RSPCA AUSTRALIA

Animal welfare science update

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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 effect of scents on the behaviour of shelter dogs

Dogs that spend a period of their lives in confinement, such as dogs that are housed in a rescue shelter, are often exposed to stressful stimuli. Isolation, noise, boredom and unfamiliar surroundings can contribute to the stress of shelter dogs. A stressed or barking dog may not accurately reflect the potential of the animal as a pet for prospective owners. In order to enhance the welfare of dogs kept in rescue shelters and to increase their chances of adoption it is necessary to examine the types of environmental enrichment that can be used to maintain the physiological and psychological health of these dogs.

Graham et al. (2005) investigate whether scents that have been known to affect the moods and behaviour of humans in a positive way can be used to produce analogous responses in dogs. The study examines whether lavender and chamomile, known to reduce anxiety and promote well-being in humans, and peppermint and rosemary, known to increase human alertness and enhance cognitive abilities, have similar effects on dogs housed in a rescue shelter. The dogs in the experiment were exposed to each of the four test scents by placing essential oils in an oil burner that was placed in each dog's kennel. The dogs were exposed to each scent for a four hour period each day for five days. The results suggest that the behaviour of dogs is significantly influenced by their olfactory environment. When the dogs were exposed to lavender and chamomile they spent less time moving and more time lying down than when they were exposed to peppermint and rosemary. Dogs were also found to bark less when they were exposed to lavender and chamomile – suggesting that these scents were having a sedative effect. Enhancing the olfactory environment of dogs in shelters by diffusing calming scents such as lavender and chamomile may reduce the stress experienced by the dogs as well as promoting behaviours that will increase the likelihood that they will be rehomed.

Graham, L., Wells, D. L. and Hepper, P. G. (2005). The influence of olfactory stimulation on the behaviour of dogs housed in a rescue shelter. *Applied Animal Behaviour Science* **91**, 143.

2. Treatment of separation anxiety in dogs

Separation anxiety, or the dislike of being left alone, usually occurs when a dog becomes overly dependent or attached to its owner. This can lead to many behavioural problems including destructive behaviour, depression, hyperactivity and excessive barking and whining. Previous research (King et al., 2000) has shown that separation anxiety in dogs can be treated with behavioural therapy and a drug known as clomipramine.

The aim of this paper (King et al., 2004) is to investigate the incidence of adverse effects and changes in behaviour after the cessation of clomipramine treatment. The investigation was based on a questionnaire given to owners of dogs who had participated in the original clomipramine clinical trial. The study found that, after the cessation of clomipramine treatment, 13% of dogs showed a relapse into separation anxiety behaviour, while the behaviour of 20% of the treated dogs was found to improve. Unfortunately, the conclusions of the study are limited due to the lack of control over the dogs' management after the clinical trial. However, the results show some indication that there are no short-term or long-term adverse behavioural consequences of using standard-dose clomipramine to manage separation anxiety in dogs.

King, J. N., Overall, K. L., Appleby, D., Simpson, B. S., Beata, C., Chaurand, C. J. P., Heath, S. E., Ross, C., Weiss, A. B. and Muller, G. (2004). Results of a follow-up investigation to a clinical trial testing the efficacy of clomipramine in the treatment of separation anxiety in dogs. *Applied Animal Behaviour Science* **89**, 233.

Farm Animals

3. Can fish suffer?

Fish cultivation is steadily becoming a major agricultural industry. As a result, the number of intensive fish farms is increasing. Interestingly, the welfare of fish raised under these conditions is an issue that has received little attention.

Chandroo *et al.* (2004) conduct a review of research that has focussed on aspects of fish physiology with a view to determining whether fish can suffer and, as such, whether it is ethically necessary to consider the welfare of farmed fish. In discussing this issue, the authors begin with the premise that, in order to accord welfare status to an animal, it must demonstrate the cognitive characteristics of sentient beings. The authors argue that if fish can be demonstrated to possess cognitive and behavioural attributes that characterise motivational states (i.e. conscious experiences such as pain, fear, hunger, thirst and pleasure), then it is reasonable to suggest that they can suffer.

Research has shown that fish are able to learn about the attributes of other fish through observation and those they are able to apply this knowledge in flexible and adaptive ways. There is also evidence that fish possess the brain structures and neural systems that are associated with motivational states in other tetrapods (i.e. classes of animal such as mammals, reptiles, amphibians and birds). Current literature also provides evidence that fish possess neural pathways that are similar to those that are involved in pain perception in other tetrapods. In addition, studies have shown that fish may have the capacity to consciously experience fear. Research has also provided evidence that fish are able to

experience psychological stress. Based on the current body of knowledge concerning fish behaviour and physiology, the authors conclude that there is strong evidence that fish can suffer in ways similar to other animals that are accorded welfare status. As a result, it is necessary to consider the welfare of fish in intensive farming situations. For a review of the welfare issues relating to cultured fish see Conte (2004).

Chandroo, K. P., Duncan, I. J. H. and Moccia, R. D. (2004). Can fish suffer? perspectives on sentience, pain, fear and stress. *Applied Animal Behaviour Science* **86**, 225.

Conte, F. S. (2004). Stress and the welfare of cultured fish. *Applied Animal Behaviour Science* **86**, 205.

4. The effect of human contact on broiler chicken welfare and performance

Human-animal interactions are an essential feature of many sections of the agricultural industry. It is important to understand the effect that these interactions have on the animals that we farm so that we may enhance the welfare of these animals. Reducing the stress experienced by farmed animals as a result of human contact may also have the added benefit of enhancing productivity.

Zulkifli and Siti Nor Azah (2004) investigate the effect of 'pleasant' and 'unpleasant' human contact on the welfare and productivity of broiler chickens. In this investigation, pleasant physical contact consisted of picking the chickens up and stroking them gently and unpleasant physical contact consisted of suspending the chickens by their legs and swinging them gently. The study separated chicks into groups that were subjected to four forms of regular human contact: minimal human contact (the control); pleasant physical contact; unpleasant physical contact; pleasant physical contact that was viewed by pen mates and unpleasant physical contact that was viewed by pen mates. The results indicated that regular, pleasant physical handling significantly reduced fearfulness in broiler chickens. In addition, the chickens that had regularly received pleasant physical contact had significantly improved body weight compared to chickens in the other groups. The results also showed that the pleasant physical treatment was effective at reducing the stress response among chickens who had regularly watched one of their pen mates receiving pleasant physical treatment. These findings suggest that by giving broiler chicks' regular pleasant physical contact it is possible to not only improve their welfare but to also improve their weight gain. As such, the conclusions drawn in this paper may assist in the effort to improve the ability of farmed animals to cope with environmental stressors.

Zulkifli, I. and Siti Nor Azah, A. (2004). Fear and stress reactions, and the performance of commercial broiler chickens subjected to regular pleasant and unpleasant contacts with human being. *Applied Animal Behaviour Science* **88**, 77.

5. The use of anaesthesia in the dehorning of calves

Dehorning is a common practice in the cattle industry. Calves are dehorned for several reasons - to reduce the risk of injury to other cattle and stockhandlers, to reduce damage to hides and carcasses and to improve handling. Many studies have shown that calves display pain responses during the dehorning procedure.

This aim of this study (Sylvester et al., 2004) is to use behavioural indicators to assess the effectiveness of anaesthesia in reducing the pain responses of dehorned calves. The study focussed on the incidence of tail flicking, head shaking, ear flicking and ruminating in three groups of calves; calves that had not been dehorned, calves that had been dehorned without anaesthetic and calves that had been dehorned with local anaesthetic treatment. The results show that dehorned calves display much higher incidences of restlessness and pain than the calves that were not dehorned. In addition, the increased incidence of pain response occurs for at least 6 hours and up to 26 hours after the dehorning procedure. The application of local anaesthetic reduced the pain reaction of dehorned calves for 2 hours following the procedure after which time they began to display the same signs of discomfort as the calves that had not been treated with anaesthetic. The results of this study demonstrate that the application of anaesthetic prior to the dehorning procedure ameliorate the discomfort of calves. As such, the authors conclude that anaesthetic should be an integral part of the dehorning procedure.

Sylvester, S. P., Stafford, K. J., Mellor, D. J., Bruce, R. A. and Ward, R. N. (2004). Behavioural responses of calves to amputation dehorning with and without local anaesthesia. *Aust Vet J* **82**, 697-700.

6. Piglet crushing

Sometimes, when a sow moves from a sitting to a standing position, she lies down on her piglets and crushes them. The problem of piglet crushing occurs in both crated (where sows are kept in individual crates) and loose housing systems although the proportion of piglets that die from crushing is greatest when the sows are kept in loose housing.

In order to understand the causes of piglet crushing Damm, Forkman and Pedersen (2005) conduct a review of the literature relating to the behavioural factors that may result in piglet crushing and how they are associated with different housing systems. The authors identify two behaviours that are principally involved in piglet crushing incidences, rolling and lying down. Little is known about the rolling behaviour in sows but the literature identifies several factors that affect this behaviour and its relationship to piglet crushing. These factors include the properties of the floor, the nest materials and the speed of rolling. In contrast to rolling, a large amount of research has been focussed on lying down in sows. This review investigates many aspects that influence the lying down behaviour including the lying down sequence, ways of lying down, breed, muscular control, previous housing and farrow housing, pre-lying behaviour, sow responsiveness to piglets, space requirements. The review highlights the many different factors that affect lying down behaviour and how these factors determine the risk of piglets being crushed. A principal outcome of the review is that piglets are less likely to get crushed if the sow lies down against a surface (such as a wall) than if she lies down in the open. The authors suggest that more work needs to be done on the types of support that sows will use and the factors that influence their use of support when lying down.

Damm, B. I., Forkman, B. and Pedersen, L. J. (2005). Lying down and rolling behaviour in sows in relation to piglet crushing. *Applied Animal Behaviour Science* **90**, 3.

Transport

7. Bobby calf welfare during transportation

Bobby calves are young calves (less than one week old) that are not considered suitable for future breeding purposes. Dairy farmers usually send these calves off to slaughter for human consumption once they are more than 4 days old. In many cases, bobby calves are transported long distances from the dairy farms to regional abattoirs. Because bobby calves are young and vulnerable it is especially important to consider their welfare during transport.

The aim of the study conducted by Cave *et al.* (2005) is to examine the factors that are associated with the death of bobby calves during transport. The authors examine the data on the mortality of bobby calves during transport from dairy farms to an abattoir in northern Victoria from 1998 to 2000. These data cover the period from August to October in each year as this is the period during which most bobby calves were transported to the abattoir. The authors examined the effects of distance travelled (which is related to duration of transport), month and year on the mortality of bobby calves during transportation.

The study revealed that bobby calf mortality increased exponentially with increased transportation distance. Distance travelled was found to be a valid estimate for the measure of journey time and the time since the calf's last feed. Therefore, the increased mortality of the calves could be related to increased exposure to the stresses of transportation and adverse environmental conditions. The results of this study highlight the need for further investigations into the welfare of bobby calves during transportation. This study also demonstrates the need for Codes of Practice to specify the maximum distance allowed for the transportation of bobby calves in addition to the specification of the maximum time taken between farm and abattoir.

Cave, J. G., Callinan, A. P. and Woonton, W. K. (2005). Mortalities in bobby calves associated with long distance transport. *Aust Vet J* **83**, 82-4.

Animals used for Sport and Entertainment

8. The effect of zoo visitor numbers on stress in captive spider monkeys

In order to assess and maintain the welfare of animals that are kept in zoos it is important to understand the impact that the zoo environment has on the physiological and psychological state of the housed animals. A common feature of the zoo environment that is a likely cause of stress in many zoo animals is human visitors. As a result, previous research has focussed on the relationship between stress behaviours exhibited by zoo animals and zoo visitors. However, to gain a thorough understanding of the effect that zoo visitors have on captive animals it is also necessary to understand the physiological impact that visitors have on these animals.

The study conducted by Davis *et al.* (2005) examined the relationship between the levels of cortisol present in the urine of spider monkeys and zoo visitor numbers. Cortisol is a steroid hormone that is commonly used as a marker for assessing physiological stress in captive animals. In this study, the cortisol levels of a group of spider monkeys were measured daily for a period over which visitor numbers to the zoo fluctuated. The results showed that the cortisol levels of the monkeys increased with an increase in the number of visitors at the zoo. However, the relationship between the cortisol

levels of the monkeys and the number of visitors was not strong; suggesting that a large increase in the number of visitors would not cause the monkeys to experience a considerable increase in physiological stress. The author's relate the limited impact that visitor numbers had on the monkeys stress levels to the fact that the design of their enclosure was such that they could escape from direct visual contact with the visitors. The results of this study indicate that zoo visitor numbers do impact upon the physiological stress levels of monkeys but that this effect may be attenuated by the presence of places in which the monkeys can escape direct visual contact with humans. For the results of a similar study based on the effect of visitor numbers on zoo housed gorillas see Wells (2005)

Davis, N., Schaffner, C. M. and Smith, T. E. (2005). Evidence that zoo visitors influence HPA activity in spider monkeys (*Ateles geoffroyii rufiventris*). *Applied Animal Behaviour Science* **90**, 131.

Wells, D. L. (2005). A note on the influence of visitors on the behaviour and welfare of zoo-housed gorillas. *Applied Animal Behaviour Science* **93**, 13.

Animal Research and Experimentation

9. Laboratory animal stress induced by laboratory conditions

Many fields of scientific research rely on data obtained from laboratory animals. Often, the housing and environmental conditions of these animals are constructed according to the space available in the laboratory and to reduce variation between animals that may bias the results. This often means that animals are kept alone in empty cages that are stacked on top of each other. However, many common practices in laboratory animal management have adverse affects on the physiological, psychological and behavioural states of the animals. These responses often differ between individual animals and as a result experimental outcomes from research that relies on any of these properties may not be accurate and may contain high degrees of individual variability.

Reinhardt (2004) has conducted a review of literature that examines the effect of several common environmental variables on stress in laboratory animals. The review aims to investigate how the average laboratory environment can induce stress in experimental animals and, as a consequence, affect the reliability experimental data. The paper discusses the most common husbandry-related variables, their impact on research data and methods to reduce or avoid the effects of these variables. Common features of the laboratory environment such as under stimulation, methods of restraint, multi-tier caging and handling have considerable effects upon the behavioural, psychological and physiological states of experimental animals. Other studies have demonstrated that abnormal lighting cycles (Van der Meer et al., 2004) and routine handling and management (Balcombe et al., 2004) significantly increase the stress responses of laboratory animals. Reinhardt argues that experimental data obtained from animals that are experiencing high levels of stress will not represent accurate models of normal function. As a consequence, the failure to reduce or avoid stressors in the laboratory environment compromises not only the welfare of the animals, but also the validity of research outcomes.

Balcombe, J. P., Barnard, N. D. and Sandusky, C. (2004). Laboratory routines cause animal stress. *Contemp Top Lab Anim Sci* **43**, 42-51.

Reinhardt, V. (2004). Common husbandry-related variables in biomedical research with animals. *Lab Anim* **38**, 213-35.

Van der Meer, E., Van Loo, P. L. and Baumans, V. (2004). Short-term effects of a disturbed light-dark cycle and environmental enrichment on aggression and stress-related parameters in male mice. *Lab Anim* **38**, 376-83.

Other Articles

- **Cooper, C. E. and Withers, P. C.** (2004). Influence of season and weather on activity patterns of the numbat (*Myrmecobius fasciatus*) in captivity. *Aust J Zool* **52**, 475-485.
- **Hampton, J. O., Spencer, P. B. S., Alpers, D. L., Twigg, L. E., Woolnough, A. P., Doust, J., Higgs, T. and Pluske, J.** (2004). Molecular techniques, wildlife management and the importance of genetic population structure and dispersal: a case study with feral pigs. *J. App. Ecol.* **41**, 735-743.
- **Hocking, P. M., Channing, C. E., Robertson, G. W., Edmond, A. and Jones, R. B.** (2004). Between breed genetic variation for welfare-related behavioural traits in domestic fowl. *Applied Animal Behaviour Science* **89**, 85.
- **Hosey, G. R.** (2005). How does the zoo environment affect the behaviour of captive primates? *Applied Animal Behaviour Science* **90**, 107.
- **Loberg, J., Telezhenko, E., Bergsten, C. and Lidfors, L.** (2004). Behaviour and claw health in tied dairy cows with varying access to exercise in an outdoor paddock. *Applied Animal Behaviour Science* **89**, 1.
- **Meldgaard, M., Bollen, P. J. and Finsen, B.** (2004). Non-invasive method for sampling and extraction of mouse DNA for PCR. *Lab Anim* **38**, 413-7.
- **Melfi, V.** (2005). The appliance of science to zoo-housed primates. *Applied Animal Behaviour Science* **90**, 97.
- **Schultz-Darken, N. J., Pape, R. M., Tannenbaum, P. L., Saltzman, W. and Abbott, D. H.** (2004). Novel restraint system for neuroendocrine studies of socially living common marmoset monkeys. *Lab Anim* **38**, 393-405.
- **Spurr, E. B. and Anderson, S. H.** (2004). Bird species diversity and abundance before and after eradication of possums and wallabies on Ragitoto Island, Hauraki Gulf, New Zealand. *N. Z. J. Ecol.* **28**, 143-149.
- **Spurr, E. B. and Berben, P. H.** (2004). Assessment of non-target impact of 1080-poisoning for vertebrate pest control on weta(Orthoptera: Anostomatidae and Rhaphidophoridae) and other vertebrates in artificial refuges. *N. Z. J. Ecol.* **28**, 63-72.