

These are but two examples from a collection that provides valuable information for those involved, whether academically or professionally, with both human abusers and human and animal abused. The editor lists child-care officers, community carers, law enforcement officers, health visitors, veterinarians, anti-cruelty inspectors, animal protection officers, social scientists, lawyers, psychologists and criminologists as stakeholders in this issue, and there is something for each and all in this collection. Certainly, for those whose major concern is animal welfare, the vulnerability of animals to cruelty through the unjust use of power by those whose motivations, while often understandable are nonetheless inexcusable, makes this collection of papers essential reading.

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### **Improving Animal Welfare: A Practical Approach**

Edited by T Grandin (2009). Published by CABI, Wallingford, Oxon OX10 8DE, UK. 336 pp Paperback (ISBN 978-1-84593-541-2). Price £39.95, US\$79.95, €55.95.

With the welcome expansion of animal welfare as a topic of importance for animal industries, policy-makers and the general public, there has been a corresponding increase in the number of comprehensive and specialised books in the area. Among the latest to arrive, this text aims to assist veterinarians, facility managers and all working with animals to understand, assess and most of all improve animal welfare. Unsurprisingly, for a text edited by Temple Grandin, the emphasis is on providing practical tools for enhancing welfare, and meeting welfare standards in animal production, transport, and at slaughter. The coverage is focused on the major production and draught species — cattle, pigs, poultry, sheep, horses and donkeys, with some information on deer and goats.

One challenge for a book such as this, with its emphasis on animal welfare in a practical farming context, is avoiding an undue focus on animal management systems common in one part of the world, to the detriment or frustration of readers elsewhere. Although the majority of chapter authors are based in North America, with some from the United Kingdom and New Zealand, it is clear that the contributors to the book have worked hard to ensure that the information is relevant to professionals and students interested in production animal welfare from a range of localities. A good example is the chapter on practical methods for improving the welfare of draught animals in regions of the world where animals are used in place of mechanised vehicles. Not everything can be covered — from my perspective I was unable to find much coverage on minimising lameness in dairy cows under extensive systems, for example, but someone operating within almost any farming system will find something of value in this book if they are interested in understanding or improving animal welfare.

The chapters are arranged to present firstly the practical and ethical value of measuring animal welfare and imple-

menting standards during animal production. Subsequent chapters present information on handling and stockmanship, and there is a comprehensive chapter on surgical husbandry procedures of poultry and livestock, providing clear descriptions of methods and highlighting techniques and impending developments to optimise welfare. Other chapters examine transport, slaughter, and addressing behavioural needs on-farm. There is one anomaly in the logical sequence, with a separate and well-written chapter by Tina Widowski on the importance of addressing behavioural needs coming right at the end of the book, rather than earlier in the sequence. Another notable chapter, by Becky Whay and David Main, covers the options for implementing change on farms, and the best ways to encourage farmers and farm staff to engage in welfare improvement schemes. The examples are mostly from the UK, but the concepts are almost universally applicable.

The chapter on euthanasia is also extremely valuable in a book with the aim of practical animal welfare. It not only presents the methods, with diagrams, rankings and caveats, but also the criteria for deciding when to euthanase an animal — given that so many severe welfare problems occur when animals that should be euthanased have been handled or maintained to remain in the value chain.

This is a book that is packed with information. Fortunately, the text is supported by a significant number of usefully illustrative diagrams and photographs, and some chapters present the most practical implementation steps in the form of ‘break-out’ boxes — indeed possibly a greater use of these would have been even more helpful. Each chapter has a list of references and further reading, and there is a helpful list of relevant websites preceding the index.

Overall, this book provides a valuable, single first point of reference for those seeking to assess and ensure animal welfare in their own operations, or as a starting point in the development of a welfare assurance process. Tertiary educators will find that the text also serves as a valuable accompaniment to animal welfare courses for animal science and veterinary students studying production animals.

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### **Exotic Small Mammal Care and Husbandry**

RE Banks, JM Sharp, SD Doss and DA Vanderford (2010). Published by Wiley-Blackwell, 2121 State Avenue, Ames, Iowa 50014-8300, USA. 192 pp Paperback (ISBN 978-0-8138-1022-5). Price £29.99, €41.70.

This handbook on exotic small mammal care is specifically intended for the veterinary technician in small mammal veterinary practices or clinics. However, the target readership is not implicated by the title — only after reading the introduction it becomes clear that this book is neither intended for veterinarians themselves nor animal technicians in the laboratory, ie animal experimentation, nor the

general, pet-owning populace. The book first deals with general factors affecting the well-being of animals, then centres one chapter each on enrichment and preventive medicine. The rest of the book's chapters are each dedicated to one species of exotic small mammal, covering the breeds, basic anatomy and physiology, reproduction and sexing, husbandry, nutrition, enrichment, handling and restraint, physical examination, clinical techniques, preventive health and common diseases. The species covered are rabbits, ferrets, mice, rats, gerbils, hamsters, guinea pigs, chinchillas, degus, hedgehogs, sugar gliders and opossums.

The strongest point of the book is that it first addresses which factors impact on the well-being of the animal, emphasising the animal's micro-environment rather than the macro-environment as experienced by the technician himself. However, it sometimes seems incidental as to which factors and information have been included in this overview, and which have been omitted. For example, under the heading 'gender', the higher susceptibility of female rats to the carcinogenic substance, DMBA is stated, information clearly stemming from laboratory animal literature, but completely irrelevant to a vet technician in a small animal surgery, since these certainly do not induce tumours but may treat occurring tumours. Also, under the heading 'endocrine factors' the fact that neonatally gonadectomised mice of some strains are prone to develop oestrogen-secreting adrenal tumours should not be taken as advice to refrain from pre-puberty castration in small mammals in general. On the other hand, important factors such as CO<sub>2</sub> (paragraph on ventilation or air quality) or vibration (paragraph on noise) have been omitted.

The contents of the chapter 'Enrichment' gives some good ideas on which parts of the animals' life could be improved by species-specific enrichment. The body of the text is very hard to read since there are no structured elements, such as sub-headings. There are lists on species-specific enrichment which are very helpful, especially the first one on enrichment strategies for small rodents. Integrating pictures of real, animal-friendly, enriched enclosures would have greatly improved the readability of this chapter and also made more of a point by illustrating enrichment suggestions. Instead of adding colour plates, unnecessarily doubling the already clear black-and-white photos from the rest of the book, such illustrations of housing and enrichment should have been included.

Unfortunately, the authors did not include precise measures for their enrichment suggestions, for example it would be helpful to know which diameter of plastic tubes they suggest for the respective species: a 5 cm diameter tube might be optimal for gerbils and hamsters, but much too small for guinea pigs or ferrets. Or they should have at least suggested an optimal depth of bedding needed for each species — tunnelling and burrowing is not possible for hamsters or gerbils with 5–10 cm of bedding, but with 30–40 cm it is. Research by Andrina Hauzenberger at the University of Bern, Switzerland, showed that golden hamsters only significantly reduce abnormal

stereotypic bar-gnawing with bedding depths of 40 to 80 cm. Since pet-keeping is not subjected to as many economical constraints as laboratory animal housing, such practical suggestions could be implemented by pet owners and vet technicians alike.

Chapters on guinea pigs, rabbits, hamsters, gerbils, rats and mice have been subjected to closer scrutiny, especially concerning behaviour, housing and husbandry of these species. In general, a good overview on housing, husbandry, handling, clinical techniques and diseases is given. However, some animal welfare issues have to be raised.

*Guinea pigs and rabbits:* I place a big question mark over the statement that guinea pigs are docile and enjoy human contact if habituated to it while young. Guinea pigs exhibit freezing upon handling, which can be and often is mistaken for relaxation. Salivary cortisol measurements by V Reinhardt of the Animal Welfare Institute have shown that young guinea pigs are subjected to five-fold increases of cortisol when handled (ie 'habituated') and need at least 60 min to recover. Concerning feeding of guinea pigs and rabbits, the order of stating pelleted food as the main food type, followed by hay, fruit and vegetables is not concurrent with prevailing recommendations, at least not in Europe. Grass hay is neither a secondary food type nor an enrichment for guinea pigs and rabbits, but their main staple food, and should be followed by fresh greens and vegetables, a few (!) fruit items and only lastly by pelleted food, which is actually only necessary if the animals are kept outdoors in big enclosures year-round. Animals housed indoors and in often very small cages just do not have big energy requirements to justify energy-rich pelleted food; too much of which will lead to obesity. The authors also failed to acknowledge that rapid changes in food type might cause more gastrointestinal problems in these animals than, for example, iceberg lettuce that they suggest should not be given to guinea pigs since it contains almost no nutritional value. Since guinea pigs and rabbits digestive system is adapted to fibre-rich, nutrient-poor coarse plant matter, ie roughage, the low nutrient value is of less concern than challenging the digestive tract of these animals with huge amounts of lettuce or frequently changing the composition of their diet.

I also place question marks on some statements about guinea pig and rabbit behaviour: are guinea pigs really as territorial as the authors write? Research by Norbert Sachser at the University of Münster has shown that guinea pigs are socially quite flexible and newcomers are usually integrated into an existing group without many problems — provided there is enough space and that all animals are properly socialised. The authors also mention rabbit foot thumping as a harbinger of aggression, however, foot thumping is more often used to alert the social group to the presence of a predator. It is strange why the authors should mention that rabbits need to chew/gnaw to maintain proper apposition of their front teeth, but fail to mention this fact in relation to guinea pigs. Some of the authors' phrasing is a bit too anthropomorphising for my tastes, ie "rabbits groom frequently, never satisfied with the present status of things".

*Hamsters*: It is zoologically incorrect to call Syrian hamsters, Chinese and Dsungarian hamsters, 'breeds': they are actually very distinct species. The running wheel the authors show is actually too small for golden hamsters, they can only run in a constant lordosis position within such a small wheel. Also, using metal wheels with rungs is dangerous since the animals can get their feet stuck in the rungs and spokes. Solid-bottomed wheels of at least 30 cm diameter should be used instead! This holds especially true for wheels used in gerbil and mouse enclosures since these animals' tails can get stuck in the rungs, leading to injuries.

*Mice*: The authors mention exercise balls as enrichment for mice. If they mean closed plastic balls into which the animals are shut in, this would be of major animal welfare concern since animals will panic inside such balls from which they cannot escape, the small slits do not allow for sufficient air supply, and the animals can hurt themselves when the ball falls down stairs. The authors did rely on a few publications but seemingly did not bother to consult the most recent literature on adequate housing requirements, behavioural needs and causes of abnormal behaviour of the species they describe. For example, they describe whisker trimming (barbering) in mice as dominance related, but a 2004 paper by Chris Sherwin in APPLAN clearly demonstrated that barbering is NOT dominance related!

*Rats*: The authors state that rats do well singly, which is not correct according to research done by Jane Hurst. Isolated rats develop abnormal behaviour (excessive self-directed grooming, bar-chewing) and organ pathologies.

*Gerbils*: Recommendations for gerbil housing are appallingly small: 36 square inches per animal, ie 232 cm<sup>2</sup>, which is less than the minimum 250 cm<sup>2</sup> recommended by Appendix A of the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (ETS No123) or a 5 gallon tank per pair, which corresponds to an aquarium or cage of 22.5 litres, ie less than 25 × 30 × 30 cm or about the size of a sheet of A4 paper. These are areas used for animals in biomedical research and should not be the standard for pet housing at all!

How well does the book cater for the needs of the target readership? The target readership, veterinary technicians, would require information on housing and husbandry, hygiene, treatment and care of exotic pet species, which is well covered. From a European point of view, however, housing and husbandry suggestions should have been more generous. Some information given is too specific. The authors, for example, mention the cyclic growing pattern of the hair in rat fur, a fact which is irrelevant to the vet technician.

The book was written for a purely American audience. Only American units (inch, ounce, gallon) have been used, not the SI units common for scientific work worldwide. Some information on disease prevalence has been included for Europe, however the book cannot cater for European vet technicians. Additionally, some of the proposed minimum cage requirements are even less than the minimum cage requirements for laboratory animals in Europe! Which, from an animal welfare point of view, is clearly a drawback: pet owners should always far exceed the legal housing

requirements. With the minimum cage requirements given in the book, it will be a *tour de force* to include all the enrichment the authors suggest! Additionally, housing types such as wire-mesh-floored cages should have been more clearly repudiated for welfare reasons.

One big drawback of the book is that it lacks a specific chapter on what can be called the 'human factor', ie the vet technician and his relationship with the other two involved human parties, the veterinarian and the owners of treated pets, despite it stressing the importance of the vet technician in educating the pet's owners! By only stating facts on animal care, the task of owner education is far from solved. Whereas the vet technician has direct influence on housing and care of the animals if they stay at the clinic, he has much less influence on how the animals are housed and treated by their owners. The vet technician cannot see the housing conditions if the animal is not brought to the clinic in its home cage but a carrier, and would therefore need the conversational tools to assess the situation of the animal at home and to persuade its owners to improve the conditions. This is especially important since many health problems in small rodents stem from inadequate housing, handling and nutrition. One important point a vet technician might discuss with pet owners would also be prevention of unwanted offspring in pet animals. The book unfortunately omits addressing this aspect altogether and gives no suggestions for adequate same-sex group compositions or neutering to prevent reproduction.

The second 'human factor' involved in the vet technicians' work is his/her collaboration with the veterinarian. How far is it the veterinarian's responsibility to talk to the owners, inquire about the animal's housing and care at home, to decide on dosing and treatment regimens, and how far is this the vet technician's responsibility? Usually (at least in Europe) the technician is not allowed to decide on treatment or dosing, therefore the question has to be raised as to why the book includes formularies.

To summarise: the book offers an overview of the basics of housing, husbandry and veterinary care of small pet mammals, however the sometimes incidental nature of the information given, as well as some animal welfare concerns, wrongly addressed or completely missed out, leave a sense of unease. The most important statement of the book unfortunately hides in the specific chapter on mice, but holds true for all species covered: "Many diseases in small rodents are the result of improper husbandry or nutrition".

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### **Precision Livestock Farming '09**

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*Precision Livestock Farming '09* presents 42 'mini-papers' from the 4th European Conference on Precision Livestock Farming (ECPLF) held in Wageningen, The Netherlands in