

## Book Reviews

### ***Animal Welfare at Slaughter, First Edition***

Edited by A Velarde and M Raj (2016). Published by 5M Publishing Ltd, Benchmark House, 8 Smithy Wood Drive, Sheffield S35 1QN, UK. 286 pages Hardback (ISBN 978-1910455692). Price £49.95, \$US73.14.

*Animal Welfare at Slaughter* is the second book in *The Animal Welfare Series* by 5M publishing. The first book in the series, which focused on animals on-farm, was titled *Animal Welfare in Extensive Production Systems*. *Animal Welfare at Slaughter* is edited by the established academics Drs Antonio Velarde and Mohan Raj. Between them, Velarde and Raj have published over 100 peer-reviewed papers on the welfare of livestock on-farm, during transport and slaughter.

The publication is intended to be a reference book for Food Business Operators (FBOs) and ultimately improve the welfare of animals at slaughter. Its target audience also includes Animal Welfare Officers (AWOs), policy-makers, veterinarians, meat inspectors and abattoir auditors. It aims to provide comprehensive practical information concerning the key stages of operation and main risk factors associated with each stage. It also describes itself as a reliable resource for veterinary and animal science students and the informed public. *Animal Welfare at Slaughter* encompasses the animals' experiences from unloading in the lairage until death. The text touches on the welfare of cattle, sheep, pigs, birds, finfish and rabbits. It is a remarkably ambitious task to cover such a range of species, particularly given the need to cater for its very diverse audience.

The book consists of 14 chapters. It opens with the concept of animal welfare and the specific animal welfare indicators that can be applied within the slaughterhouse environment. Other chapters cover the physiology and behaviour of food animals, and how to optimise their welfare throughout the slaughter process. There are chapters devoted to the techniques employed using the three main stunning and killing methods (mechanical, electrical and gas), a chapter dedicated to fish welfare and one focused on slaughter without stunning. Animal welfare during disease control situations is covered later in the book. The legal requirements for those operating abattoirs in the European Union are set out with regard to the EU Directive 1099/2009. The final two chapters are on future trends to improve welfare at slaughter and the effect of handling at the abattoir on meat quality.

Each chapter is prefaced with a list of Learning Objectives (LOs) such as 'Describe the procedures for the handling of animals at unloading at the slaughterhouse'. These LOs are presumably to aid the readers and maintain their focus throughout the chapter while keeping specific tasks in mind.

In the teaching community, increased attention is being given to LOs and what they should achieve. Ideally, when

setting an LO, it should be measurable, observable and assessable (Schoenfeld-Tacher & Sims 2013). Verbs such as 'describe', 'demonstrate' and 'show' are examples of quantifiable tasks set to the reader or student through LOs. Many of the LOs throughout this book are well-specified and clearly ask this of the reader. However, I believe that some are not true LOs. Some ask the reader to be 'aware of...' or 'to learn ...' which are rather vague. Others, such as 'cover the legal requirements...' or 'guidance for...' appear to be directed towards the author and it is not obvious what the reader is meant to gain from such objectives. Also, in several instances, there is a great deal of assumed knowledge and not enough information is provided to the readers to allow them to address and answer the LO presented at the beginning of the chapter.

As with many multi-authored books, the chapters vary in quality. Some are particularly well-written with clear descriptions of responsibilities of FBOs, equipment manufacturers, AWOs and animal handlers. These high-quality chapters are well laid out making for easy reading and digestion of the content. They provide clear definitions and accurately summarise existing knowledge of the relevant species' behaviour and physiology, and what is yet to be understood. In many places the book offers neat, practical and sensible advice on how to recognise potential welfare issues, such as heat stress, and suggests solutions to these problems, for example, providing a sprinkler system for pigs in warm weather. Well-chosen pictures with clear descriptions help the reader to quickly understand and appreciate the issues discussed. Scientific principles and current knowledge are deftly linked to real life examples encompassing the animals' experiences and associated welfare status. Care has been given to describe indicators of unconsciousness and death which is undoubtedly useful to people working in this area.

However, I found some chapters disappointing, and this may reflect the challenges of combining inputs from multiple authors, suffering from poor layout, and a general lack of cohesion. There is also some unnecessary repetition, both between and within chapters, sometimes *verbatim*.

Perhaps because of the authors' familiarity and experience with their subject matter, the species covered by the book do not receive equal attention. For example, the introductory chapter only discusses welfare assessments for species covered in the Welfare Quality® project (cattle, pigs and broilers), even though similar measures, eg slipping and falling (for mammals during unloading) or wing damage (for birds) could be applied to the other species in the book. This could be frustrating for readers, especially those working with under-represented species. There is, however, a well-written and comprehensive chapter addressing our understanding of finfish and their needs during the slaughter process. Many species of

finfish are covered, along with detailed descriptions of the techniques for stunning, stun/killing, killing without stunning and depopulation. Too often, fish are the forgotten livestock, but the advice and recommendations presented in this chapter should help those employed in the industry to improve the welfare of their animals.

The book would have benefited from better copy-editing and proof-reading, as errors throughout the book give it a rather rushed and unfinished feel. Some pictures have been included to help the reader, however not all are referred to in the text, making it difficult to decipher what the picture is intended to show. In some instances, the picture and description do not match, as when the wrong species is referred to in the photograph legend. There are also misspellings of names in the cited material. Better copy-editing would also have improved the quality of English, which is variable.

A couple of pages of definitions, placed at either the front or the back of the book, would have been easier to access than definitions within the texts of chapters. The clarity of definitions also varies. Definitions that are suitable for use with biologists or academics familiar with the area are not always appropriate for the intended, industry-based audience.

To be useful to an FBO, AWO or other industry worker it is helpful to have conclusions that show them how the information is relevant to their daily work. Some authors clearly translate academic findings into workable practical advice, but others do not. Similarly, some chapters offer good advice, enabling the reader to rectify situations which he/she may face in their plants, while other chapters only state what should not be done. For some authors a greater focus on the identities and needs of their target audience would have been useful.

This book provides a comprehensive account of the welfare of numerous species during slaughter and contains very useful information. However, it may be best suited for academics who wish to learn more about this interesting and complex topic.

## Reference

**Schoenfeld-Tacher R and Sims MH** 2013 Course goals, competencies, and instructional objectives. *Journal of Veterinary Medical Education* 40(2): 139-144. <https://doi.org/10.3138/jvme.0411-047R>

*Susan Richmond,*

*Humane Slaughter Association, Wheathampstead, UK*

## **Olfaction in Animal Behaviour and Welfare**

Edited by BL Nielsen (2017). Published by CABI, Nosworthy Way, Wallingford, Oxon OX10 8DE, UK. 221 pages Paperback (ISBN: 978-1-78639-159-9). Price £45.00.

Perhaps because our sense of smell is relatively unimportant, we underestimate the importance of smell in the lives of other species around us. Humans who live or interact with animals, then, need to understand how odours shape almost every facet of their lives, whether they be exotic creatures in zoological gardens or domestic livestock, animals in the laboratory or pets at home. It was to address this need, coupled with a sense that the information that is available is often not easily accessible to those who might use it, that this book was conceived. As described in the preface, the book represents a fuller treatment of an argument presented in a short opinion piece by the editor and many of the contributing authors. According to this argument, consideration of olfaction is absent in most studies of animal behaviour but addressing this absence could reap enormous benefits. In a nutshell: "By using the right (or removing the wrong) odors at the right time in the housing and handling of farm, zoo, lab, and companion species, we may be able to improve various aspects of animal behavior, reproduction, and health, and create animal environments that are more suitable, more productive, as well as welfare enhancing" (Nielsen *et al* 2015).

The book is comprised of three sections. First, there is an introduction to some basics. Five chapters set the scene for the rest of the book, dealing with the fundamentals of olfaction and odour perception, the role of learning in odour perception, communication, behavioural testing, and odour valence. A second section provides an overview of the role of olfaction in specific aspects of animal life, namely feeding and foraging, mate selection and reproductive behaviour, maternal care and offspring survival, disease detection and prevention, stress and fear, and animal housing and enrichment. Finally, a focused section contains four chapters on olfactory behaviour of animals in specific settings: farm animals, zoo animals, laboratory animals, and companion animals.

There is a lot to like here. The broad scope of the first section provides for a solid, basic understanding of how smells are perceived and how associated behaviours develop and can be measured. The second section tackles the main 'uses' of smell, the kinds of functional benefit that make it so essential in regulating behaviour. The final section provides relevant practical issues that an under-