

## Book Reviews

### *The Welfare of Fish*

Edited by TS Kristiansen, A Ferno, MA Pavlidis and H van de Vis (2020). Published by Springer Nature, Tiergartenstrasse 15-17, D-69121 Heidelberg, Germany. 532 pages Hardback (ISBN: 978-3030416744). Price £108.64.

Fish welfare has lagged behind that of terrestrial animals, both in terms of understanding and management. There are many reasons for this, ranging from a fundamental lack of information through to a lack of empathy for animals that are hard to observe and have few behaviours we can easily relate to. The subject of fish welfare is an area that has substantial challenges but one that also presents opportunities for significant impact. There is compelling evidence that we should afford the welfare of fish some consideration. We are now coming to understand the capacity of some species for cognition, learning and consciousness and if that convinces us they are worthy of our concern then we have to consider truly astonishing numbers of animals. In 2010, it was estimated that between 37 and 120 billion farmed fish were slaughtered for human food (Lines & Spence 2014). More than half all vertebrate species are fish — an estimated 31,200 species — and individual farmed populations can number in the millions. Many of the challenges relate to the differences between fish and mammals and the diversity of fishes. One of the chapters in this book does an excellent job of describing the diversity in morphological and physiological adaptations, cognitive capacity and behavioural repertoires.

If you are already working in the field or have a new interest in fish, is this book worth consideration? The title may sound like many other recent publications but there is valuable depth and novelty here; I will also mention weaknesses in an attempt to present a balanced review. I should declare that I know some of the authors very well and therefore am not completely impartial. However, my honest opinion is that this book has many more strengths than weaknesses.

In terms of its content, this is not a book limited to the welfare of farmed fish, but a much more ambitious attempt to cover all aspects of fish welfare and the many ways in which humans interact with or have an impact on fish. As the book itself states, it is not “a detailed blueprint for managing [welfare].” This is a substantial tome with 21 chapters, and over 500 pages of dense text. If your eyesight is anything less than perfect you may wish to consider the electronic version, since the book uses a small font size and dense spacing.

The book starts out with a useful preface that directs the reader to the various subjects covered. This is followed by a helpful and readable introduction to the topic of fish welfare and a challenging but worthwhile chapter on ethics and fish welfare. The next chapter is on the ‘Diverse world of fishes’ and contains some indication of the range of diversity and

plenty of interesting and (in my opinion) enjoyable examples. The following six chapters cover the functional nature of fish in the context of welfare; from their behaviour and brain anatomy through function to cognition, learning, consciousness, awareness and the predictive brain. Function relating to welfare concludes with pain, stress and coping styles.

There is then a shift in focus to the very practical assessment of welfare in aquaculture, followed by human use of fish, ie aquaculture, fisheries, experimentation and the impact of pollution. The book concludes with a crib sheet: ‘what we have learned.’

Anyone working or interested in the area of fish welfare would find new and useful information in this book. If you are new to the field, you will find this a comprehensive review (if perhaps a bit overwhelming as an introduction). The book does not shy away from some of the more difficult or controversial aspects of the subject, with authors from opposing camps of opinion.

This is one volume in a series but the first to cover a wide range of species. It is inevitable that for a book covering such a wide range of subjects, some of the areas are only covered briefly. For example, there are relatively superficial chapters on the various uses of fish, aquaculture, capture fishes, ornamentals, capture-based aquaculture, recreational fishing. These could each have been a book in their own right but are potentially useful for some readers. I was very familiar with the content of some chapters and, therefore, did not find anything particularly novel in them. However, despite working in the area of fish welfare for some considerable time there were chapters that either introduced me to new concepts or explored them in greater detail than I have previously encountered. The chapter on ethics and the welfare of fish, I found particularly challenging but very informative. There are generous suggestions for research, with many potential student projects and larger studies contained within the text, for those looking for inspiration.

In an already dense book, it is churlish to complain about omissions, but it would have been nice to have seen some reference to earlier evidence of concern for animal welfare, rather than the relatively recent history referred to.

This is a multi-author book, but considerable effort has gone into making it a coherent volume, with not only an introduction and lessons learned but cross-references in some of the chapters. However, in common with most books of this type, there are stronger and weaker chapters, some extremely well written and others less so. Some of the chapters are excessively reliant on self-citation, but this may be partly justified by the lack of relevant literature in some areas. There are a few surprising opinions expressed, including the suggestion in one chapter that moral and ethical concerns are somehow less valuable or inappropriate when considering the practical implications of fish welfare. I certainly identified other content that I did not agree with and some mistakes, but these were relatively few and far between. For example, there are

mistakes with common names of at least one species and some of the references to the value of EEG for detecting loss of consciousness do not match with the experience of my co-workers who find it a complex tool to use and certainly not an easy off-the-shelf answer.

So, to conclude, did we need another review of fish welfare? After reading the book from cover-to-cover, I would say we did and there is a great deal of value in this book.

I would certainly advise all students or early career scientists working in the field of fish welfare to read *The Welfare of Fish*. For those longer in the tooth (or the field), you will also find value, novelty and some beautifully written text.

## Reference

Lines JA and Spence J 2014 Humane harvesting and slaughter of farmed fish. *Scientific and Technical Review OIE* 33(1): 255-264

James Turnbull,  
Institute of Aquaculture, Stirling, UK

## **Understanding the Behaviour and Improving the Welfare of Chickens**

Edited by C Nicol (2020). Published by Burleigh Dodds Science Publishing, 82 High Street, Sawston, Cambridge CB22 3HJ, UK. 688 pages Hardback (ISBN: 978-1786764225). Price £170.00.

Written by scientists throughout the western world, *Understanding the Behaviour and Improving the Welfare of Chickens* is an easily interpretable book encompassing multiple facets of chicken behaviour (genetics, sensory and pain perception, cognition and sociality), providing a coherent overview of current welfare challenges (related to breeding, management and housing) and offering abundant suggestions and tools to monitor and improve welfare in poultry. Targeting all professionals in the field, not to mention researchers, students, producers, breeders and all other poultry-related professions, the book expertly outlines both scientific and commercial advancements. Directions for future research and development are given, while considering their feasibility as regards finance, practicality and commercial demands within the industry.

At the start of the book, a concise introduction outlines the chapters and their content. Each chapter provides an overview of current knowledge on the topic in question, accompanied by an outline of advances in both scientific and applied fields. The chapters are written by twenty-five authors, all scientific experts in the subjects discussed. Each chapter states separately what knowledge or potential solutions to improving welfare are missing from their field. Some authors also detail hypotheses for further investigations.

Instances in which no unequivocal answer to a question exists or a clear understanding is lacking, sees various views and arguments presented by different authors. This illustrates gaps in knowledge and how much research is still required. However, explicit references to other chapters in the book stating different perspectives are often lacking,

which makes the book less coherent overall and challenges the reader to formulate their own judgements. Also, chapter order is, at times, unhelpful as issues relating to different breeds, namely broilers and laying hens, do not always follow consecutively.

The book is divided into parts one and two, organised into eight and ten chapters, respectively. The first part, entitled 'Behaviour', offers a broad explanation of chicken behaviour (in terms of genetics, physiology and ethology) as well as providing scientific tools to monitor and enhance their welfare (by sensor technology and welfare assessment protocols). The second part, 'Welfare issues in breeding, management and housing', focuses on the applied part of the poultry industry, including specific welfare compromises and ways of improving the farming environment to meet the behavioural needs of specific poultry breeds.

What stands out in the opening chapters is the emphasis on the importance of studying sensory capabilities (Chapter 2), pain perception (Chapter 3), cognition (Chapter 4) and social behaviour (Chapter 5), from the chickens' point of view. What may intuitively seem natural or painful to humans may not be perceived similarly in poultry. Guarding oneself against anthropomorphism is imperative when working with animals, especially when focusing on their well-being.

From genetics (Chapter 1) to sensory perception (Chapter 2), the first part of this book covers a wide range of disciplines. Moreover, it introduces a variety of tools to monitor welfare, by observing behaviour (Chapter 5), applying sensor technology (Chapters 6 and 7) and using welfare assessment protocols (Chapter 8). Each considers the feasibility in practice when it comes to offering advice to professionals in the field, in terms of finances, practicality, efficacy and acceptance by the industry. This is an important aspect, since most of the presented outcomes are from more fundamental research investigations, performed in experimental settings — a potential hindrance for translation of the results into practical implementation.

More specifically, Chapter 1 (entitled 'Advances in understanding the genetics of poultry behaviour') gives an expert introduction to Quantitative Trait Loci mapping and related methodologies, which are used to unravel the genetics behind poultry behaviour. Because of the high level of information provided and the use of many field-specific abbreviations, the general impression is that this chapter is not written for laymen. In contrast, Chapter 3 ('Understanding states of suffering with implications for improved management of poultry') discusses discomfort, suffering, and pain perception in chickens in an easily understandable style. Undeniably, this is an important topic due to its obvious and direct link to welfare. This chapter offers a broad overview of states of suffering and related factors in farmed poultry, and it's a subject all professionals in the field should become acquainted with. Lacking, unfortunately, is a discussion of positive emotional states in poultry and mention of future possibilities to investigate emotions further.