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.

Farm Animals

1. Tooth clipping in pigs

In the April 2004 edition of the Science Update we reviewed a French article examining the microscopic damage caused by tooth grinding and tooth clipping in piglets that concluded that the damage caused to the piglet is severe, and these procedures should be re-evaluated with respect to the welfare of the piglet. This new Australian report looked at 207 piglets in a Southern New South Wales piggery. The piglets were divided into three groups: teeth clipped, teeth ground and teeth left intact. The researchers found that there was significantly more damage done to piglets' faces in the intact group than in the other groups, but that damage to sows' udders was not increased. They found that piglets in the group whose teeth were ground had more tooth abscesses than those in the clipped teeth group (in accordance to the French study). This study focused on macroscopic damage to the pigs and concluded that tooth clipping was a worthwhile practice, due to the decrease in facial damage in piglets who had their teeth shortened. This shows that there are many conflicting conclusions surrounding tooth clipping and the issue is being followed closely.

Holyoake PK, Broek DJ and Callinan APL (2004) **The effect of reducing the length of canine teeth in sucking pigs by clipping or grinding.** Australian Veterinary Journal. 82(9): 574-576

2. Feather Pecking

One problem with free-range and barn-housed chickens is that of aggression between animals. Cannibalism and severe feather pecking are extremes of this, but why these behaviours are expressed is uncertain.

The paper by Rodenburg *et.al.* discusses some aspects of feather pecking such as definitions, coping strategies and causation of feather pecking, and genetic traits associated with the behaviour. There are degrees of feather pecking. Gentle pecking is associated with exploring or grooming; this seldom causes the recipient harm but has been associated with stereotypical behaviours or more aggressive feather pecking from the perpetrator. Severe pecking, which leads to the feathers being pulled out, pecking the exposed tissue and vent pecking are a welfare problem leading to lesions, infection, very poor health or death of the victim. Severe feather pecking can develop in day-old chicks and is influenced by the familiarity of the animals, but there is no clear evidence to say why the normal exploratory and grooming behaviour is over expressed. It is known that severe feather

pecking is initiated by a small number of individual animals, and the rest of the flock often follow suit. These birds often show a more aggressive and less physiological stress response in a restraint test than the average bird. There are also a number of strains which are more predisposed to feather peck than others, indicating a genetic predisposition for feather pecking, but this paper did not disclose a distinct gene or area on chromosome associated with the behaviour.

In a short communication in the journal *Nature,* the authors did find a gene associated with feather pecking, and suggested that the expression of this gene predisposed chickens to becoming victims of severe feather pecking. A mutation in the gene PMEL17 causes chickens to be white (i.e. it disrupts the normal colouration in the feathers), as is the case with white leghorn domestic fowls. In this experiment white chickens were bred with wild red junglefowl, which do not have the mutation in the PMEL17 gene and are therefore coloured. The coloured gene is recessive, therefore only one in four will be coloured when white chickens are crossed with coloured ones. The results showed that the pigmented birds were significantly more likely to suffer from severe feather pecking than white birds. The authors suggest that the link is only with the victim, not the perpetuators, and hint that the environment may also influence the chance of being bullied (chickens were housed with light-coloured wood shavings on the floor).

Rodenburg TB, van Hierden YM, Buitenhuis AJ, Riedstra B, Koene P, Korte SM, van der Poel JJ, Groothuis TGG and Blokhuis HJ (2004) **Feather pecking in laying hens: new insights and directions for research?** Applied Animal Behaviour Science. 86: 291-298

Keeling L, Andersson L, Schutz KE, Kerje S, Fredriksson R, Carlborg O and Cornwallis CK (2004) **Feather pecking and victim pigmentation.** Nature. 431: 645-646

Animal research and experimentation

3. The welfare of genetically modified animals

The development and use of genetically modified (GM) animals in research raises public concerns, especially with respect to the welfare of these animals. Not only are there concerns with the general welfare aspects of using animals for research, there are also concern that genetic modification may cause suffering as a direct result of the genetic changes. This paper examines what conditions, modifications or procedures involved in creating and experimenting on genetically modified animals may affect the welfare of laboratory animals. They focus on suffering caused directly by the modification, not on other causes such as experimental procedures or housing conditions. The discussion revolves around the advantages of genetic modification and the problems with disease models.

One of the experimental advantages of genetic modification is that there is a greater predictability of knowing the outcome of the modification, as a known gene is often targeted. With conventional breeding there is not much control on the genotype (genetic makeup) or phenotype (physical appearance and behaviour) of the progeny, and often it takes many generations to obtain the desired result. Genetic modification may result in a reduction of the number of animals used to obtain an experimental result, but the exact result of a genetic modification can only be known when the genetically modified animal's DNA is analysed. The procedures are often invasive (e.g. requiring embryo transfer) and the insertion may result in unacceptable or unexpected outcomes.

One major concern with the development of GM animals is with disease models. The animals are designed to express a gene associated with a genetic disorder in humans or animals and therefore designed to suffer if that disease manifests in the experimental animal. Sometimes this is not a

problem because the model animal does not experience the disease in the same way as the human/animal sufferer, or the experiment is terminated before problems arise.

The authors backed up their discussions with published examples when available. Their main conclusion was that, although there may be additional welfare concerns involved with GM experimental animals, each experiment and issue must be assessed individually.

Buehr M, Hjorth JP, Hanse AK and Sandoe P (2003) **Genetically modified laboratory animals – what welfare problems do they face?** Journal of Applied Animal Welfare Science. 6(4): 319-338

Wildlife

4. 1080 Poisoning

Sodium monofluoroacetate, commonly known as 1080, has been widely used to control a variety of animals in Australia for over 50 years. Traditionally it was thought that different animals were affected very differently by the poison, and can be divided into four groups first developed in 1946 depending on the main symptoms of poisoning and the final cause of death. It is often said that 1080 affects the heart (cardiac system) of herbivores, that carnivores die from severe central nervous system failure and omnivores die from a combination of heart failure and CNS breakdown.

By careful analysis of the literature published over the last 50 years, the author of this paper details all the symptoms reported for various animals and discusses the underlying causes of these symptoms. She concludes that the symptoms of 1080 poisoning are quite similar between animals and that the traditional categories of 1080 poisoning are misleading. This implies that the poison may be less humane for animals such as rabbits, which are commonly thought not to suffer severely from 1080 poisoning.

Sherley M (2004) **The traditional categories of fluoroacetate poisoning signs and symptoms belie substantial underlying similarities.** Toxicology Letters. 151: 399-406

5. Tranquiliser trap for dingoes

In parts of Australia the dingo is considered a significant pest because of its supposed predatory effect on sheep and cattle. Trapping and shooting is a relatively effective method for control of dingoes, but traps have welfare problems associated with them, causing pain, injury, stress and anxiety. To make leg-hold traps more humane, they can be fitted with capsules containing tranquiliser drugs (tranquiliser trap devices, or TTDs) which the captive animal bites and then ingests the drug. The aim is to sedate the animal until the trapper comes.

This paper reports on a Central Western Queensland study of the effectiveness of the delivery of the sedative diazepam using a TTD fitted to a Victor© Soft-catch leg-hold trap. Traps were fitted with a TTD containing either the drug or a placebo preparation and set in a high dingo activity area. They were checked every 24 hours. Buried beside each trap was a vibration monitor set to begin recording if the trap was sprung. Trapped dingoes were subsequently killed, and blood and limb samples were collected and analysed off-site. A total of 48 dingoes were trapped, but only 36 were shown to have ingested the contents of the TTD. The animals that consumed the drug showed significantly less activity than the placebo group, especially in the first few hours (it was suggested that the placebo group eventually settled because of exhaustion or acceptance of capture). There was, however, no difference between the groups in the amount of gum and tooth damage or limb injuries caused by the animals' attempts to escape from the trap. Suggesting that the animals injured themselves before the drugs effects set in. There was a 25% failure rate of the TTD in

administering the drug: either the capsule was not broken or the drug was not ingested. The authors conclude that the TTD has some limitations and discuss improvements to the use of TTDs, e.g. using more tranquiliser devices per trap.

Marks CA, Allen L, Gigliotti F, Busana F, Gonzalez T, Lindeman M and Fisher PM **(2004) Evaluation of the tranquilliser trap device (TTD) for improving the humaneness of dingo trapping.** Animal Welfare. 13(4): 393-399

6. Fox control using para-aminopropiophenone

Pest control using poisoned baits poses two main problems: non-target species being poisoned and dying or becoming sick, and the inhumanness of the poison being used. This paper addresses both issues. The M-44 ejector is a new device developed for delivering poison specifically to a fox. A capsule of poison is incorporated into bait which is attached to a spring-loaded piston device inside a cup. The cup is a size that only a fox's snout can enter, and when the bait is tugged, the ejector springs the poison capsule directly into the fox's mouth. The paper reports the use of a new poison, para-aminopropiophenone (PAPP), being delivered by the M-44 ejector. PAPP affects the oxygen-carrying capacity of the blood in canids.

In this paper, different concentrations of PAPP were tested in a laboratory setting and it was found that the poison is dose-dependent, i.e. stronger concentrations showed faster onset of symptoms. The behaviour of 5 foxes was recorded when placed in a pen containing an M-44 ejector baited with liver containing a 226mg capsule of PAPP. Symptoms, onset of abnormal behaviour and time of death were compared to previously published 1080 data. When the foxes triggered the ejector they shook their head vigorously but this did not deter them from the bait. They showed no abnormal behaviour for 10-24 minutes after ingesting the poison, when they became lethargic and staggered until they collapsed and died 30-43 minutes later. This result was considerably faster than that reported for onset of symptoms and death from 1080 and the animals did not express the characteristic retching, paddling and spasms seen with 1080.

Although more work is required on this poison before it is commercially available, these results show it to be a promising and more humane alternative to 1080 for foxes.

Marks CA, Gigliotti F, Busana F, Johnston M and Lindeman M (2004) **Fox control using para-aminopropiophenone formulation with the M-44 ejector.** Animal Welfare. 13(4): 401-407

7. Aquatic Zoos

The Captive Animals Protection Society commissioned an independent report on the public aquarium industry in the United Kingdom. The report is based on statistical data and observations/interviews from 31 public aquaria around the country and concentrates on observing the welfare status of the animals and the conservation, education and research focus of each aquarium.

The report concludes that the welfare of captive aquatic animals in public aquaria is generally inadequate, and that aquaria seldom met the criteria for conservation, education and research that modern zoos claim to fulfill. The health of the animals was on the whole poor, with a high incidence of abnormal behaviour and physical injury, infection and disease. There was little conservation effort, with many organsiations taking animals from the wild and returning them to the sea if they become sick or just because they were no longer needed. Habitat protection may have been jeopardized because the fish were collected from the wild or the display of tropical animals may encourage visitors to buy their own. Breeding programs were relatively unsuccessful.

Sometimes species of display animal were even served in the associated café (e.g. battered cod with chips). Many aquaria actively encouraged physical touching of the animals by the visitors, which poses health and welfare problems for both the animals and visitors. There was a problem with the educational relevance of some aquaria because of poorly designed and used signs, poorly informed staff and misleading or wrong information. There was very little scientific research occurring in the aquaria investigated.

The report concludes that the conditions of modern public aquaria are very poor for the welfare of the animals; they do not show the animals in their natural habitat; they do not benefit the animals and essentially exist for the entertainment of humans.

Casamitjana J (2004) **Aquatic Zoos: a critical study of UK public aquaria in the year 2004.** At http://www.captiveanimals.org/aquarium/suffering.htm

Humane Killing

8. Blood loss after religious slaughter or stunning

One of the arguments made against the stunning of animals before slaughter for religious purposes is that Jewish and Muslim practices require all blood to be removed from the meat before consumption, and it is believed that pre-stunning prevents this from happening. This report tested the validity of this belief.

Sixty sheep were selected from two commercial abattoirs in Istanbul, Turkey. The usual method for slaughter in the slaughterhouse was slitting the neck without pre-stunning, according to Muslim protocol, but for the sake of this experiment a group of animals were stunned using head-only electrical stunning and captive bolt pre-stunning. The blood loss rate and percentage of total blood loss as a percentage of total body weight was calculated and compared between the three groups, as well as some biochemical aspects of the blood, and meat pH and colour. It was found that there was no significant difference between the blood loss rate and amount of blood loss between animals which were pre-stunned and those that were not. There was no difference in blood biochemistry between the groups, but there was a slight difference in the meat quality. However, this result was not discussed in detail.

The authors conclude that there is no evidence to show that animals have less blood in their meat if they are not stunned before slaughter. Although this is only one paper using a small number of animals, it lends support for the pre-stunning of animals before religious slaughter.

Anil MH, Yesildere T, Matur E, McKinstry JL, Erdogan O, Hughes S and Mason C (2004) **Comparison of religious slaughter of sheep with methods that include pre-slaughter stunning, and the lack of difference in exsanguinations, packed cell volume and meat quality parameters.** Animal Welfare. 13(4): 387-392

Other Articles

- Albentosa MJ and Cooper JJ (2004) **Effects of cage height and stocking density on the frequency of comfort behaviours performed by laying hens housed in furnished cages**. Animal Welfare. 13(4): 419-424
- Carlsson H-E, Schapiro SJ, Farah I and Hau J (2004) **Use of primates in research: a global overview.** American Journal of Primatology. 63: 225-237
- Latham N and Mason G (2004) **From house mouse to mouse house: the behavioural biology of free-living *Mus musculus* and its implications in the laboratory.** Applied Animal Behaviour Science. 86: 261-289
- Hone J (2004) **Yield, compensation and fertility control: a model for vertebrate pests.** Wildlife Research. 31: 357-368

- Johnson SR, Patterson-Kane EG and Niel L (2004) **Foraging enrichment for laboratory rats.** Animal Welfare. 13(3): 305-313
- Manteuffel G, Puppe B and Schon PC (2004) **Vocalisation of farm animals as a measure of welfare.** Applied Animal Behaviour Science. 88: 163-182
- Maria GA, Villarroel M, Chacon G and Gebresenbet G (2004) **Scoring system for evaluating the stress to cattle of commercial loading and unloading.** The Veterinary Record. 154: 818-821
- Nugent G and Yockney I (2004) **Fallow deer deaths during aerial 1080 poisoning of possums in the Blue Mountains, Otago, New Zealand.** New Zealand Journal of Zoology. 31: 185-192
- O'Connell NE, Beattie VE and Moss BW (2004) **Influence of social status on the welfare of growing pigs housed in barren and enriched environments.** Animal Welfare. 13(4): 425-432
- Parker R, Watson R, Wells E, Brown SN, Nicol CJ and Knowles TG (2004) **The effect of blindfolding horses on heart rate and behaviour during handling and loading onto transport vehicles.** Animal Welfare. 13(4): 433-438
- Pinchbeck GL, Clegg PD, Proudman CJ, Morgan KL and French NP (2004) **Whip use and race progress are associated with horse falls in hurdle and steeplechase racing in the UK** Equine Veterinary Journal. 36(5): 384-389
- Tarou LR, Kuhar CW, Adcock D, Bloomsmith MA and Maple TL (2004) **Computer assisted enrichment for zoo-housed orangutans.** Animal Welfare. 13(4): 224-254
- Warburton B and O'Connor C (2004) **Research on vertebrate pesticides and traps: do wild animals benefit?** Alternatives to Laboratory Animals. 32: Supplement 1, 229-234
- Wells DL and Egli JM (2004) **The influence of olfactory enrichment on the behaviour of captive black-footed cats, *Felis nigripes*.** Applied Animal Behaviour Science. 85: 107-119
- Wells DL (2004) **The influence of toys on the behaviour and welfare of kenneled dogs.** Animal Welfare. 13(3): 367-374
- Zulkifli I and Siti Nor Azah (2004) **Fear and stress reactions, and the performance of commercial broiler chickens subjected to regular pleasant and unpleasant contacts with human beings.** Applied Animal Behaviour Science. 88: 77-87