



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. Environmental enrichment for kennelled dogs

Many dogs must spend some time of their lives housed in kennels. Confinement raises welfare issues due to boredom and lack of stimulating exercise. This review paper covers two types of environmental enrichment advocated by researchers: allowing dogs to interact with other dogs and humans, and giving the dogs things to play with and explore.

The review found that dogs housed alone are more likely to perform unacceptable behaviours such as constant barking, cowering and stereotypic pacing. Therefore, dogs are better housed in pairs, small groups or in visual contact with other dogs. Human contact also has a positive effect on the welfare of kennelled dogs, possibly more so than contact with other dogs. Examples of human interaction that benefits dogs includes grooming, training and play. For dogs housed in shelters, positive human interaction whilst in the shelter also affects adoption success, as the dogs become more confident and friendly and therefore more likely to be chosen by potential owners.

Dogs in confined accommodation not only benefit from having other dogs and people to play with but from objects to play with and explore in their cages. Toys and furniture are good for the mental and physical stimulation of caged dogs, provided the dogs know how to use them and the toys are changed regularly. There has also been research into the use of television, music and different odours for environmental enrichment, but evidence for welfare benefits of these is inconclusive.

Wells D (2004) A review of environmental enrichment for kennelled dogs, *Canis familiaris*. Applied Animal Behaviour Science 85: 307-317

2. What happens to shelter dogs?

Dogs come to a shelter from many different places. This article analysed statistics from three shelters in Melbourne, Australia, over a one-year period, to determine what kind of dog comes through the shelter and what happens to them. Over 20,000 admissions were tracked over the study period and revealed that most dogs in the shelters were male, sexually entire, small and more than six months old. Most were stray, lost or homeless. About half were returned to owners, about one third were euthanased and about one fifth resold. The average length of stay in the shelter was five days, but most reclaimed dogs were there for less than two days. Victorian legislation states that dogs must be euthanased after 28 days in a shelter. Almost one third of owners did not give a reason for surrendering their dogs, but for those that did the most common reasons were behavioural problems or accommodation reasons. Dogs were euthanased mainly for health reasons or

aggressive/temperamental behaviour. About 7% of dogs adopted were returned, reasons for return included inappropriate accommodation, inappropriate/unexpected behaviour and conflict with household members including existing pets. The majority of these returned dogs were rehomed.

The main conclusion of the study was that the high number of sexually intact stray dogs arriving at shelters may indicate that the messages of desexing and adequate confinement have to be emphasised more in education programs.

Marston, LC; Bennett, PC; Coleman, GJ (2004) **What happens to shelter dogs? An analysis of data for one year from three Australian shelters** *Journal of Applied Animal Welfare Science* 7(1) 27-47

3. Anti-barking muzzles for dogs

Dog anti-barking muzzles, which restrict the jaw movement and aim to reduce excessive barking, have been in use for some time, but little is known about the welfare implications of dogs being unable to open their mouths widely. This experiment looked at the behaviour and cortisol levels of dogs fitted with anti-barking muzzles for 48-hours. Sixteen pure-bred Australian Kelpie dogs with histories of excess barking were tested, paired by age and sex but housed individually. One dog from each pair was fitted with a commercially available "Husher" anti-barking muzzle, and the dog's behaviour was observed and salivary cortisol level determined over the 48-hour period while the muzzle was worn and the following three days after removal of the muzzle.

Initial reaction to the muzzle was to adopt a submissive position (ears and tail down), and to paw at the muzzle, but these behaviours diminished over time. The muzzled dogs, as expected, did not bark as much as the control dogs when muzzled, but they barked as much as control dogs when the muzzle was removed. The muzzled dogs tended to be less active than control dogs, standing or lying down more often than moving about the pen. The authors hypothesise that this may be due to the unfamiliar feeling of the muzzle or subordinate behaviour induced by not being able to open their mouths wide enough to bear their teeth. After the muzzle was removed, the dogs tended to be more active, possibly because the period of inactivity induced a desire to exercise afterwards. There was no difference between cortisol levels of muzzled and control dogs, or evidence of physical injuries (e.g. scratches on head due to attempts at self-removal of the muzzle) in the muzzled dogs. The article did not specifically advocate the use of anti-barking muzzles, but the authors concluded that such muzzles reduces the amount of barking in dogs whilst not having a significant effect on stress levels. Further experiments on the effect of the muzzle on eating and drinking and during periods of heat when the dog needs to pant are required.

Cronin, GM; Hemsworth, PH; Barnett, JL; Jongman, EC; Newman, EA; McMaulen I (2003) **An anti-barking muzzle for dogs and its short-term effects on behaviour and saliva cortisol concentrations** *Applied Animal Behaviour Science* 83: 215-226

4. Behavioural effects of training using shock collars

Collars fitted with a remote-controlled electrical shock generator are sometimes used as training devices for dogs, but the welfare impacts of these collars is a matter of much debate. This report investigates whether shock collars are an effective training tool, and whether their use has any lasting affect on the behaviour and welfare of working dogs. The authors suggest three outcomes of training using shock collars: (a) the dog stops doing what it is not supposed to do when shocked, and continues with training routine (minimal welfare problem); (b) the dog stops what it is doing when shocked and cowers in pain or fear but soon continues with training routine (minor welfare problem); (c) the dog continues unusually fearful behaviour even after the shock collar is removed or during subsequent training sessions without the shock collar (considerable welfare problem). The behaviour of 15 police dogs was observed during training sessions using shock collars, whilst

another experiment observed 31 dogs trained to the same level, where half of the dogs were trained using shock collars and the other half were not. The researchers did not do any direct experimentation on the dogs, but recorded the behaviour during standard training sessions. Behaviours associated with pain, fear and submission (lowered tail and ears, crouched posture, yelping, snapping, licking lips nervously) were observed immediately after administration of electric shocks, indicating that the collar was painful, but no physical damage was detected. There was also a small but consistent difference in the longer-term behaviour of dogs trained using the shock collar. They tended to express fear related behaviour such as walking with a crouched posture with lowered ears and licking their lips after the training sessions when in the presence of their trainer, even outside of the training grounds. The authors conclude that, although training can be achieved by using shock collars, the dogs associate a painful shock with training (and the trainer) which leads to constant fear and a long-term negative effect on the welfare of working dogs. This result further adds to the concerns that negative reinforcement and punishment training is detrimental to the welfare of animals.

Schilder MDH; van der Borg JAM (2004) **Training dogs with the help of the shock collar: short and long term behavioural effects** Applied Animal Behaviour Science 85: 319-334

Farm Animals

5. Environmental conditions and gilt behaviour

Pregnant pigs will naturally gather nesting materials and make an isolated nest just before giving birth. In commercial farms, sows are usually kept in farrowing crates (small pens that restrict the movement of the sow and provide an area for the piglets to move around) during late pregnancy and birth, and until their piglets are weaned. This practice reduces piglet mortality, but raises welfare concerns for the sows. Much research has been carried out into the costs and benefits in terms of pig health and welfare of farrowing crates. This study looks at the behaviour and physiology of first-time mother pigs (gilts) with respect to the amount of space provided in the crate and the provision of straw. Thirty-four pigs were allocated to one of four conditions consisting of: (a) a farrowing crate 2.25m by 0.45m without straw; (b) farrowing crate with straw; (c) individual pens 2.5m by 3.0m without straw; (d) individual pen with straw. The pigs were fitted with a catheter for ease of blood testing and moved into the test areas five days before giving birth. Gilt behaviour was recorded from the time of introduction into the test area until two days after birth. Piglet position and behaviour was recorded every 10 minutes for eight hours following the birth of the first piglet. The presence or absence of straw appeared to have little effect on the behaviour or maternal ability of the pigs under these housing conditions, but may have had a thermoregulatory effect on the newborn piglets (the piglets in the barren environment tended to stay closer to mother for warmth). However, pigs with more space tended to display more “natural” behaviour towards their piglets, showing an initial interest in them and then lying down to feed. Pigs in crates were more restless and tended to not to lie down for long, and there was a significantly higher incidence of savaged piglets in crates. Blood tests showed no significant difference in stress hormones between the test environments, however the behavioural differences expressed give further support to the move towards providing larger space for breeding sows.

Jarvis S; Reed BT; Lawrence AB; Calvert SK; Stevenson J (2004) **Peri-natal environmental effects on maternal behaviour, pituitary and adrenal activation, and the process of parturition in the primiparous sow** Animal Welfare 13(2): 171-181

6. Environmental enrichment for pigs

Effective environmental enrichment for confined animals requires an understanding of the behavioural and physiological needs of the species, or inappropriate or wasteful techniques may be employed. There is a tendency for humans to provide environmental enrichment based on intuitive feeling towards what the animal might like rather than on natural animal behaviour. Pigs are intelligent, inquisitive animals and in restrictive production systems environmental enrichment is often employed in order to prevent destructive behaviours arising. This study investigated the interaction of pigs with a variety of objects, in order to identify the characteristics which promoted and maintained foraging and exploratory behaviour. The interactions of 444 weaner and grower pigs with 74 different items were recorded, and the characteristics of each object with regard to the behaviour of the pigs was analysed. For each test, three pigs were housed individually in pens with test objects/substrates such as ropes, balls, boxes, chains, clothing, sticks, straw, coconuts, peanuts, hard vegetables, sand, gravel etc. Behaviour was monitored for five days and the experiment repeated with a different set of pigs. Pigs interacted mostly with objects classified as “ingestible”, “odorous”, “chewable”, “renewable”, “deformable” and “destructible”. The most-used object was a box filled with lavender straw with whole peanuts dispersed throughout. This experiment illustrates the importance of determining how the animal uses objects before environmental enrichment programs are implemented.

Van de Weerd, HA; Docking, CM; Day, JEL; Avery, PJ; Edwards, SA. (2004) **A systematic approach towards developing environmental enrichment for pigs** Applied Animal Behaviour Science 84:101-118

7. Castration and tail docking techniques in lambs

Meat and wool sheep are usually castrated and tail-docked early in life, and the pain associated with these techniques raises animal welfare concerns. Using rubber rings is an effective method for amputation, but this method does not destroy the nerves to the appendage and lambs often show signs of considerable pain for hours or days after the procedure. This UK study compares two methods of pain reduction for use with rubber rings; crushing the nerves of the appendage after application of the ring using a “big nipper” bloodless castration device (similar in appearance to flat tongs), and injection of a common anaesthetic using a high pressure water jet injector (no needles required). Ten shepherds were asked to assess these techniques in field conditions on 60 newborn lambs (12-36 hours old). Twenty lambs were to have the rubber rings applied and immediately have the appendage crushed; 20 to have the rings applied just after injection with anaesthetic using the jet injector; 10 to have the rings applied after a placebo injection; 10 to have rubber rings applied with no pain-reducing techniques (control group). The behaviour of the lambs was recorded for at least 30 minutes starting within 15 minutes of the operation. The pain-relieving procedures used significantly affected the behaviour of the lambs, with the control group showing more pain-indicative behaviours such as kicking, tail wagging, stretching, jumping, stamping and rolling. The shepherds were asked to complete a questionnaire regarding the ease of use of the devices and the behaviour of the sheep after the operation. The shepherds preferred the water jet injector to the crusher, because it was overall easier to use, although it was more expensive. They agreed that the techniques tested reduced the amount of pain experienced by the animals, but due to the extra time required to administer the technique and the additional cost of purchasing the equipment, they suggested they would only use the devices if pain reduction became mandatory.

Kent JE; Thrusfield MV; Molony V; Hosie BD; Sheppard BW (2004) **Randomised, controlled field trial of two new techniques for the castration and tail docking of lambs less than two days of age** The Veterinary Record 154: 193-200

Animals used for sport and entertainment

8. Training zoo animals

Zoo animals have to interact with humans for physical, medical and hygiene maintenance, and they often need to be trained to perform certain activities for the safety of both animal and human handler. This paper discusses some of the techniques used to train zoo animals to comply with minor veterinary treatments and examinations, without the use of punishment, restraint or drugs. The authors advocate the “standard animal learning ability” theory, which uses the animals’ natural ability to learn and associate certain activities with a reward, and detail the basics of how to use this technique, the advantages of this technique, and possible disadvantages of this technique.

Young RJ; Cipreste CF (2004) **Applying animal learning theory: training captive animals to comply with veterinary and husbandry procedures** *Animal Welfare* 13(2): 225-232

Animals used in research and experimentation

9. Refinement, reduction and replacement

In the last few decades there has been an emphasis on the implementation of the reduction, replacement and refinement strategy with respect to the use of animals in research and education. This paper looks at the changes that have taken place over the last thirty years in biomedical research using animals. Data was collected by searching for the first fifty articles involving the use of animals published in the years 1970, 1980, 1990 and 2000 by fourteen leading journals. Factors such as the nature of the study (long/short term, invasive/non-invasive); the number of animals used for each study; the sex, age, species, and genetics of each animal; the housing conditions of the animals; diet; and whether the animals were euthanased at the end of the experiment were recorded (when possible). The major findings of this study were that although there was a huge increase in the number of papers published over the period examined, there has been a considerable reduction in the total number of animals used in biomedical research over the last thirty years – from an average of 110 animals per experiment in 1970, to 57 per experiment in 2000. The average number of mice used dropped by almost 80% over this period. Assessing any trend in refinement was much harder in the papers studied. A smaller proportion of dogs, cats, rabbits, and guinea pigs are being used now compared to previous decades, but with a slight increase in the proportion of mice and rats in experiments. The authors suggest that this may be one form of refinement; using rodents in place of other animals that may have more complex requirements. The study also found that more recent papers tended to give more consideration to the health and wellbeing of the animals when designing experiments, possibly reflecting an increased awareness of animal welfare issues in biomedical research.

Carleean, H-E; Hagelin J and Hau J (2004) **Implementation of the “Three Rs” in biomedical research** *The Veterinary Record* 54: 467-470

Wildlife

10. Humane vertebrate pest control

New Zealand, like Australia, has problems with introduced vertebrate animals having unintentional and detrimental effects on humans, animals and the environment. As in Australia, the control of

pests is a huge welfare issue. This paper provides an overview of considerations for humane vertebrate pest control. It focuses on animal welfare aspects including pain and sentience in the pest species, public opinion, legalities, ethics, justification, and research into more humane alternatives, standards and control programs. It sets out a series of guiding principles for the consideration of humaneness in decision-making processes for pest control that are accessible to all those involved. Although the points covered are illustrated in a New Zealand context, they are designed to cover vertebrate pest control worldwide.

Littin KE; Mellor DJ; Warburton B and Eason CT (2004) **Animal welfare and ethical issues relevant to the humane control of vertebrate pests** New Zealand Veterinary Journal 52(1): 1-10

11. Effectiveness of ROO- guards

The manufacturers of the commercially available “ROO-guard” (Shu Roo Pty. Ltd) claim that the ultrasonic sound frequencies emitted by this sonic deterrent device deter kangaroos to a radius of 250m. This independent study was conducted to test that claim. Two models of the “ROO-guard” were evaluated for acoustical characteristics and the effectiveness of deterrence in a captive and two free-ranging kangaroo populations. Despite the claim the devices were ultrasonic, sound emitted from each device, collected using a standard cassette recorder in indoor and field conditions, was clearly audible to the human ear. Behavioural observations were recorded before, during and after exposure to the active “ROO-guard” in kangaroo populations at Melbourne Zoo (where the kangaroos were used to close human presence); Weribee Open Range Park (where they were used to distant vehicle presence); and Yan Yean Reservoir Catchment (a wild population of kangaroos unused to vehicle presence). None of the kangaroos observed had any change in behaviour when the ROO-guard was active, nor did they not show any heightened awareness or vigilance or move away from or avoid the device.

Blender, H (2003) **Deterrence of kangaroos from agricultural areas using ultrasonic frequencies: efficacy of a commercial device** Wildlife Society Bulletin 31(4): 1037-1046

Miscellaneous

12. New Scientist Special

The June 12 2004 edition of New Scientist has a special section on “Animal Minds”, six features covering research into animal behaviour, personality and consciousness. The social structure of fish, ability of non-human primates to make complex judgements, tool making prowess of crows, recognition skills of sheep, personality of canines, and interspecies communication, all contribute to the changing views that traits which we thought were uniquely human may not be quite so exceptional after all.

Other articles

- Archer N; Johnston AM and Khalid M (2004) **Differences in the acute pain response of two breeds of lamb following castration and tail docking with the rubber ring method.** Animal Welfare 13(2): 135-141
- Arnould C; Faure JM (2003) **Use of pen space and activity of broiler chickens reared at two different densities** Applied Animal Behaviour Science 84: 281-296
- Baker, KC (2004) **Benefits of positive human interaction for socially housed chimpanzees** Animal Welfare 13(2): 239-245

- Blaney EC and Wells DL (2004) **The influence of a camouflage net barrier on the behaviour, welfare and public perceptions of zoo-housed gorillas.** *Animal Welfare* 13(2) 111-118
- Bornett, HLI; Edge, H and Edwards, SA (2003) **Alternatives to nose-ringing in outdoor sows: 1. The provision of a sacrificial rooting area** *Applied Animal Behaviour Science* 83: 267-276
- Edge HL; Bornett HLI; Newton E; Edwards SA (2004) **Alternatives to nose-ringing in outdoor sows: 2. The provision of edible or inedible overground enrichment** *Animal Welfare* 13(2): 233-237
- Honess, PE; Johnson, PJ; Wolfensohn, SE (2004) **A study of behavioural responses of non-human primates to air transport and re-housing** *Laboratory Animals* 38:119-132
- Hotzel, MJ; Machado, LCP; Wolf, FM; Costa OAD (2004) **Behaviour of sows and piglets reared in intensive outdoor and indoor systems** *Applied Animal Behaviour Science* 86: 27-39
- Schon PC; Puppe B; and Manteuffel G (2004) **Automated recording of stress vocalizations as a tool to document impaired welfare in pigs.** *Animal Welfare* 13(2) 105-110
- Sorrensen DB; Ottesen JL; Hansen AK (2004) **Consequences of enhancing environmental complexity for laboratory rodents – a review with emphasis on the rat** *Animal Welfare* 13(2): 193-204
- Studnitz, M; Jensen, KH; Jorgensen, E (2003) **The effect of nose rings on the exploratory behaviour of outdoor gilts exposed to different tests** *Applied Animal Behaviour Science* 84: 41-57
- Thomas, DG; Raindran, V; Thomas, DV; Camden BJ; Cottam YH; Morel, PCH and Cook CJ (2004) **Influence of stocking density on the performance, carcass characteristics and selected welfare indicators of broiler chickens** *New Zealand Veterinary Journal* 52(2): 76-81
- Van Loo PLP; Van der Weerd HA; Van Zutphen LFM; Baumans V (2004) **Preference for social contact versus environmental enrichment in male laboratory mice** *Laboratory Animals* 38: 178-188
- Van Loo PLP; Van der Weerd HA; Kruitwagen CLJJ; Koolhass JM; Van Zutphen LFM; Baumans V (2004) **Long term effects of husbandry procedures on stress-related parameters in male mice of two strains** *Laboratory Animals* 38: 169-177