



RSPCA AUSTRALIA

Animal welfare science

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The Animal Welfare Science Update aims to keep you informed of developments in animal welfare science that relate to the work of the RSPCA. The update provides summaries of some of the most relevant scientific papers and a bibliography of other articles that have been received by the RSPCA Australia office in the past few months.

Companion Animals

1. The requirements of domestic cats kept indoors

Cats are popular companion animals in Australia. Because of the attention that has been placed on the impact of domestic cats on native animal populations, as well as the introduction of cat curfews in some areas, people are keeping their cats indoors for longer periods of time. However, little attention has been focussed on the behavioural, social and physiological requirements of cats that spend the majority of their time within the household.

Rochlitz (2005) conducts a review of research that discusses the features of the domestic environment that are important for the welfare of cats. The review focussed primarily on cats that are housed entirely indoors to determine the environmental requirements for cats when they are confined. In particular, this paper focuses on the relationship between the household environment and aspects of feline welfare such as the expression of normal behaviour and the protection from fear and stress. One of the features of the home environment that is important for cat welfare is the area in which the cat is allowed to roam. Research on cats that are kept indoors indicates that the quantity and quality of space in which the cats are allowed to roam is crucial for individual space (especially when two or more cats are housed together) as well as for the expression of territorial behaviour. In addition to allowing cats to roam in a suitably sized area (studies suggest that cats should have access to at least two rooms) it is important to provide features within this environment such as raised vantage points (such as a space on a shelf or a windowsill) from which cats may survey their territory. Cats often cope with stressful stimuli or changes in the environment by hiding. Therefore, cats should also be provided with a hiding spot such as a comfortable box placed in a quiet corner of a room into which they can retreat and be concealed. Interactions with humans and other cats are also important to the welfare

of cats in the household. Cats form the best associations with humans and other cats if they experience human and other feline contact early in their life. Cats can also become accustomed to the presence of dogs within the household, especially if they have had contact with dogs in their early life. Other aspects of the household environment that are important to cat welfare include the sensory environment (especially visual and olfactory stimulation), toys (a variety should be available) and nutrition (the number of feeds per day and the methods of feeding can provide behavioural enrichment).

The author also discusses the advantages and disadvantages associated with keeping cats indoors in contrast to allowing them access to the external environment. Some disadvantages of keeping a cat indoors all the time is the potential for boredom, stress and behavioural problems associated with confinement as well as health problems that are associated with a reduction in physical movement. However, research indicates that cats that have been kept within the household from an early age cope well with this type of environment. Cats that have had outdoor access for some of their life may have some difficulty adjusting to indoor confinement and it is therefore important to be aware of their social and behavioural requirements and try to satisfy these needs within the household.

Rochlitz, I. (2005). A review of the housing requirements of domestic cats (*Felis silvestris catus*) kept in the home. *Applied Animal Behaviour Science* **93**, 97.

2. The relationship between stress in thunderstorm-phobic dogs and the behaviour and emotional state of their caregivers

Some dogs display an excessive fear response during thunderstorms, a condition that is described as thunderstorm-phobia. The fear that some dogs experience during thunderstorms can result in cowering and whimpering as well as barking and destructive behaviour. Research has indicated that dogs who display fearful behaviour during thunderstorms are also likely to suffer from other stress-related behavioural disorders such as separation anxiety.

Dreschel and Granger (2005) investigate the relationship between the stress response of thunderstorm-phobic dogs and the emotional state of their owners. The authors' hypothesise that the cortisol level of a thunderstorm-phobic dog during a thunderstorm event is related to the severity of the dogs' behavioural response to the thunderstorm, the behavioural profile of the dog (eg. whether the dog is normally excitable, anti-social, attention-seeking etc.), the baseline anxiety level of the owner and the dogs' social environment (eg. the quality of the dog-owner relationship and the presence of other dogs in household). In this study, the authors measured the stress response of dogs and their owners by measuring their salivary cortisol levels (thought to be a reliable indicator of physiological and psychological stress). Thunderstorm events were simulated with a sound recording of a thunderstorm that was played through a stereo system in the dog's home. Cortisol measurements were taken 20 min and 40 min after the simulated storm as well as on another day when no storm was experienced. A series of surveys were used to assess the behavioural

characteristics of the dogs, the quality of the dog-owner relationship and the owners' level of anxiety.

The cortisol levels of thunderstorm-phobic dogs were found to peak 20 minutes after the simulated thunderstorm whilst the cortisol levels of the owners did not change significantly from baseline levels. Interestingly, the results showed that the stress response in dogs that lived in households with other dogs was not as great as the response of dogs that lived in a single-dog household. This suggests that the presence of other dogs may help to alleviate the anxiety of thunderstorm-phobic dogs. The results of the study also indicate that the behavioural and physiological responses of thunderstorm-phobic dogs to the simulated thunderstorm were not affected by the behaviour or emotional state of their owners (bearing in mind that the emotional state of the owners may differ in a real thunderstorm compared to a simulated event). Interestingly, the study found that there was no relationship between the underlying behavioural characteristics of the dogs and their stress response during the simulated thunderstorm. Although this study has investigated the interaction between the behavioural characteristics of dogs and their carers during an audio replay of a thunderstorm, it would be necessary to investigate these interactions during a real thunderstorm (where audible changes are accompanied by changes in air pressure, humidity, temperature and electrical activity) to get a more thorough understanding of the relationship between canine and human stress in these conditions.

Dreschel, N. A. and Granger, D. A. (2005). Physiological and behavioral reactivity to stress in thunderstorm-phobic dogs and their caregivers. *Applied Animal Behaviour Science* **95**, 153.

Farm Animals

3. Sow preferences for walls to lean against when lying down

Due to a lack of muscle tone in their legs and their large size and weight, sows are often unable to control their body when they lie down which can lead to the accidental crushing of piglets. Crushing is the predominant cause of piglet death in the pig industry although the incidence of piglet crushing is higher when sows are kept in open pens rather than crates. Research has indicated that sows kept in crates use the wall of the crate for support when lying down which can enable them to avoid accidentally lying on a piglet. The lower incidence of piglet mortality in crates is often used to support the case for keeping sows in crates even though they are known to severely compromise the welfare of the sow.

Previous studies have shown that sows that are kept in loose housing systems such as pens prefer to use support (if it is available) when lying down. Damm et al. (2005) investigate whether sows that are kept in pens will prefer walls with certain features with an aim of determining which features are more likely to encourage sows to use the walls for support when lying down. The authors conducted two experiments using pregnant sows that were all housed in pens in the same shed. Each pen had three solid walls and one wall with a vertical grating to which food and water troughs were attached.

In the first experiment, each pen had a flat sloping wall, a curved sloping wall and a rail wall comprising wooden rails that were fitted to a flat sloping wall. In the second experiment, each pen had a sloping wall (the same as the one used in the first experiment), a flat vertical wall and a wall with a piglet protection rail (an iron tube placed 15 cm from the foot of a vertical wall and 22 cm above the floor of the pen). In both experimental situations, sows used the walls of the pen for support in 86% of the times they lay down, confirming that sows in pens do indeed prefer to use walls when lying down. In addition, the results from both experiments also showed that sows preferred to use the wall at the back of the pen to lie down against rather than the walls at the side and the front of the pen although it is not clear whether this was related to position of other features of the shed such as light sources and airflow. In the first experiment, there was no significant difference between the type of wall that the sows used when lying down. In the second experiment, the sows showed no significant preference for either the sloping wall or the plain wall but avoided using the wall with the piglet protection rail. The results of this study highlight the importance of the design and placement of walls in pens for encouraging sows to use them for support when lying down. In addition, this study also shows that the present system for preventing piglet crushing in pens is inadequate and that it is important to design a wall that will help to protect the piglets whilst also providing an attractive support for the sow.

Damm, B. I., Moustsen, V., Jorgensen, E., Pedersen, L. J., Heiskanen, T. and Forkman, B. (2005). Sow preferences for walls to lean against when lying down. *Applied Animal Behaviour Science In Press, Corrected Proof.*

4. Vocalisation in farm animals as a measure of welfare

Vocal sounds are an important means of communication in many animal species. Animal calls have evolved as signals that provide other animals with information on the perceptions and emotions of the individual emitting the sound.

Manteuffel, Puppe and Schon (2004) conduct a review of the literature in the area of vocalisation to investigate whether analyses of animal calls could be developed as a reliable method for measuring the welfare of farm animals. Current methods of welfare assessment often rely on a human's perception of an animal's state of well-being. However, analyses of animal vocalisation, the authors argue, can potentially provide a measure of welfare from the individual animal's perspective. In addition, it could be possible to develop vocalisation analysis as a tool for monitoring welfare that could be easily implemented in modern farming situations.

In order to develop a welfare assessment that is based on vocalisation it is first necessary to establish whether there is an association between vocalisation and an animal's welfare. Research that has combined analyses of vocalisation with physiological measurements of stress (such as increased heart rate and raised cortisol levels) suggest that, in some species at least, there is a link between certain calls and situations in which the welfare of an animal is compromised (such as when an animal is hungry or in pain). The second important issue to consider is whether we have the technological capacity to measure and analyse animal calls. Given the recent advances in digital sound recording, as well as the recent advancements in human voice

recognition technology, the authors assert that modern technology provides an avenue for the precise quantification and assessment of vocal signals in farm animals. The final, but perhaps the most important, point that the authors discuss is whether it is possible to characterise the calls that farm animals make in such a way that an analysis of their vocal sounds can be used to accurately assess their state of being. The authors discuss the results of research that has been conducted in three common species of farm animal: pigs, cattle and poultry. This research indicates that specific types of vocalisations can be related to different types of stressful events suggesting that vocalisation analysis may be a useful tool for welfare assessment in these species. The authors note that more extensive research is required in this area before it will be possible to measure the welfare of animals using vocalisation. One drawback of using vocalisation to measure welfare is that, in some situations such as when an animal is experiencing chronic pain, vocalisation is absent. As a result, any tool that uses vocalisation as a measurement of welfare must comprise a more extensive system of welfare management and does not, in itself, represent a complete solution for monitoring the welfare of animals.

Manteuffel, G., Puppe, B. and Schon, P. C. (2004). Vocalization of farm animals as a measure of welfare. *Applied Animal Behaviour Science* 88, 163.

Animals in Sport and Entertainment

5. Foraging enrichment for stabled horses

Many horses that are kept in stables develop behavioural stereotypies such as weaving and crib biting that result from the physiological and psychological stress of confinement in a small area. Research has indicated that the feeding regime is a significant contributor to the stress that horses experience in the stabled environment.

Horses have evolved to forage for up to 18 hours a day on a high fibre diet but in the stabled environment their diet consists predominantly of high-energy concentrates, which they receive periodically. Thorne et al. (2005) investigate whether an increase in the time a horse spends foraging for food, and the type of food that they are fed, can improve the welfare of stabled horses. In this experiment, stabled horses were fed on either a single forage diet (consisting of 6kg of hay fed in a single net) or a multiple forage diet (comprising 5.5 kg of 6 types of hay presented in nets and dried chopped grasses presented in buckets). The behaviour of the horses was observed directly after the food was placed in the stable and 15 minutes later. The results of the experiment showed that horses that were fed the multiple forage diet spent significantly more time performing foraging behaviour whereas horses on the single forage diet spent more time engaging in behaviour that was interpreted as searching for alternative food sources. The authors also found that there was a difference in the amount of time that horses on the multiple forage diet spent eating each type of food. The results of this study suggest that providing stabled horses with a variety of food types can help to satisfy the normal behavioural requirements of the horse and, as a result, alleviate the stress that horses experience in the stabled environment. In addition, increasing the amount of time that horses spend eating may help to reduce the incidence of stomach

ulcers that are caused by fasting and episodic feeding. The multiple forage diet is a practical alternative to the current methods of feeding concentrates and could be easily implemented by the owners and managers of stabled horses.

Thorne, J. B., Goodwin, D., Kennedy, M. J., Davidson, H. P. B. and Harris, P. (2005). Foraging enrichment for individually housed horses: Practicality and effects on behaviour. *Applied Animal Behaviour Science* **94**, 149.

Wildlife

6. Assessment of stress in non-human primates

Physiological measurements of stress are often used as an assessment tool for animal welfare. Traditional measures of psychological stress such as changes in cortisol levels, heart rate or blood pressure can be difficult to interpret or obtain and may sometimes provide inaccurate results.

Recent research has indicated that leukocyte (white blood cell) activity, which changes when the body experiences physical stress, also changes during periods of psychological stress. Honess et al. (2005) investigate whether leukocyte activity can be used as an accurate and reliable indicator for the measurement of stress in non-human primates. To do this, the authors compared the leukocyte activity of Rhesus monkeys that were kept in two types of housing system, cages or open rooms. The cage system consisted of three linked modules of reinforced two-tier steel laboratory cages. The open rooms consisted of either the cages in the traditional system with their front section removed or no cages at all. Leukocyte activity was measured through blood samples which were taken during routine veterinary inspections. The results of the study indicated that leukocyte activity was reduced in the monkeys that had been housed in the cage system. This is consistent with studies in humans which have shown that under conditions of psychological stress, leukocyte activity is depressed. A reduction in leukocyte activity has been shown in several species to cause a weakening of the immune system which can increase an animal's susceptibility to disease. The results of this study indicate that leukocyte activation can be used as a reliable method for assessing psychological stress in non-human primates. In addition, these results also highlight the impact that psychological stress can have on immune system function and the importance of taking this type of stress into account when assessing the welfare of animals.

Honess, P. E., Marin, C., Brown, A. P. and Wolfensohn, S. E. (2005). Assessment of stress in non-human primates: application of the neutrophil activation test. *Animal Welfare* **14**, 291-296.

Other Articles

Andersen, I. L., Berg, S. and Boe, K. E. (2005). Crushing of piglets by the mother sow (*Sus scrofa*)--purely accidental or a poor mother? *Applied Animal Behaviour Science* **93**, 229.

Angus, L. J., Bowen, H., Gill, L. A. S., Knowles, T. G. and Butterworth, A. (2005). The use of conjoint analysis to determine the importance of factors that affect on-farm welfare of the dairy cow. *Animal Welfare* **14**, 203-213.

Cooper, J. J., McAll, N., Johnson, S. and Davidson, H. P. B. (2005). The short-term effects of increasing meal frequency on stereotypic behaviour of stabled horses. *Applied Animal Behaviour Science* **90**, 351.

Levine, E., Perry, P., Scarlett, J. and Houpt, K. A. (2005). Intercat aggression in households following the introduction of a new cat. *Applied Animal Behaviour Science* **90**, 325.