

Book Reviews

Variables, Refinement and Environmental Enrichment for Rodents and Rabbits in Research Institutions

V Reinhardt and A Reinhardt (2006). Published by the Animal Welfare Institute, PO Box 3650, Washington DC 20027, USA. 71 pp Paperback. Available free of charge: viktor@snowcrest.net.

This book is the latest in a series of initiatives from long-standing advocates for animals Viktor and Annie Reinhardt of the Animal Welfare Institute in Washington DC. Aimed at animal-care staff, veterinarians and scientists who wish to improve the living conditions and welfare of rodents and rabbits housed in research institutions, and in so doing produce better science, it summarises and discusses available refinement and environmental enrichment techniques for these animals. The book is essentially a literature review of 260 articles and, as such, is best consulted for specific queries rather than read cover-to-cover, which can be hard going. Subject and author indices are provided which assist in using the book in this way.

The literature review is organised into two parts, each with a summary and discussion section. The first 'Variables and Refinement' considers various housing, husbandry and handling practices for rodents and rabbits which can result in physiological and behavioural responses that have the potential to confound research data. These are: confinement in a barren cage; cage cleaning; transfer to an unfamiliar location and separation from cage mates; restraint; multi-tier caging; and noise. For each of these practices, the impact on the animal (species, strain and sex) is briefly described, followed by information on how they can be refined so that the animals and science are less affected. For example, in mice and rats, the distress and fear associated with confinement can be buffered by the presence of one or more compatible companions and by increasing the complexity of the living space. Consequently, this part of the book should prove useful to staff responsible for designing, managing and analysing experiments using rodents and rabbits by helping them to identify and address possible confounding variables in the experiments as well as means of reducing suffering and improving animal welfare.

The second part of the book 'Environmental Improvements' focuses on changes in traditional housing conditions that can promote the physical and behavioural well-being of rodents and rabbits. It summarises the results of preference, consumer-demand and other studies that have been used to assess what these animals need and want in their environment (descriptive and theoretical articles are mentioned only if they have practical relevance). The environmental improvements included are classified as necessities (flooring and bedding material; shelter, burrows, nest boxes and nesting material; social housing) and enrichments (objects and structures; additional space; feeding enrich-

ment; interaction with humans). Twenty-five photographs illustrate some of the improvements described and the species-typical behaviours they promote. Attention is given in the text to the potential negative effects (eg increased aggression) as well as the positive effects of such improvements. Hence, this part of the book comprises a handy source of enrichment techniques for laboratory staff to consider applying to their local situation.

The authors note that a greater number of rodents and rabbits are used annually in the United States of America (> 20 million) compared with Europe (> 9 million), and that European legislation on laboratory animal welfare covers all rodents whilst mice and rats are excluded from the US Animal Welfare Act. They argue that less attention has been given to improving the living conditions for such animals housed in US research institutions because of the lack of a serious legal incentive to do so. This may well be the case, but some scientists are also reluctant to provide enrichment for their animals due to concerns that it may disrupt standardisation and reproducibility of results. Surprisingly little attention is given in the text to this debate and to the associated literature (eg Wolfer *et al* 2004; Bayne 2005).

In summary, this book is valuable because the authors have pulled together a large percentage of the relevant literature into one single resource. Since the information given on each article is limited to a few sentences in most cases, it does not itself provide sufficient guidance to enable laboratory personnel to go away and implement the refinement and environmental enrichment techniques that are included. In any case, many scientific readers will want to read the full articles in order to evaluate the evidence themselves. The book does, however, serve as an excellent resource for identify further reading. It can be accessed on the Internet at www.awionline.org/pubs/rabrodent/rodtab.html.

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References

Bayne K 2005 Potential for unintended consequences of environmental enrichment for laboratory animals and research results. *ILAR Journal* 46: 129-139

Wolfer DP, Litvin O, Morf S, Nitsch RM, Lipp H-P and Wurbel H 2004 Cage enrichment and mouse behaviour: test responses by laboratory mice are unperturbed by more entertaining housing. *Nature* 432: 821-822

Feral Manual

Edited by C Bessant. Published by the Feline Advisory Bureau, Tisbury, Wiltshire SP3 6LD, UK. Price £20.

This manual on feral cats addresses their management, largely by the method of trap-neuter-release (TNR). It is edited by Claire Bessant and published by the Feline Advisory Bureau, a cat charity based in the United