

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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review

Carrots and sticks – principles of animal training

For many people animal training is somewhat of a 'black box', with teaching the family dog to sit and stay being the pinnacle of their achievement. This mystique is perpetuated by claims by some trainers of the uniqueness of their approach and the use of almost magical terminology when explaining their methods.

A new book by Paul McGreevy and Robert Boakes aims to prise open the black box and explain in scientific terms the whys and hows of animal training. If you've ever wondered how police attack dogs are trained or how to teach an octopus to take the lid off a jar, it will tell you that too.

The book begins with four chapters on the science of training and behavioural modification of animals. The authors explain the importance of understanding natural behaviour and the social evolution of different animals and how behaviour can be modified by the use of techniques such as habituation, imprinting and altering early experience. The next two chapters discuss the 'carrots and sticks' of the title, or the use of learning theory and positive reinforcement, and then fear, punishment and avoidance training. This first part ends with a chapter on animal intelligence and the role of memory, reasoning and problem solving in training. Each chapter contains numerous descriptions of training techniques, many of which are illustrated with photographs or attractive sketches.

The juicy part of the book is the series of 50 case studies in part two. Each study provides a training profile which explains the target behaviour and training programme applied to achieve this behaviour. Examples of companion, performing, working and exotic animals are covered in a systematic approach which teases out the use of positive and negative reinforcers and the key elements of training for each purpose. What is clear from these studies is that timing and consistency are essential, and all trainers rely on the same basic principles of habituation, sensitisation, reinforcement and/or punishment.

The approach of this book is straightforward and the ideas well-presented, though not all the examples are linked to the text and the lack of references could frustrate the academic reader. The tips and insights from animal trainers are a useful resource. Most importantly, it provides the reader with the opportunity to draw their own conclusions about the ethics of animal training and its impact on the welfare of the animals involved.

McGreevy, P.D. and Boakes, R.A. (2007) *Carrots and Sticks: Principles of Animal Training*. Cambridge University Press, Cambridge, UK 301pp.

Special offer!

Science Update readers can obtain *Carrots and Sticks* at 40% off the retail price (\$140 reduced to \$84) until 30 June 2008. Go to: <http://www.cambridge.org/aus/9780521686914> and click on "Add to basket". In the shopping basket screen, add the promotion code CARROTS in the grey area where indicated and then proceed to checkout. If you want to pay by cheque or don't wish to order online, contact Jenny Symons at jsymons@cambridge.edu.au or (03) 8671 1402.

special editions

Journal of Veterinary Behavior: Clinical Applications and Research (2007) Volume 2, Issue 6

This edition of the *Journal of Veterinary Behavior* is dedicated to the papers presented at the 2007 RSPCA Scientific Seminar entitled "How much space does an elephant need? The impact of confinement of animal welfare." The papers discuss various strategies of assessing the spatial requirements of different animals including production, companion and zoo animals. The use of scientific evidence in shaping policy and confinement standards is examined and specific contexts are considered, including laying hens, laboratory rats and mice and, as the title suggests, captive elephants. The papers from the Scientific Seminar are also available on the RSPCA Australia website at: <http://www.rspca.org.au/events/seminar2007.asp>

Veterinaria Italiana (2008) Volume 44, Issue 1

This edition of *Veterinaria Italiana* is entitled 'Welfare aspects of the long distance transportation of animals.' The journal aims to 'assist in the strengthening of global public policies for the protection of animal health and welfare' and, despite its global outlook, makes specific reference to Australian public policy, citing the *MV Becrux* and *MV Cormo Express* incidents that shaped the Australian livestock export industry. The journal opens with an historical background of animal transportation, examining the effect of economic, social and geographic transitions on livestock movement through antiquity, the Middle Ages and into the New World. The journal then moves onto the present, with various civil society organizations consulted, including papers from the Animal (Air) Transportation Association (AATA), the International Federation of Agriculture Producers, the Vienna Zoo and the World Society for the Protection of Animals (WSPA). The journal examines the use of public policy by various governments in Europe, South America, Australia and Canada. Quality management during transportation of various animals is then discussed, including laboratory animals, non-human primates and horses. Design and engineering of transport infrastructure is featured in several articles regarding livestock and horse transport. The journal concludes with a series of articles regarding the role of education and training in improving animal welfare during long distance transport. This edition of *Veterinaria Italiana* is timely, given the recent launch of the Handle With Care Coalition, led by WSPA, which believes that animals should be slaughtered as close as possible to their place of rearing. This journal provides a thorough review of the industry including several viewpoints and the various factors that contribute to animal welfare during long distance transport. Articles are available online at: http://www.izs.it/vet_italiana/issues_vet_it.htm

Reform: A journal of national and international law reform (2007/08) Issue 91

This edition of *Reform*, published by the Australian Law Reform Commission (ALRF), focuses entirely on animals and the law. Articles include comments by Nobel laureate in literature, Professor JM Coetzee and Professor Weisbrot, president of the ALRF. The journal discusses the basic rights of non-human animals and the philosophy of animal welfare and includes the perspectives of food producers, animal welfare advocates and lawyers. Ethics and the law, relating to various animal groups such as livestock, feral animals and experimental models are examined. The growing public concern for animal welfare amongst consumers and the failure of labelling laws to keep up with consumer demand is also discussed. The journal provides a stimulating look at various aspects of animals and the law and is available online at: <http://www.austlii.edu.au/au/other/alrc/publications/reform/reform91/>

companion animals

Biting dogs

This report collates the data gathered from surveying 100 owners whose dog had bitten a person, drawing statistically significant predictors of aggressive behaviour from the results. Of the 100 dogs, 79 were reported to have exhibited aggressive behaviour before the incident while the remaining 21 appear to have bitten accidentally or contrary to their normal behaviour and were classified as having no prior history of aggression. Owners were questioned about their pet's behaviour, obedience training and daily management.

The authors concluded that certain behavioural and management predictors correlate significantly with aggressive behaviour. Dominance and territorial type aggression were most frequently reported before the biting incident (50% and 33% respectively) and aggressive behaviour was often (38%) expressed on a daily frequency. Fear and anxiety were found to be significantly associated with a history of aggression. It was also found that there was an association between aggressive behaviour and lack of socialisation with other dogs or children and failing to respond to the command 'sit.' Unfortunately the authors were not able to compare their data to a control group of dogs that had not bitten a person and it is therefore difficult to gauge the true significance of the management and behavioural factors that appear to be associated with aggression. For instance, it is not clear whether the prevalence of dogs that do not sit on command is actually different in groups of biting and non-biting dogs. Nevertheless, the authors describe a subset of behaviours and management factors that appear to positively correlate with biting dogs and may be used as predictors of aggressive behaviour.

O'Sullivan, E.N., et al (2008) The management and behavioural history of 100 dogs reported for biting a person. *Applied Animal Behaviour Science* In press

farm animals

Global animal welfare

With the majority of the world's meat being produced in developing nations, animal welfare is becoming an increasingly global issue. This trend became particularly apparent when the World Organisation for Animal Health (OIE) adopted its first global guidelines for animal welfare in 2005. In this review of the global state of farm animal welfare, Fraser examines the factors that have distinguished the progress of the animal welfare movement in industrialised nations, from that of less industrialised countries. He begins by discussing changes in animal production, social consciousness and consumer demand over the last half of the 20th century and how this caused production systems to diverge. The West's reliance on systems that require high capital and low labour costs has resulted in industries that are far more intensive than those found in other parts of the world. In some industries production has been so concentrated that very few producers supply the majority of market. For example, half of chicken meat production in the USA is controlled by only five companies. By contrast, production systems in less industrialised countries have continued to rely on large numbers of small-scale producers. Therefore, the legislative, technological and academic progress that has been made in the field of animal welfare in industrialised nations may not be easily transferable to countries where the majority of food animal production continues to be extensive. Moreover, the legislative reforms that have prompted improvements in animal husbandry in the West are unlikely to be successful in countries that lack the resources for enforcement. Fraser discusses the difficulties of initiating positive changes in developing countries where the regulatory bodies, resources and animal welfare organizations that industrialised nations rely on are unavailable. He goes on to explore alternative approaches to improving animal welfare on a global scale. The economic advantages of good animal welfare are an important incentive to improve practices. Reducing losses by improving handling, transport, slaughter and disease control in turn increases profits. Fraser discusses the role of international corporations in improving industries by requiring producers to meet certain standards. He observes that the current extensive practices in some developing countries could be amenable to conversion to lucrative organic or other specialty farms. Trade agreements that promote import of high-welfare products from developing countries could encourage improvement of practices. Finally, Fraser touches on the role of animal welfare science which, in the West, has tended to focus on the welfare problems caused by conversion to intensive practices, often because the research has been required to allow regulatory change. Fraser comments that animal welfare scientists have an opportunity to broaden their field to incorporate the under-researched welfare problems of the developing world and in doing so contribute to improved animal welfare on a global scale.

Fraser, D. (2008) Toward a global perspective on farm animal welfare. *Applied Animal Behaviour Science* In press

Public expectations of broiler welfare

This article examines how good welfare practices impact animal production industries and the role of governments in setting regulatory targets to ensure that pro-welfare markets do not fail. More specifically the authors explore the use of public attitudes to welfare policies as an indicator of their benefits. The authors use a method called stated preference (SP) for evaluating the economic value of animal welfare whereby survey participants are asked to give their evaluation of welfare improvements in a hypothetical market. The recent European Union directive on broiler welfare is used as an example in this study. The authors found that 75% of participants were concerned about animal welfare, although only 50% were informed about

production systems and changed their purchasing behaviour accordingly. Respondents ranked farmers as the most responsible and consumers as the least responsible for broiler welfare, despite 58% agreeing that consumer behaviour has a positive impact on animal welfare. The authors used the respondents' willingness to pay (WTP) for the higher cost of welfare-friendly chicken meat to evaluate the benefits to society versus the costs to the industry. In doing so they found that even if all farmers committed to the strictest guidelines of the EU directive, the public's WTP would outweigh the costs. The paper concludes by discussing the difficulties of reconciling the public's stated preference with actual purchasing behaviour and how this creates difficulties for suppliers. The difficulty of compensating the broiler industry for complying with improved welfare standards is also discussed.

Moran, D. and McVittie, A. (2008) Estimation of the value the public places on regulations to improve broiler welfare. *Animal Welfare* 17:43-52

Food and water deprivation before livestock transport

It is common practice to withhold food and water from livestock prior to transport in order to reduce soiling of vehicles, roads and animals and their hides during transportation. This review considers the physiological effects of food and water deprivation (FWD) and explores the various factors that contribute to morbidity and influence rate of recovery. FWD particularly affects the gastrointestinal tract with changes in gut microflora predisposing animals to proliferation of pathogenic flora such as *Salmonella* and *E. coli*. This presents not only animal welfare problems but is also a concern in terms of food safety and public health. Because FWD tends to be accompanied by the stressors of transport – handling, unfamiliar yards and vehicles, fractured social groups – related increases in circulating corticosteroids (stress-related hormones) may contribute to morbidity and predispose animals to disease. The authors also discuss the effect of FWD on meat quality, commenting that muscle glycogen stores are rapidly depleted when stressed animals are not able to eat. This results in meat that is tough and dry. When animals have been food and water deprived for extensive periods, substantial recovery time with high quality feed may be necessary to ensure that the meat is tender and palatable. Recovery is required to rehydrate, repopulate the gut microflora and recover from the stress of transportation. Little is known about the effects of FWD on the recovery times of different species of animals, subject to different husbandry systems and diets. The authors conclude that more research is required to elucidate the many factors that contribute to FWD related health problems to improve the welfare of transported animals and produce healthier, more palatable meat.

Hogan, J.P., Petherick, J. C., and Phillips, J.C. (2007) The physiological and metabolic impacts on sheep and cattle of feed and water deprivation before and during transport. *Nutrition Research Reviews* 20:17-28

Welfare implications of broiler watering systems

Farming facilities are ideally designed with the health, welfare and productivity of the animals in mind. Facilities that allow housed animals to demonstrate instinctive behaviours are considered more welfare-friendly than systems that limit these behaviours in order to increase productivity. The authors of this paper investigate the use of nipple drinkers in the broiler chicken industry. Birds are required to peck at nipple drinkers, which are positioned above their heads, in order to release water. This system is contrary to the normal drinking behaviour of chickens. Given the opportunity, chickens prefer to drink by lowering their heads to a water source, scooping water into their beak and raising their heads to swallow. Despite the birds' preference for water bowls or even puddles, nipple drinkers are widely used in the broiler industry as they result in reduced water spillage and therefore a lower incidence of foot lesions such as hock burn and pododermatitis. This study tested broiler chicken preference for nipple drinkers, bell drinkers and water bowls and used video footage to analyse the drinking behaviour observed at each of these systems. The birds showed a preference for bowls and bell drinkers over raised nipple drinkers. Interestingly, when the nipple drinkers were lowered the birds showed no preference for any of the three systems. These experiments indicate that elevated nipple drinkers are potentially uncomfortable for broiler chickens and that lowered drinkers are apparently acceptable to the birds, despite being unable to drink by scooping water. Welfare of broiler chickens could therefore be improved by lowering nipple drinkers as lower drinkers result in increased water intake and growth. Lower drinkers, however, conflict with other aspects of broiler welfare. Higher drinkers discourage birds from perching on them and soiling them, increase floor space and reduce foot lesions caused by moist litter due to leakage. The authors conclude that a new design of broiler housing that lowers nipple drinkers without encroaching on these other aspects of chicken welfare could be easily achieved and commercially acceptable.

Houldcroft, E. et al (2008) Welfare implications of nipple drinkers for broiler chickens. *Animal Welfare* 17:1-10

research animals

What is it like to be a rat?

This comprehensive review of the literature pertaining to rat sensory perception aims to highlight the practical implications of rat perception with respect to laboratory animal welfare and experimental design. Burn draws on the literature concerning each of the classic five senses: vision, audition, olfaction, taste and touch. She discusses the physiology of rat sensation and provides examples of how this might be translated into better husbandry practices. She also gives examples where disregarding rat biology and behaviour has led to poor results. For example, rats are nocturnal animals with poor visual acuity and extreme sensitivity and aversion to light. This presents conflicts in the laboratory setting where good lighting may be required to perform experiments and monitor rat health yet their welfare is compromised by the damaging effects of bright, superficial lights. She also cites several studies that use rat models to examine the effects of light therapy on reducing depression. Obviously, in light of the significant differences between human and rat vision, the rat is not an appropriate model for such experiments; results are unreliable and rat welfare is compromised by performing them. Burn makes suggestions for improving laboratory rat welfare on the basis of their sensory perception, ranging from preferences for cage colour to reducing the usage of devices, such as fire alarms, that emit high levels of ultrasound. This review enables us to at least imagine what it might be like to be a rat by discussing rat sensory biology and how it differs from our own. In doing so, practical improvements to both rat welfare and experimental design are apparent. Burn concludes that further research to understand rat perception and that of other experimental species will continue to improve animal welfare, target laboratory resources and refine experimental design.

Burn, C.C. (2008) What is it like to be a rat? Rat sensory perception and its implications for experimental design and rat welfare. *Applied Animal Behaviour Science* In press

wildlife

Sea gull deterrence

In areas where humans and wild birds co-exist, food sources are readily available and adaptable bird populations readily expand to the point where they may out-compete other species and become unmanageable. While reducing food availability is one approach to managing bird numbers, in some situations, such as orchards and airports, bird deterrents are considered necessary adjuncts. The authors of this paper tested the efficacy of three non-lethal, non-chemical deterrents in discouraging two gull species from colonising a landfill in Italy. This was deemed to be an extreme scenario as dumps are such an attractive food source and gulls are considered to be highly intuitive. The first deterrent tested was a purpose-built acoustic device which randomly emitted sounds ranging from distress calls to electronic sounds over a wide range of frequencies. The next deterrent was termed a 'visual scare' and involved two people dressed in bright clothing waving, yelling and behaving in a threatening manner towards the gulls. The final deterrent tested was a trained falcon, released by a falconer at intervals to circle above the gulls threatening, but not harming the birds. The authors found that none of the tested stimuli were particularly successful as the gulls tended to linger in the area waiting for the disturbance to stop. The gulls rapidly habituated to both the audio device and the falcon with the visual scare proving the most effective of the three systems.

Soldatini, C. et al (2008) Testing the efficacy of deterring systems in two gull species. *Applied Animal Behaviour Science* **110**:330-340

Reducing aggression in captive chimpanzees

Zoo enclosures aim to encourage natural behaviours in wild animals by simulating their natural habitat, an approach known as environmental enrichment. For semi-arboreal species such as the chimpanzee, this includes providing structures that enable captive animals to move vertically as they would in the wild. Vertical structures are particularly important for providing a means of escaping conflict, as most primates exhibit a vertical flight response when distressed. This study examines the effect of a large vertical structure comprising 50 wooden poles, ropes and nets on a large chimpanzee group at the Chester Zoological Gardens in England. Twenty-nine chimpanzees were observed for aggressive interactions over a period of 2.5 years after the structure was erected in their enclosure. Behaviours were classified according to their intensity and location (including whether the vertical structure was involved). Unfortunately insufficient data was sampled before the structure was added to allow a direct measure of the change in intensity of

aggression that the structure might have facilitated. Regardless, the authors observed that the structure provided a means of avoiding conflict in the group and was effective in reducing the severity of aggression as evidenced by the lower proportion of serious injuries after the structure was added. The proportion of severe aggression was higher when the structure was not involved in aggressive incidents and no episodes of severe aggression were initiated between individuals on the structure. The authors concluded that in groups of potentially aggressive semi-arboreal species, complex vertical structures may mitigate aggressive interactions by providing escape routes and should be considered by facilities housing these animals.

Caws, C.E., Wehnelt, S. and Aureli, F. (2008) The effect of a new vertical structure in mitigating aggressive behaviour in a large group of chimpanzees (*pan troglodytes*). *Animal Welfare* **17**:149-154

other articles of interest

Barnett, J.L., Cronin, G.M. and Scott, P.C., (2007) Behavioural responses during the kosher slaughter of poultry and their implications for welfare. *The Veterinary Record* **160**(2):45-49.

Burn, C.C. and Mason, G.J. (2008) Effects of cage-cleaning frequency on laboratory rat reproduction, cannibalism, and welfare. *Applied Animal Behaviour Science* In Press

Edwards, L.E., Hemsworth, P.H. and Coleman, G.J. (2007) Human contact and fear responses in laying hens. *Australian Poultry Symposium* **19**, 33-36.

Ferguson, D.W. *et al* (2007) Evaluation of the effect of cattle marketing method on beef quality and palatability. *Australian Journal of Experimental Agriculture* **47**(7):774-781.

Håstein, T., Scarfe, A.D. and Lunde, V.L. (2005) Science-based assessment of welfare: aquatic animals. *Scientific and Technical Review of the Office International des Epizooties* **24**(2):29-547

Jarvis, S. *et al* (2007) Effects of weaning age on the behavioural and neuroendocrine development of piglets. *Applied Animal Behaviour Science* **110**:166-181

Jensen, P. *et al* (2008) Genetics and genomics of animal behaviour and welfare—Challenges and possibilities. *Applied Animal Behaviour Science* In Press

Karlen, G.A. *et al* (2007) The welfare of gestating sows in conventional stalls and large groups on deep litter. *Applied Animal Behaviour Science* **105**:87-101

Kuenzel, W.J. (2007) Neurobiological basis of sensory perception: Welfare implications of beak trimming. *Poultry Science* **86**(6): 1273-1282

Knowles, T.G. *et al* (2008) Leg disorders in broiler chickens: Prevalence, risk factors and prevention, *PLoS ONE* Issue 2, e1545.

Lauber, M.C.Y., Hemsworth, P.H. and Barnett, J.L. (2006) The effects of age and experience on behavioural development in dairy calves. *Applied Animal Behaviour Science* **99**:41-52.

McLeod, S.R. *et al* (2007) Prospects for the future: is there a role for virally vectored immunocontraception in vertebrate pest management? *Wildlife Research* **34**:555-556

Nicol, C.J. *et al* (2008) A targeted approach to developing environmental enrichment for two strains of laboratory mice. *Applied Animal Behaviour Science* **110**:341-353

Patterson, L. *et al* (2007) Physiological stress responses in the edible crab to the fishery practice of de-clawing. *Marine Biology* **152**: 265-272.

Riedel J. *et al* (2008) The early ontogeny of human-dog communication. *Animal Behaviour* **75**:1003-1014

Toth, L. *et al* (2008) Playing styles and possible causative factors in dogs' behaviour when playing with humans. *Applied Animal Behaviour Science* In Press

Warner, R.D. *et al* (2007) Acute stress induced by the preslaughter use of electric prodders causes tougher beef meat. *Australian Journal of Experimental Agriculture* **47**(7):782-788

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