The experimental selection of many domestic animals has been carried out in recent decades, in order to create strains with desirable behavioural characteristics, as well as to better understand the underlying genetic mechanisms. For example, over 20 years of selection led to a line of tame foxes, which actively sought human contact, and wagged their tails and whined on approach. Similarly, leghorn chickens can be selected to exhibit high or low feather-pecking behaviour; such breeding can also have other beneficial effects that are related to low feather pecking – chickens from the low feather pecking line also had higher egg masses and better feed efficiency.

Recent advances in genetics and molecular biology are making it easier to analyse and manipulate such complex behavioural interactions in farm animals. Many behavioural traits are now known to have an underlying genetic basis; these include vocalization in response to isolation in sheep, and immobility in response to handling in Japanese quails. Molecular approaches can also uncover correlations between genes and behaviour that have serious welfare implications. For example, it has been found that even 15 minutes of social isolation will cause changes in the expression of certain genes in the brain related to neuronal function, structure and protection. It has also been suggested that the selection of domestic chickens for egg-laying efficiency has had serious negative impacts on the fertility of males (the fertility and sperm quality of male domestic fowl are significantly lower than those of their wild counterparts – jungle fowl). The males' bigger body size may also reduce fertility, meaning that they may have to attempt more frequent copulation. This in turn will generate more intense male sexual harassment of females, and thus exacerbate welfare problems associated with female sexual coercion in this species. It is therefore essential to understand the 'underlying genetic architecture' to ensure that only desirable traits are selected, and that the harmful side effects of selective breeding are avoided.

Jensen, P. *et al.* (2008) Genetics and genomics of animal behaviour and welfare - challenges and possibilities. *Applied Animal Behaviour Science*, **113**: 383–403.

Killing poultry with CO² foam

With the outbreak of bird-borne diseases such as avian influenza posing public health risks, it is often necessary to perform an emergency cull of large numbers of birds at once. Recently, it was suggested that a gas-filled foam be used to cover large numbers of birds that have been placed in a closed container. A medium-density firefighting foam was trialled in this regard, but this method probably works by cutting off the birds' air supply and causing asphyxia. Given the welfare concerns raised by such a technique, the authors

of this paper trialled a CO²-filled foam, to see if it would help induce rapid unconsciousness prior to death. Of the six birds subjected to this treatment, gasping was observed in two birds in the early stages of the experiment, possibly due to the free CO² in the air above the foam. The authors also observed two birds jump up in the container when the foam completely covered the test subjects. This was interpreted by the researchers as an escape response, rather than a convulsion. Following this, the birds were stationary within the box for the remainder of the experiment. A rapid decline in heartbeat was observed on average 2 minutes after foaming started. A pathological examination revealed no signs consistent with asphyxiation. The authors suggest CO²-filled foam as a potentially acceptable and efficient method for the emergency killing of poultry.

Gerritzen, M. and Sparrey, J. (2008) Emergency killing of poultry with CO₂-enriched foam. *Animal Welfare*, 17(3): 285-288.

Religious slaughter and the risk of prolonged consciousness

When the carotid arteries (arteries in the neck) of cattle are severed during slaughter following a conventional stunning procedure, blood can sometimes collect in the connective tissue sheath around the artery, causing the artery wall to swell and reduce the flow of blood – this is known as a false aneurysm. This has the theoretical risk of causing the animal being slaughtered to remain conscious for longer, thus causing it unnecessary suffering. This study investigated the prevalence of false aneurysms in cattle being slaughtered by the processes of halal and shechita. The researchers observed the religious slaughter of cattle at six locations in Asia and Europe, and found that false aneurysms occurred in about 10% of arteries in cattle being subjected to religious slaughter. Moreover, the authors calculated that between 7-8% of cattle would experience false aneurysms in both carotid arteries, which would have the effect of significantly slowing down the bleeding out process.

Gregory, N. *et al.* (2008) False aneurysms in carotid arteries of cattle and water buffalo during shechita and halal slaughter. *Meat Science*, 79: 285–288.

Showers for ducks

Ducks are often reared without access to open water, despite a considerable amount of evidence suggesting that ducks prefer ponds and troughs to bathe in. Instead, many ducks are reared with access only to water-dispensing ‘nipples’, which does not allow them to dip their heads into water or to splash water onto themselves. This study investigated the behavioural and welfare outcomes of providing ducks with 1) a bath or small pond, 2) a trough just large enough for the ducks to dip their heads in, 3) a shower, 4) drinking water nipples, and 5) nipples for the first week, followed by a bath for another week.

The researchers found that a lack of bathing water, without the opportunity to at least dip heads and splash water onto their bodies, adversely affected duck body and plumage condition. The best plumage condition was observed with the bath and shower treatments, which had full body access to water. In a further experiment, when the ducks from all the above conditions were given access to baths, it was found that the ducks from the ‘nipple only’ condition spent the most time bathing – this indicated that they had been deprived of bathing earlier, and were compensating for that lack by bathing more now. Finally, in a third experiment, when all ducks were presented with all four conditions simultaneously, they greatly preferred to rest and drink/dabble at the shower, even though they still mostly chose to bathe in the open-water bath. The authors suggest that improvements could be made to duck welfare (in terms of physical condition and what the animals want) on commercial farms by relatively simple means – ponds do not appear to be necessary, and troughs and showers would be much easier to keep clean, and would be more water efficient.

Jones, T. *et al.* (2008) Water off a duck’s back: Showers and troughs match ponds for improving duck welfare. *Applied Animal Behaviour Science*, in press.

The effect of two analgesics on the responses of mulesed lambs

The practice of mulesing to prevent flystrike in lambs is a painful procedure, one which needs to be replaced by a viable, non-surgical option. In the meantime, it is important to develop procedures that will minimise the pain and suffering experienced by lambs undergoing this procedure. The authors of this paper trialled two veterinary analgesics, tolafenamic acid and meloxicam, on the behaviour and physiological responses of lambs subjected to mulesing. The study showed that the two drugs had no effect on any of the parameters investigated: mulesed lambs, in spite of receiving these painkillers, still showed behavioural signs of pain (not walking normally, abnormal posture, lying down for less time), physiological signs of stress associated with trauma, as well as weight loss.

research animals

The role of non-physical contact in mice

Mice reared in isolation in laboratories commonly suffer from 'social isolation syndrome', which is marked by behavioural abnormalities such as hyperactivity, increased anxiety levels, and enhanced reactions to substances such as amphetamines. The syndrome is most readily induced by social isolation from about three to seven weeks of age, and its effects are not reversible. Some studies have suggested that a key factor that causes the syndrome is the absence of physical contact, particularly play behaviour, among young rodents. To test this idea, the authors of this study raised mice in a 'pseudoisolation' condition (caged in pairs but separated by a transparent perforated partition, allowing the mice to smell, see and hear, but not touch, each other). Mice in this condition were compared to mice reared in true isolation, or in groups.

The study's main finding was that mice raised in pseudoisolation had markedly lower anxiety levels – when put into the middle of an open arena, for example, they were willing to remain in the centre, rather than attempting to hide near the periphery. Similarly, when put into a maze with four arms, they were more eager to explore the open arms than the other mice. Pseudoisolated mice also had lower hyperactivity scores than isolated mice, and were more resistant to the effects of amphetamine. The authors conclude that since the presence of visual, sound and scent cues was enough to diminish the effects of physical isolation, the lack of physical contact alone cannot be responsible for the emergence of the isolation syndrome in mice.

Pietropaolo, S. *et al.* (2008) Nonphysical contact between cage mates alleviates the social isolation syndrome in C57BL/6 male mice. *Behavioral Neuroscience*, **122**: 505–515.

Mouse maternal behaviour

This paper reviews research on various aspects of maternal behavior in mice, both in the wild and in laboratory conditions. Maternal behaviour includes nursing, licking, grooming young, nest building and protecting young against other mice by means of aggressive behaviour. Nest building is an important behaviour, as a well constructed nest will be able to keep any newborn pups warm, and significantly increase their chances of survival. Often, groups of females living within a single female's territory will build communal nests, and even nurse pups born to other females. This has the advantage of not only enhancing offspring survival, but also of improving female reproductive efficiency, in terms of larger litters and heavier pups. Pregnant or nursing females will also attack strange males which wander close to the nest; this is also a useful adaptation, as males will often kill the offspring of other males. Not surprisingly, many of the above mentioned maternal behaviours have been found to have a genetic basis: different genetic strains of mice exhibit significantly different degrees of nest building behaviour, or interactions with offspring. However, experience can also improve maternal behaviour as demonstrated by the higher survival of offspring in second versus first litters, and larger weight gains in certain strains of mice. Mothers can also sometimes kill their own offspring – although the reasons for such behaviour in laboratory settings remains unclear, in the wild it can be a means of reducing litter size when food is scarce. Again, certain mutant strains of mice show poor maternal behaviour, and often let newborn pups die of exposure or starvation.

Housing and management routines in laboratory animal facilities do not always take such complex maternal behaviours into consideration, as they are often designed solely for hygiene and standardization, with little consideration for natural behaviour. For example, laboratory mice may be reared in bare cages, with disregard for their need to build temperature-regulating nests. This prevents animals from performing many instinctive behaviours, and gives them little control over their environment, leading to negative welfare outcomes.

Elin, M. *et al.* (2008) Maternal behaviour in *Mus musculus* sp.: an ethological review. *Applied Animal Behaviour Science*, **114**: 1–22.

wildlife

Control of feral cats

Feral cat populations are the result of pet owners irresponsibly abandoning their pet cats for a number of reasons. In addition, some owners allow their cats to breed freely, or to have kittens prior to sterilizing them. This review article gives an overview of this broad topic, and focuses primarily on the situation in the USA. The debates regarding feral cats in western countries revolve around issues such as the risks to public health, the spread of disease to other animals, including pet cats, the public nuisance caused by ferals, and the predation of wildlife and the extinction of native animals. More recently, people are also becoming concerned about the welfare of feral cats themselves. A range of diseases in humans have been associated (although not exclusively) with feral cats – these include rabies, plague, toxoplasmosis and cat-scratch fever. Cats can also contract bird flu, although there is no evidence that they can transmit the disease to humans.

One of the most hotly debated and emotional issues regarding feral cats is their impact on local (native) ecosystems. While cats undoubtedly do kill small mammals, reptiles and birds, there is often little scientific evidence to back either of the polarized 'pro-cat' or 'anti-cat' points of view. Some important points raised by the authors in this regard include the following: 1) often, the role of other predators in killing native wildlife is ignored, 2) cats may be making a positive contribution to native animal populations by controlling the populations of other predators, and 3) even when cats are implicated, it is not always advisable to eradicate them completely, as that can lead to unsuspected and unwanted changes to the ecosystem. Finally, the available evidence shows that the cats themselves do not have an easy life, and often fall victim to hunger, disease and predation at an early age. Many proposals have been forwarded for the control of feral cats, ranging from indiscriminate euthanasia to trap-neuter-release programs – all such measures have the potential to be non-humane if applied incorrectly, and therefore should be given careful consideration on a case-by-case basis.

Robertson, S. (2008) A review of feral cat control. *Journal of Feline Medicine and Surgery*, **10**: 366-375.

Stress in captive gorillas

Although it is sometimes stated that zoo primates find the presence of visitors to be enriching, recent studies have shown that human visitors looking at primates may have a negative impact on the welfare of these animals. Signs of stress or anxiety in primates include self-scratching behaviour and visual monitoring (looking around, usually for the presence of danger). The authors of this paper compared the behaviour of gorillas at two UK zoos in response to the presence of human visitors, focusing in particular on the effect of feeding times on the display of stress-related behaviours. Feeding times involved enrichment activities for the animals, as they had to look for and extract food hidden in various places around their enclosure. The researchers found that at one of the zoos, larger visitor numbers caused gorillas to display more self-scratching and visual monitoring behaviour outside feeding times. No such relationship was seen during feeding time. The authors suggest that these findings potentially have important animal welfare implications, as they indicate that engagement of animals in a stimulating activity ameliorates the effects of visitors on their anxiety levels.

Carder, G. and Semple, S. (2008) Visitor effects on anxiety in two captive groups of western lowland gorillas, *Applied Animal Behaviour Science*, in press.

animals used in sport and entertainment

Pain-indicating behaviours in two species of fish

Although fish constitute a very diverse group of vertebrates, and are used extensively by man, very little is known about the pain-related behaviours of these animals. To date, only goldfish and rainbow trout have been studied in this respect, in spite of the fact that there are likely to be inter-species differences in how fish react to painful stimuli. This study investigated this issue in two further fish species, the common carp and the zebrafish, by injecting dilute solutions of acetic acid (vinegar) into their lips. Although no changes in swimming behaviour or ventilation rate were observed in the carp, two of the five fish were seen performing anomalous behaviours such as rocking from side to side and rubbing their lips against the tank walls. In contrast, zebrafish displayed a significant reduction in frequency of swimming and an increase in ventilation rate, which was similar to the results obtained from rainbow trout. The zebrafish did not display any

anomalous behaviour. The results of the study indicate that there are major differences in pain response between carp and zebrafish, and that activity levels and ventilation rate may not be valid indicators of suffering or poor welfare across all fish.

Reilly, S.C. *et al.* (2008) Behavioural analysis of a nociceptive event in fish: comparisons between three species demonstrate specific responses. *Applied Animal Behaviour Science*, **114**: 248–259.

Self-mutilation in horses

Self mutilation (biting e.g., abdomen, flanks, groin, shoulders, limbs, or chest, stomping and kicking, rubbing, and lunging into objects) when seen in male horses, is often mistaken for signs of boredom, unwillingness to work, or other psychological issues. The author of this review article distinguishes three types of self-mutilation in horses, based on the actions involved and their underlying cause. Type 1 self mutilation is brought about by chronic or intermittent pain or discomfort due to a physical/medical condition, such as ulcers or hernias. Type 2 self-mutilation is a variant of the normal, ritualized aggressive interaction that occurs between males under herd conditions. In captivity, however, self-directed injuries may be triggered by the sight of other stallions, or by the smell of their body residues or faeces in stalls or trailers. Type 3 self-mutilation involves a more quiet, often rhythmically repetitive or methodical behavior, e.g. nipping at various areas of the body, stomping, or kicking against an object. Such behaviours may be controlled by a number of methods, such as physical devices (e.g. soft basket grazing muzzles), medication, social distractions such as pasturing the offending stallion with mares, or providing the horse companion animals such as donkeys, chickens or rabbits. Naturally, such strategies will only be effective for Types 2 and 3. With Type 1 mutilation, it is essential to treat the underlying medical condition.

McDonnell, S. (2008) Practical review of self-mutilation in horses. *Animal Reproduction Science*, **107**: 219-228.

other articles of interest

Burn, C.C. and Mason, G.J. (2008) Rats seem indifferent between their own scent-marked homecages and clean cages, *Applied Animal Behaviour Science*, in press.

Daly, B. and Morton, L.L. (2008) Empathic correlates of witnessing the inhumane killing of an animal: an investigation of single and multiple exposures, *Society and Animals*, **16**: 243-255.

De Leeuw, J.A. *et al.* (2008) Effects of dietary fibre on behaviour and satiety in pigs, *Proceedings of the Nutrition Society 2008*, p.1-9.

Diesel, G. *et al.* (2008) Reliability of assessment of dogs' behavioural responses by staff working at a welfare charity in the UK, *Applied Animal Behaviour Science*, in press.

Ellis, S.L.H. and Wells, D.L. (2008) The influence of visual stimulation on the behaviour of cats housed in a rescue shelter, *Applied Animal Behaviour Science*, **113**(1-3): 166-174.

Feuerstein, N. and Terkel, J. (2008) Interrelationships of dogs (*Canis familiaris*) and cats (*Felis catus* L.) living under the same roof, *Applied Animal Behaviour Science*, **113**: 150–165.

Fröberg, S. *et al.* (2008) Effect of suckling ('restricted suckling') on dairy cows' udder health and milk let-down and their calves' weight gain, feed intake and behaviour, *Applied Animal Behaviour Science*, **113**:1-14.

Greenough, P.R. (2008) Animal welfare in dairy farming: Lameness and the organic movement, *The Veterinary Journal*, in press.

Gupta, M. (2008) Functional links between intimate partner violence and animal abuse: personality features and representations of aggression, *Society and Animals*, **16**: 223-242.

Haverbeke, A. (2008) Training methods of military dog handlers and their effects on the team's performances, *Applied Animal Behaviour Science*, **113**(1-3): 110-122.

Jeleníková, J., Pipek, P. and Staruch, L. (2008) The influence of ante-mortem treatment on relationship between pH and tenderness of beef, *Meat Science*, **80**:870–874.

Kirkden, R.D. (2008) The validity of using an approach-avoidance test to measure the strength of aversion to carbon dioxide in rats, *Applied Animal Behaviour Science*, **114**: 216–234.

Manteca, X. (2008) Is dietary choice important to animal welfare?, *Journal of Veterinary Behavior*, **3**:229-239.

McGrogan, C. *et al.* (2008) Dimensions of horse personality based on owner and trainer supplied personality

- traits, *Applied Animal Behaviour Science*, **113**(1-3): 206-214.
- Mendl, M. and Paul, E.S. (2008) Do animals live in the present? Current evidence and implications for welfare, *Applied Animal Behaviour Science*, **113**: 357–382.
- Millsopp, S. and Laming, P. (2008) Trade-offs between feeding and shock avoidance in goldfish (*Carassius auratus*), *Applied Animal Behaviour Science*, **113**: 247–254.
- Pedersen, R.E. *et al.* (2008) How milk-fed dairy calves perform in stable versus dynamic groups, *Livestock Science*, in press.
- Stewart, M. *et al.* (2008) Infrared thermography and heart rate variability for non-invasive assessment of animal welfare, *ANZCCART News*, **21**(1):1-4.
- Svobodová, I. *et al.* (2008) Testing German shepherd puppies to assess their chances of certification, *Applied Animal Behaviour Science*, **113**(1-3): 139-149.
- Tadich, N. *et al.* (2008) Effects of weaning and 48 h transport by road and ferry on some blood indicators of welfare in lambs, *Livestock Science*, in press.
- Weeks, C.A. (2008) A review of cattle, sheep and pig lairages, with emphasis on stocking rates, ventilation and noise, *Animal Welfare*, **17**(3): 275-284.
- Yin, S. *et al.* (2008) Efficacy of a remote-controlled, positive-reinforcement, dog-training system for modifying problem behaviors exhibited when people arrive at the door, *Applied Animal Behaviour Science*, **113**(1-3): 123-138.

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