

with the need for environmental enrichment, including (depending on the species) provision for resting, running, climbing, leaping and foraging as well as offering some control and choice over their environment. It is also suggested that the success of each form of enrichment be reviewed regularly to assess effectiveness.

The guide concludes with suggestions as to how the implementation of the principles of the 3Rs can be encouraged. Methods include the dissemination of relevant information through appropriate scientific publications, the inclusion in their publications of information on how researchers implemented the 3Rs, and encouraging the fostering of relationships with animal welfare scientists. Furthermore, it is suggested that recognition by the MRC of "...significant and original contributions to the development of the 3Rs in...reviews of MRC establishments... may be rewarded through...providing additional funds..."

Whilst readily applicable to most MRC-funded primate research, these guidelines relate specifically to the use of macaques and marmosets, and to associated breeding programmes. They set out optimal rather than minimum requirements and also allow a degree of flexibility by acknowledging that, in some situations, full implementation of these guidelines may not be possible. No reading list or details of where to find additional information are included, although those requiring such information are directed to a website where an up-to-date reading list can be found.

MRC Ethics Guide: Best practice in the accommodation and care of primates used in scientific procedures (2004). Produced and published by the Medical Research Council, 20 Park Crescent, London W1B 1AL, UK. 16 pp A5 paperback. Available free of charge from the MRC at: www.mrc.ac.uk/index/publications/publications-electronic_publications.htm

The behavioural biology of the mouse: implications for the welfare of laboratory mice

The house mouse (*Mus musculus*) is the animal most commonly used in research, with over 30 million kept worldwide. In a recent review of the scientific and pest control literature, Naomi Latham and Georgia Mason (Oxford University) discuss various aspects of mouse behaviour including the sensory capabilities, developmental processes and behaviour of the free-living house mouse, whilst proposing how laboratory environments might affect such behaviour and welfare. The authors also suggest how an understanding of the behaviour of free-living mice can generate new ideas for research and can help in interpreting findings.

Following a short description of the adaptability and sensory biology of free-living mice, the review proceeds to more in-depth discussions on the developmental factors that affect adult phenotype, sexual maturity and dispersal, choosing and establishing a territory, behaviour within the territory, dominance and territorial aggression, mating and reproduction, and morbidity and mortality. The remainder of the paper focuses on the implications of these natural behaviours for mouse use, functioning and welfare in the

laboratory. Here, the authors consider the differences between wild and laboratory mice and the impact of these differences on four topics: (i) housing issues that may affect welfare; (ii) housing issues that may affect mouse functioning; (iii) factors that could refine behavioural tests; and (iv) long-term housing/husbandry effects that may lead to unexplained variance in research results.

In terms of housing factors that might affect welfare, in addition to the issues that have already received considerable attention, such as nesting material and floor substrate, the authors suggest a number of new hypotheses relating to social factors. For example, they suggest that the lack of choice in dispersal age or strategy, and the lack of exposure to maternal auditory and olfactory cues following 'weaning', may reduce welfare. The authors also address the possibility that being housed with unfamiliar, same-sex adults, with little opportunity for escape from aggressive encounters or the odours and vocalisations of potentially threatening conspecifics, may be aversive and detrimental to welfare. Regarding the factors which may influence behavioural tests, the authors suggest a number of sensory cues that may be important, such as computers and large dark objects, which may be perceived as predator cues.

This paper will be of interest to anyone engaged in research using mice as well as those with a more general interest in the implications of behavioural biology for the welfare of captive animals.

Latham N and Mason G (2004) From house mouse to mouse house: the behavioural biology of free-living *Mus musculus* and its implication in the laboratory. *Applied Animal Behaviour Science* 86: 261-289

Video on emergency slaughter of farmed livestock

When farmed livestock have to be euthanased, for example because of severe injury or illness, and under circumstances in which treatment is not an option because of welfare, economic, or other considerations, it is very important (and in European and many other countries a legal requirement) that the procedure is carried out humanely. Everyone responsible for animals needs to have a system in place for dealing with such situations immediately when they arise, in order to prevent unnecessary suffering. In many cases this means that the task falls to the farmer him/herself, and it is essential that all who are responsible for despatching animals have the necessary knowledge, skills and equipment for the task.

The Humane Slaughter Association has recently published a video (see details below) in which humane killing techniques for a range of farmed livestock including cattle, pigs, sheep, infant animals, and poultry are demonstrated. The use of electrical and captive bolt stunning equipment is described, as is the use of a non-penetrative captive bolt poultry killer and firearms. Various manual methods that can be employed in emergencies when no special equipment is available are also described for some

livestock. There are also sections on correct servicing and maintenance of firearms and other equipment.

The video is well produced and the information presented in it is clearly demonstrated and described. It is an informative and valuable training resource for all those responsible for, or planning to become responsible for, farmed livestock. It will be of interest also to all those involved in education about farm animal production and welfare. It is accompanied by a booklet which provides further information and re-emphasises key points.

Emergency Slaughter: practical guidance on the humane killing of injured, diseased, and non-viable livestock Humane Slaughter Association (February 2004). Video. Produced by Countrywise Communication. Published by and available from the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, UK; telephone +44 1582 831919; email info@hsa.org.uk. Price £15.

Reducing injuries to dairy cattle

'Reducing Injuries to Dairy Cattle' is an interactive CD-ROM resource aimed at providing guidance on minimising the risk of injuries to dairy cattle through the identification and amelioration of potential causes. This guide is the result of a series of Department of Environment, Food and Rural Affairs (DEFRA)-sponsored meetings held around the UK to provide practical advice and technical support for all those involved in the dairy industry

From the title page, clicking on one of the eight module icons takes the user to a PowerPoint presentation on the theme of the module, most of which are sub-divided into further sections. In addition to the introduction and a section describing common injuries, the other sections discuss housing factors affecting the prevalence of injury, lameness, cow behaviour, locomotion scoring, teat injuries, and ear tagging.

The introduction outlines the types of injury to which dairy cattle are susceptible, with accompanying photographs illustrating the main injury points, together with the potential causes. Drawing on the Farm Animal Welfare Council's Five Freedoms, the different aspects of welfare

are discussed, as are the financial benefits for the farmer of investing in good welfare practices. The most comprehensive section covers the topic of housing conditions, primarily focusing on the advantages and disadvantages of cubicles and straw yards. Detailed information regarding cubicle design is given: bedding material, appropriate dimensions of individual cubicles in relation to cow movement, and the common problems associated with their use are detailed. In the section on lameness, prophylactic measures are discussed, including how underfoot conditions, concrete, farm tracks, gateways and paths, and access and feed passages can affect its incidence. A practical demonstration on identifying lameness by locomotion scoring is given in a series of video clips showing cows with varying degrees of lameness. Understanding the natural behaviour of cattle is also an important tool in minimising the number of avoidable injuries as it can help in the designing of facilities in order to avoid accidents and stress. This point is captured in the section on cow behaviour, in which the strengths and weaknesses of the senses, the flight zone and its application for control of movement (including video clips), and handling facilities (including the race, AI stalls and backing gates) are discussed.

Navigation through the CD-ROM is straightforward although the narration accompanying each slide has to be complete before the user can move on to the next slide. The package takes approximately one hour to navigate fully. The major points are illustrated throughout with well-placed diagrams and photographs, whilst links to further sources of information, including the 'Code of Recommendations for the Welfare of Livestock: Cattle' and the FAWC website, are supplied. For those requiring further information, a list of websites on the topic of cow health is provided, along with contact details for the Animal Health and Welfare Department (DEFRA).

Reducing Injuries to Dairy Cattle DEFRA (May 2004). CD-ROM produced by ADAS, compiled by Countrywise Communication. Available from the Animal Welfare Division of DEFRA at Animal Welfare Division, Area 509, 1A Page Street, London, SW1P 4PQ, UK; telephone +44 20 7904 6521; website www.defra.gov.uk/animalh/welfare/default.htm