2015 - VOLUME 27 ISSUE 1

ISBE Newsletter

International Society for Behavioral Ecology
www.behavecol.com
Supplement to *Behavioral Ecology*

CONTENTS

FROM THE NEWSLETTER EDITOR

Alteast for us northerners, spring has finally sprung, and for many of us, these are hectic times. End-of-term admin, exams, project supervision... it all tends to aggregate this time of year. And for those of us who study reproduction in the field, it's crunch time also for our research. Despite the stress, I really enjoy the spring, not least because I get to teach my favourite unit: "Behavioural Ecology". It is great to see the students develop an evolutionary way of thinking, and to hear them discuss strategies and costs vs. benefits. Behavioural Ecology is intrinsically an easy sell, because... really, who isn't interested in animal behaviour? Students on the hunt for bachelor or masters projects often ask me "umm perhaps something with behaviour?". So despite all the stress of springtime, let's remind ourselves that the fascination we have for animal behaviour, and the work we do, actually inspires new generations of behavioural ecologists.

I would like to extend my sincere gratitude to all that have contributed to this newsletter, especially those that have reviewed books.

P. Andreas Svensson, ISBE Newsletter editor
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WANTED

Are you interested in working with the ISBE website?
www.behavecol.com

We are looking for somone to help develop and update our website. If you have some experience with web pages and want to contribute to your society, please contact the newsletter editor.

How to contribute to the newsletter

The ISBE Newsletter publishes Book Reviews, Conference/Workshop Reviews and Commentary Articles of interest to the International Society for Behavioral Ecology. The ISBE Newsletter will only consider work that is not already published or intended to be submitted for publication elsewhere.

Book Reviews: Reviews are generally solicited by the Editor as new books arrive at the office, and are deemed to be of interest to the society. Persons involved in the publishing of books who would like these to be considered for review in the Newsletter should contact the Editor and arrange for their publisher to forward a review copy to this office. Authors may submit a list of possible reviewers. Members who wish to review a particular text should contact the Editor. The Editor will provide reviewers with instructions and a style sheet. Reviews are typically 1500-2000 words.

Workshop/Conference Reviews: Workshop and/or Conference reviews should be prepared in one of the following two formats. *Brief synopses* (max 1500 words) and *Longer reports* (max 3000 words) Graduate students and postdocs are strongly encouraged to consider contributing to writing these reports.

Cartoons: Cartoonists and other artists are encouraged to submit artwork, either in hardcopy, or as TIFF or high resolution (300 dpi) gig or jpg files. All cartoons published in the newsletter will be credited to the illustrator, and will appear on the Newsletter's website www.behavecol.com.

Spotlight on young scientists: Early career members (PhDs/ postdocs) are encouraged to participate in the section "Spotlight on"; please provide name, education, current address, research interests and selected papers in an email to the editor.

I S B E E X E C U T I V E

Welcome to Behaviour 2015!

We are please to invite you to Behaviour 2015 – the 34th International Ethology Conference http://behaviour2015.org/. Below we list the vital statistics for the conference, and hope that you will join us for a fantastic event. August 9-14, 2015 in Cairns, Tropical Queensland, Australia

Participating Societies:
Australasian Evolution Society
Australasian Society for the Study of Animal Behaviour
International Society for applied Ethology

Plenaries:
Marta Manser (U. Zurich),
Mark Briffa (U. Plymouth)
Joan Silk (U. Arizona)
Mandyam Srinivasan (U. Queensland)
Melissa Bateson (U. Newcastle)
Public Lecture: Rick Shine (U. Sydney)

Over 35 symposia:
http://behaviour2015.org/symposium-details/

Workshops:
Social Network Analysis and Next Generation Sequencing (detail below)

Special features:
Augmented reality at poster session, excellent lunches, fantastic conference dinner, tropical climate, deadly wildlife.

Post-conference workshops:
1) Social Network Analysis
2) Next Generation Sequencing
If you are interested please contact simon.griffith@mq.edu.au for further information.

See you in Cairns!
Mariella Herberstein & Phil Taylor for the organising committee

UPCOMING WORKSHOPS

Reality systems and computer animations in animal behavior research.

Virtual reality (VR) systems and computer animations are promising but yet possibly underestimated methods for the use in behavioral research. Sharing many advantages, both methods are ideal for standardized, repetitive testing of behavior. Computer animations allow replacing experimental animals by their virtual counterparts that can be manipulated in any way and who behave totally predictable. The same counts for virtual environments that are created according to specific and predefined landmarks for testing navigational skills or discrimination abilities in a certain animal. Both methods inevitably combine aspects of biology and computer science which leaves many scientists reluctant to use them. Fear of possibly high technical requirements and the lack of know-how are the main reasons.

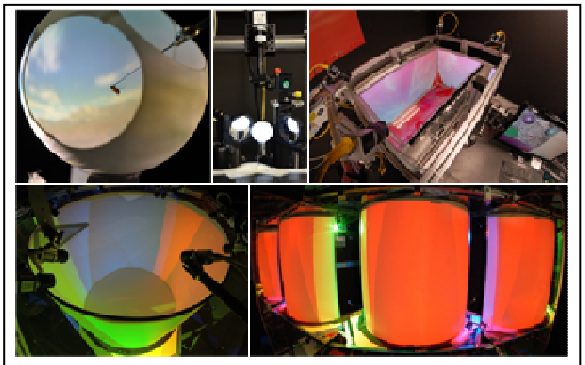
This workshop will be discussion based, offering introductions to the different methods with two step-by-step tutorials and a more detailed look at DOs and DON'Ts:

- Introduction to VR systems for freely moving model organisms and discussion of possible ways of implementation in research and constraints to keep in mind depending on different experimental animals.
- Short overview of useful techniques and software to create and animate virtual animals.
- Step-by-step tutorial for creating a 2D computer animation of a spider with Adobe products. This method is not restricted to the use with spiders but might also be applied with other animals.
- Introduction to the novel and free software tool anyFish with a tutorial describing its functions. AnyFish was developed to create 3D animations of fish for the use in behavioral experiments.

Participation is recommended for early stage scientists (PhDs and early PostDocs). Participants can follow the step-by-step tutorials with their own laptops (software and additional files needed). Specifics are given after registration. By the end of this workshop, participants should have a better idea of existing programs and tools and how to implement them in their research. The workshop also serves to form a network of scientists using VR and computer animations to share future knowledge and advice.

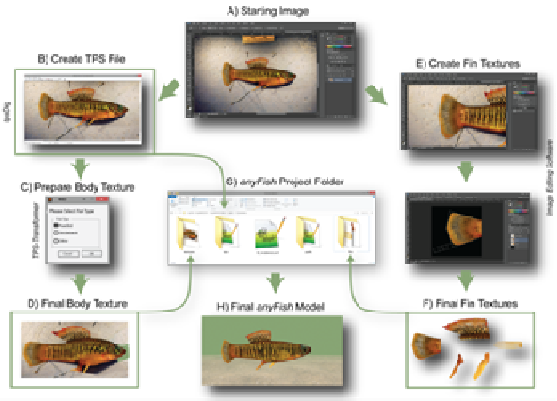
To participate please contact Stefanie Gierszewski via email: gierszewski@chemie-bio.uni-siegen.de

This workshop is a supplement to the "Virtual Reality"-*Symposium* held at Behaviour2015 14th August 2015. Time and room to be announced.: http://iec2015-symposium.wix.com/virtual-reality



© Dr John Stowers, TU Wien & Institute of Molecular Pathology, Austria

Cynthia Teodore, and Sönke Johnsen
Behavioral Ecology 2014;beheco.aru222



© Spencer Ingley, *anyFish* development team

Improving undergraduate education through science outreach

Doing science outreach directly benefits college students' engagement and skill in STEM education. Formally training undergraduates in effective scientific outreach greatly enhances the probability that these students will go on to become STEM teachers or to continue to do informal science education throughout their careers.

Take the 2.5 day NSF-funded professional development workshop on 10 – 12 October 2015 for college educators to help organize a course in how to do effective scientific outreach, develop an outreach program, provide guidance on how to host a large community science outreach event, and help you engage with K-12 teachers and museums. The workshop, 3-nights lodging, and most meals are free to participants. The workshop will be delivered at Cornell University in Ithaca, NY by science outreach experts from Cornell University's Naturalist Outreach Program, the Sciencenter, and Museum of the Earth. Applications due 20 May 2015. For more information see (https://blogs.cornell.edu/outreachworkshop/; http://blogs.cornell.edu/naturalistoutreach) or contact Dr. Linda S. Rayor (LSR1@cornell.edu)

C O N F E R E N C E C A L E N D A R

11the Ecology And Behaviour Conference. May 18-21, 2015 in Toulouse, France.
http://eb2015.sciencesconf.org/

Human Behavior and Evolution Society. We are pleased to announce the 26th annual meeting to be held at the University of Missouri, May 27–30, 2015: http://www.hbes.com/conference/

95th ASM meeting. Meeting of the American Society of Mammalogists in Jacksonville, Florida, 12 - 16 Jun 2015.
http://conferences.k-state.edu/mammalogists/

Evolution 2015. A joint annual meeting of the Society for the Study of Evolution (SSE), the Society of Systematic Biologists (SSB), and the American Society of Naturalists (ASN) will be held on June 26-29 at the Casa Grande Resort in Guarujá, Brazil (visa required). sbg.org.br/Evolution2015/

52nd Annual Conference of the Animal behavior society. In Anchorage, Alaska June 10-14, 2015. www.abs2015.org

38th Meeting of the American Society of Primatologists. June 17–20, 2015 in Bend, Oregon. https://www.asp.org/meetings/conference.cfm

Behavior Genetics Association. The 2015 BGA meeting will take place June 17-20 at the Omni Hotel in San Diego. http://bga.org/meetings/

Evolution 2015 meeting. The Evolution annual meetings are held jointly by the Society for the Study of Evolution, the American Society of Naturalists and the Society of Systematic Biologists in São Paulo, Brazil – June 26-30
http://evolution2015.org/

The annual Joint Meetings of Ichthyologists and Herpetologists will occur in Reno, Nevada from 15-19 July 2015: http://www.dce.k-state.edu/conf/jointmeeting/future-meetings

Joint Ornithology meeting. The Society of Canadian Ornithologists, the Association of Field Ornithologists, and the Wilson Ornithological Society will hold their joint 2015 annual meetings in Nova Scotia 16 - 18 July 2015. Also a workshop on mentoring and field trips on 19 July.
http://personalpress.acadiau.ca/ornithmeet2015

Eighth International Conference on Stickleback Behavior and Evolution. Stony Brook University, New York, USA, July 26 to 31, 2015.
http://life.bio.sunysb.edu/ee/stickleback

International Congress for Conservation Biology (ICCB). In Montpelier, France August 2-6, 2015. http://conbio.org/conferences/about-scb-meetings/

XVth ESEB Meeting, Lausanne. The Department of Ecology and Evolution of the University of Lausanne organises the 2015 meeting of the European Society for Evolutionary Biology. It will be held on August 10th-14th 2015 in Lausanne, Switzerland. http://www3.unil.ch/wpmu/eseb2015/

Behaviour2015 Cairns. A joint meeting of the International Ethological Conference (IEC), Australasian Society for the Study of Animal Behaviour (ASSAB), Australasian Evolution Society (AES), and Australasia, New Zealand and Africa Region of Applied Ethology. 9 to 14 August, 2015, in Cairns, Australia. www.behaviour2015.org/

29th European Congress of Arachnology in Brno Czech Republic August 24-28, 2015. http://ta-service.cz/eca2015/

International Society for Applied Ethology
The ISAE Congress of the returns to Japan! The 49th congress will be held in in Sapporo, Japan from September 14th to 17th in 2015.
http://www.jsaab.org/isae2015/

ASAB Winter meeting 2015: Animal Social Learning and Culture. London, UK, December 3-4 2015. http://asab.nottingham.ac.uk/meetings

ISBE 2016 in Exeter UK, more information TBA

10th Conference of the European Ornithologists' Union. In Badajoz Spain: 24 – 28 August 2015. http://www.eou2015badajoz.com/

ASAB Winter meeting 2015. Animal Social Learning and Culture. London, UK December 3-4 2015. Organisers: Kevin Laland and Andy Whiten (St Andrews, UK).http://asab.nottingham.ac.uk/meetings/

Society Of Integrative And Comparative Biology (SICB). 2016 Meeting in Portland, OR. *Call for Symposia* Please consider proposing a symposium for an upcoming SICB meeting!
http://www.sicb.org/meetings/2016/callsymp

International Congress of Neuroethology
Uruguay 2016. March 29 – April 3.
http://eventegg.com/icn-2016/

Arachnology meeting. The joint meeting of the International Society of Arachnology and the American Arachnological Society will be held from July 2 – 9, 2016 in beautiful Golden, Colorado. http://www.americanarachnology.org/about_AAS/bb-items/ISA_AAS_2016.pdf

8th World Congress of Herpetology. August 2016. Hangzhou, China. www.worldcongressofherpetology.org

XXV International Congress of Entomology
September 25-30 2016, Orlando, Florida, USA
www.ice2016orlando.org

POSITIONS AVALIABLE

Graduate positions in behavioral neurogenomics and neuroethology, University of Nebraska in Omaha

The Wong lab is seeking applications for graduate student positions (Master's or Ph.D.). The lab is broadly interested in the proximate mechanisms of variation in complex behaviors. We employ an integrative approach to understand the molecular and neural mechanisms of stress coping and related behaviors. More specifically, we examine the network of brain regions that modulate variation in stress coping and explore the neural and neurotranscriptomic mechanisms underlying observed interaction effects of stress coping styles and learning and memory in zebrafish. We draw on principles and methodologies from behavioral ecology, neuroethology, molecular neuroscience, to bioinformatics. Additional details are found on the lab website www.unomaha.edu/wonglab/ or you can contact Dr. Ryan Wong, wong@unomaha.edu.

Students can apply to the University of Nebraska at Omaha's (UNO) Psychology Department (Master's or Ph.D., www.unomaha.edu/psych/psychbiol.php) or Biology Department (Master's only, www.unomaha.edu/biology/index.php). UNO is a metropolitan campus located near downtown Omaha in Nebraska. Consider joining the actively growing neuroscience community at UNO. Strong applicants are eligible for Teaching Assistant Fellowships with tuition waivers, health insurance, and competitive stipends. The Wong lab currently has funds for graduate student support on a Research Assistantship. Interested students are highly encouraged to initiate contact with Dr. Ryan Wong to further discuss opportunities. Please e-mail a statement of interest and CV.

POSITIONS AVALIABLE

PhD positions in Behaviour/Cognition and Visual Ecology/Evolution

I am looking for two people who are interested in the evolution and function of colour patterns and the choice behaviour associated with the patterns. You will work under Prof. John A. Endler in the Centre for Integrative Ecology at Deakin University, Australia. You should have prior experience working with choice and/or mating behaviour of small freshwater fishes, although I may consider people who have worked with other animals.

One position will investigate the mode, pattern, causes, function, and evolutionary effects of female preferences for particular combinations of colour patterns. This is a study of the action and consequences of correlational selection, and will take advantage of my ongoing guppy mesocosms, which are evolving under different light environments. It is also an opportunity for some advanced research in quantitative genetics (the evolution of the G-matrix in different environments), if the student wants to pursue that aspect of this subject.

The other position will involve examining the relationship between physical difference and perceptual difference between different colours and patterns. Many people use visual models to calculate the number of JND (just noticeable differences) between stimuli, but those models are only valid with similar stimuli; essentially nothing is known about how differences are perceived when they are more than 2 or so JNDs apart, and whether, or how often, this leads to categorical perception. This second project will be carried out with the collaboration of both Karen Cheney and Justin Marshall of the University of Queensland, although it will be based at Deakin University.

There are lots of different ways you can go in either project, and I always encourage my PhD students to "follow your nose". If you are interested in either of these Ph.D. positions, please email me at John.Endler@deakin.edu.au Applications for applying to the PhD programme at Deakin can be made anytime up to July, but I would like to fill these positions as soon as possible. Basic requirements are first class honours or equivalent. Having your name on a publication is also welcome, but I am really looking for people who think and have original testable ideas.

Many thanks! John

POSITIONS AVALIABLE

Postdoc: Behavioral Ecology in Chile

We seek a postdoctoral fellow to participate in our ongoing research project on how ecology, mediated through stress physiology, influences group living and communal rearing in the South American rodent Octodon degus. The fellow will (i) design and/or conduct independent projects, (ii) assist with the organization of field teams consisting of S. American and U.S. junior scientists, (iii) use a long-term database to test questions about degu sociality, and (iv) conduct laboratory analyses.

The ideal candidate will have an expertise in behavioral ecology and stress physiology, with an emphasis on mammalian systems. We seek individuals with compatible interests in social theory, experience with lab techniques required to understand mechanisms underlying sociality, the ability to work and analyze large datasets, and the desire to develop field experiments. The candidate must have a history of publishing papers in peer-reviewed journals and the potential to secure external funding.

The fellow will seek funding from the FONDECYT postdoctoral program (Chile). Due date for such application: early May. This program provides support to researchers of any nationality. Support includes a stipend, travel expenses, and health insurance.

Application: Include the following in a single PDF file ('Lastname_Firstname_FONDECYTpostdoc'):
(i) documentation of PhD earned after November 2012, or evidence that PhD will be earned by August-September 2015,
(ii) CV highlighting research and educational activities,
(iii) 1 page summary of ideas and
(iv) contact information of three academic professionals (including a PhD advisor).

Dr. Luis Ebensperger, P. Universidad Católica de Chile (lebensperger@bio.puc.cl)
Dr. Loren Hayes, University of Tennessee at Chattanooga (loren-hayes@utc.edu)

HERPETOLOGY COURSE

The American Natural History Museum is pleased to announce the 2015 edition of its Field Herpetology of the Southwest course, held at the Southwest Research Station in the Chiricahua Mountains, Arizona between 24 July – 2 August 2015.

This course is open to anyone interested in learning more about the behavior and ecology of amphibians and reptiles native to the Southwest U.S., and the environment in which they live. Students get the opportunity to participate in labs, attend seminars on a variety of topics, and get hands-on experience with these taxa in the field, even assisting with several long-term in-situ conservation projects. This course provides an educational and rewarding opportunity to see an abundance of herpetofaunal species in one of the biodiversity hot-spots of the U.S.

The application deadline for the course is 1 June 2015. For more information, see the following URL:
http://research.amnh.org/swrs/herpetology-southwest

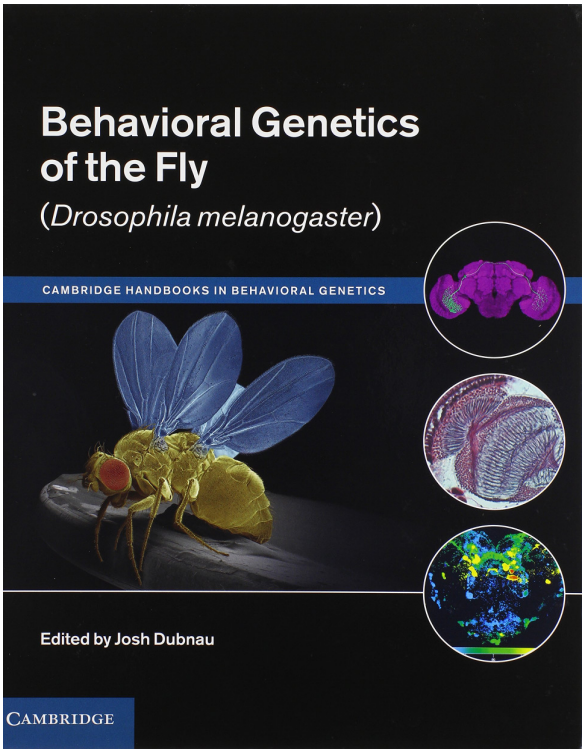
POPULAR ARTICLES IN BEHAVIORAL ECOLOGY
Ten Most Cited Articles Published 2014

First Author	Title	Reference	Times cited to 15th January 2015
Pinter-Wollman, Noa	The dynamics of animal social networks: analytical, conceptual, and theoretical advances	25/2	9
Brown, Culum	Individual personality traits influence group exploration in a feral guppy population	25/1	9
Kelley, Laura A.	Animal visual illusion and confusion: the importance of a perceptual perspective	25/3	8
Radford, Andrew N.	Acoustic communication in a noisy world: can fish compete with anthropogenic noise?	25/5	6
Keiser, Carl N.	Spider aggressiveness determines the bidirectional consequences of hostinquiline interactions	25/1	6
Rowe, Candy	Measuring variation in cognition	25/6	5
Boos, Stefan	Maternal care provides antifungal protection to eggs in the European earwig	25/4	5
Johnstone, Rufus A.	Reciprocity and conditional cooperation between great tit parents	25/1	5
Steele, Michael A.	Do scatter hoarders trade off increased predation risks for lower rates of cache pilferage?	25/1	5
Bokony, Veronika	Necessity or capacity? Physiological state predicts problem-solving performance in house sparrows	25/1	4

Top 10 Full-Text PDF Downloads, 2014 ytd

First Author	Title	Information	Requests
Ruxton, Graeme D.	The Unequal Variance t-Test is an Underused Alternative to Student's t-Test and the Mann-Whitney U Test	(2006), Volume 17, Issue 4, 688-690	1,996
Pinter-Wollman, Noa	The dynamics of animal social networks: analytical, conceptual, and theoretical advances	(2014), Volume 25, Issue 2, 242-255	1,981
Nakagawa, Shinichi	A Farewell to Bonferroni: The Problems of Low Statistical Power and Publication Bias	(2004), Volume 15, Issue 6, 1044-1045	1,747
Strassmann, Beverly I.	Menstrual hut visits by Dogon women: a hormonal test distinguishes deceit from honest signaling	(1996), Volume 7, Issue 3, 304-315	1,686
Martin, Stephen J.	Egg marking pheromones of anarchistic worker honeybees (*Apis mellifera*)	(2004), Volume 15, Issue 5, 839-844	1,401
Birkhead, Tim R.	Reflections	(2014), Volume 25, Issue 2, 239-241	1,395
Dixson, Barnaby J.	Beards augment perceptions of men's age, social status, and aggressiveness, but not attractiveness	(2012), Volume 23, Issue 3, 481-490	1,345
Nettle, Daniel	Human behavioral ecology: current research and future prospects	(2013), Volume 24, Issue 5, 1031-1040	1,267
Muller, Ulrich	Facial dominance in *Homo sapiens* as honest signaling of male quality	(1997), Volume 8, Issue 5, 569-579	1, 246
Gagliano, Monica	Green symphonies: a call for studies on acoustic communication in plants	(2012), Volume 24, Issue 4, 789-796	1,196

Behavioral Genetics of the Fly (*Drosophila melanogaster*) Edited by Josh Dubnau



Part of the "Cambridge Handbooks in Behavioral Genetics" series, Cambridge University Press, 2014 - 291 pages. ISBN 978-1107009035 (hardcover)

For more than a century *Drosophila melanogaster* has been a permanent fixture in most areas of biology. As a consequence there is never any shortage of books covering *Drosophila* genetics, husbandry, laboratory techniques, or other aspects of *Drosophila* biology. It is therefore easy to dismiss any book with the D-word in its title as just another version of something that has already been said. Luckily "Behavioral Genetics of the Fly" does not fall into this category. It constitutes the first attempt at a comprehensive review of behavioural genetics research with *Drosophila*. Considering that behavioural genetics was practically founded by early *Drosophila* geneticists like Seymour Benzer and Jerry Hirsch in the 60s, it is surprising it took this long. After reading the book, we can attest it was worth the wait. This book gives an exciting overview of a very diverse range of topics in short, readable chapters, written by some of the key figures (of both genders) in the field.

The majority of the text is easily comprehensible, but readers should be forewarned that some previous knowledge is expected, if not required. It does not cover basic *Drosophila* genetics, so readers not at all familiar with this species, might find it useful to start elsewhere. For example, Chapter 19, which covers a range of advanced genetic techniques for "dissecting" neurocircuitry, would be challenging for someone without a solid foundation in genetics. Similarly, the most basic aspects of fly work, such as husbandry and stock maintenance, are not mentioned. In other words, if you are a researcher, at any stage in your career, just getting started with *Drosophila* or genetics, it is probably wise to start with something more basic. But if you are already familiar with *Drosophila* and genetics, and hope to take full advantage of the power offered by this organism to elucidate mechanisms underlying behaviour, this is the book for you.

While intended for both students and researchers, we reckon this book would be an ideal companion for readers with a background in behavioural research using other organisms, who plan to undertake *Drosophila* research. For such researchers, this book will provide familiarity with the literature, paradigms, and behavioural quirkiness of this model organism. The majority of the book can be easily understood by readers ranging from the young and bewildered undergraduate trapped in a fly lab over the summer, to the seasoned PI seeking to expand their lab's repertoire. It could also prove a useful reference for researchers who need to make sense of fly papers, but do not work with *Drosophila* themselves. Many chapters would be suitable for advanced undergraduate or graduate courses, but will require the instructor to assign additional readings to cover the basics.

The book covers a lot of ground, in terms of diversity of topics covered and level of detail in each chapter. Many chapters start by outlining why *Drosophila* is a good organism for the particular subject matter, and how findings from the fly tie into work on other model systems. The way this is done varies substantially between chapters, some focus primarily on current research, while others are more concerned with the history of the field. The amount of detail used to describe methodology often far surpasses what is found in published papers, making this book a handy reference for anyone who wants to try to establish a new assay in their lab. E.g. chapter 20 gives the most straightforward introduction to generating useful data for connectomic analysis that we have seen, and is sure to become a classic reference. Most chapters extensively refer to useful reviews for readers wishing more depth. One of the aspects we liked most about this book was that some chapters highlighted major unanswered questions in the field and how emerging techniques will make these accessible to researchers.

While the book has a lot of substance, we found it lacking in terms of structure. The chapters are not logically ordered (e.g. chapters 1 and 3 detail fly vision and visual systems, but are interrupted by chapter 2 which covers neuropeptides). Further, related but spatially separated chapters do not progress naturally or build on each other's strengths. A chapter on advanced neurogenetic techniques is second to last, despite the use of these techniques, without much explanation, in earlier chapters. Some of the chapters have really great introductions on the use of *Drosophila* for specific disciplines, e.g. Chapter 12 outlines why *Drosophila* is a particularly powerful model for neuroscientific research, which could apply

to most of the chapters in this book. As it stands, each section of the book has value as a stand-alone chapter, but a future edition could benefit from a more general introduction to the power of *Drosophila* earlier on, allowing for more specific chapter introductions.

The book is filled with gorgeous figures. However, their usefulness is hampered because the colour versions are only present in an awkward plate section in the middle of the book (black and white replacements are found in the main text). In this section, figures appear in a somewhat random order without proper captions or page number references. This requires the reader to spend time looking for the colour version of a given figure, and then flip back and forth between figure and caption. Surprisingly, this is also true in the eBook version, which is particularly infuriating. As both students and researchers move towards primarily reading electronically, this book would benefit from taking advantage of the graphic possibilities of this format, not just for coloured figures, but also for example by using 3-dimensional anatomical figures, and animations to describe genetic techniques and pathways.

It would be impossible to end this review without briefly mentioning why this book and its creature should be of interest to behavioural ecologists. It is no secret that while *Drosophila* is immensely popular, many behavioural ecologists have shunned it. As it is becoming possible to apply advanced DNA editing techniques, such as CRISPR, to non-model organisms there is likely to be a quantum-shift in the types of questions we address and the animals we address them in. If the field is to remain relevant, it must take advantage of these new techniques to move towards an understanding of how behaviour results from the interplay between environment, neural circuitry and genetics. In order to make these endeavours fruitful, we need clear and testable hypotheses to follow. Genetic model organisms such as *Drosophila*, with decades of amassed research literature and ready-made transgenic tools for exploration, provide an ideal resource for hypothesis generation. Fortunately, there is now a book that can help introduce researchers to this exciting and rapidly evolving field.

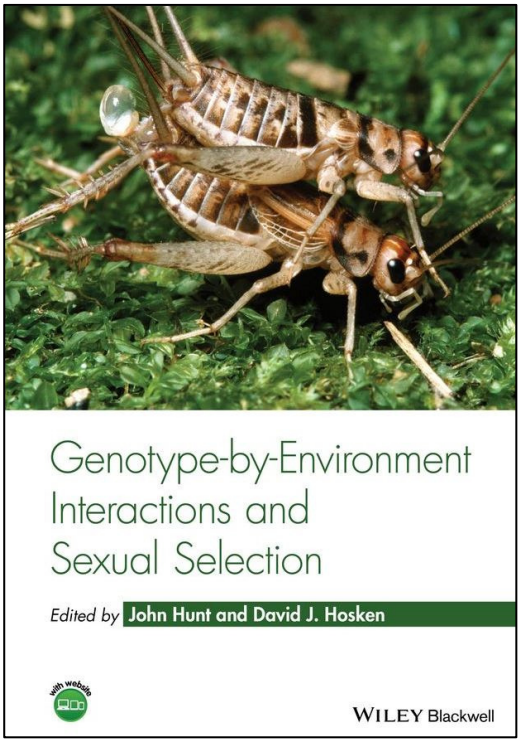
Eirik Søvik and **Alexis S. Hill**
Department of Biology,
Washington University in St. Louis

BOOK REVIEW

"A manual for exploring the complexities of sexual selection"

Genotype-by-Environment Interactions and Sexual Selection.
Edited by John Hunt & David J. Hosken.

John Wiley & Sons, West Sussex.
ISBN 978-0-470-67179-5



The differing performance of genotypes across environments, known as genotype by environment interactions (GEIs), has long been recognised as an important source of phenotypic variation. It is therefore surprising that one field of behavioural ecology that is particularly focussed on variation, sexual selection, for some time largely ignored the effect GEIs may have on sexually selected traits. Recent research has shed light on the role of GEIs in sexual selection, revealing the complexity of the processes involved and addressing some fundamental questions in sexual selection theory. *Genotype-by-Environment Interactions and Sexual Selection*, edited by John Hunt and David Hosken, provides a timely synthesis of this work in a volume that will appeal to all levels of reader. For PhD students new to the topic (JB & FR) charged with leading this review by our supervisor (LWS), it provided an invaluable resource when formulating our proposed research, a stated aim of the book which we can confidently say it achieved.
The editors take the reader through a well-structured exploration of GEIs and sexual selection, highlighting key ideas within a logical framework encompassing both theoretical and empirical work. This is achieved through contributions from some of the leading researchers in the field. After placing the work in its historical context and providing a useful summary in the preface, the first section of the volume outlines the theoretical underpinnings of GEIs in a sexual selection context. Section two then details current methods for measuring GEIs in both natural and laboratory settings. The last section describes several systems in which the role of GEIs in sexual selection have been studied. We found this structure both easy to follow and useful for understanding why GEIs are important in sexual selection and how we might measure them in our own studies. The empirical examples are both interesting in their own right and demonstrative of how current researchers are applying the theory and methodology to various systems.

For non-modellers, Section 1 provided some challenges to understanding the details of the models presented. Nevertheless, we felt that the chapters were written in a way that allows readers with to readily grasp the key concepts being discussed. Chapters 1 (Wade) and 2 (Getty) provide an introduction to broader themes in sexual selection theory, such as good genes and signalling (respectively) and how these relate to GEIs. For us, Chapters 3 (Holman and Kokko) and 4 (Wolf, Royle, and Hunt) were the highlights of this section. Luke Holman and Hanna Kokko do an excellent job explaining the 'Jekyll and Hyde' nature of GEIs, that is their ability to maintain variation in sexually selected traits (and therefore provide a solution to the lek paradox) on the one hand whilst potentially disrupting signal reliability on the other. These twin effects are incorporated into their simulation model where they demonstrate that female choice for indirect (i.e. genetic) benefits can be selected for where GEIs exist but only under certain conditions. Jason Wolf, Nick Royle, and John Hunt then go on to successfully take the reader through a progression of understanding, from GEIs to gene interactions (GxGs), to lay the foundations for describing genotype by social environment interactions (GSEIs) – essentially GEIs where the environment contains genes and can itself evolve. A useful feature of both of these chapters was the explication of areas for future theoretical and empirical research, itself a stated aim of the editors.

Section 2 sets out to provide a guide to measuring GEIs in laboratory and natural settings, a very useful feature for anyone interested in entering the field. We particularly enjoyed the details provided in chapter 5, written by Derek Roff and Alastair Wilson, which outlines several breeding designs as well as statistical methods used for measuring GEIs. The provision of relevant code for common statistical packages and worked examples in both chapters 5 and 6 are a nice inclusion that will benefit many readers. A challenge that many researchers face is measuring GEIs outside of the lab – chapter 6 provides an excellent guide on how this may be done. The last chapter in this section, written by Jennifer Perry and Judith Mank, takes us to the realm of transcriptomics – itself a rapidly evolving discipline. Perry and Mank supply an up to date methodology for measuring transcriptome by environment interactions (TEIs) whilst being refreshingly explicit that such methodology is likely to be very quickly obsolete due to the quickly changing technology employed in transcriptomics.

The theory and 'how to' provided in Sections 1 and 2 are nicely brought together in the final part of the book with several chapters describing recent empirical work. The examples encompass a broad range of taxa and techniques, as well as identifying gaps in our current understanding. These chapters can easily be read on their own, as each provides a brief overview of GEIs and how they relate to the systems under study. David Hosken and John Hunt then tie all three sections together with a 'Conclusions and Final Thoughts' chapter, raising some interesting questions and outlining areas for future research. The book is accompanied by a website from which PowerPoint slides of all figures and pdfs of all tables can be downloaded, facilitating the use of material gathered in the book for both undergraduate teaching and research seminars. *Genotype-by-Environment Interactions and Sexual Selection* provides a source of reference to the history and development of the field. It offers the new student embarking on their own research journey an invaluable instruction manual, and the persuasive arguments detailed should challenge how established researchers examine sexual selection.

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BOOK REVIEW

Animal Movement Across Scales Edited by Lars-Anders Hansson & Susanne Åkesson.

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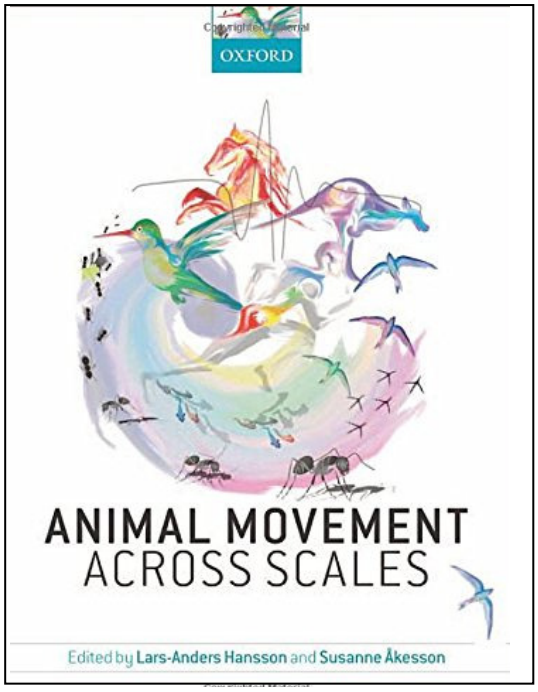

The editors of this volume have assembled a self-described 'integrated team of leading researchers' (37 in all, mostly from the Institute of Biology at Lund University, Sweden), to create a book that covers all aspects of animal movements: how and why animals move, locomotion and navigation, the genetics of movement, and novel tracking technologies. The authors iterate, however, that the aim of the book is not to provide a complete review of the decades-old field of animal movement, but rather to 'cherry-pick' absorbing, timely material in order to stimulate and encourage readers and researchers already involved in the field. That said, several chapters of the book are in fact authoritative syntheses of topics ranging from the patterns of animal migration (Chapter 2), exciting findings from recent tracking of birds, bats, and insects (Chapter 5), animal navigation (Chapter 9) and the genetics of migration (Chapter 12).

The book is divided into three main sections, book-ended by an introductory chapter (written by the editors) and a wrap-up synthesis chapter (written by all of the lead-authors). The introductory chapter 1 provides an overview of the layout of the book, and introduces readers to the concept (which runs throughout the book) of movement as an optimization, an approach that allows for an understanding of the evolution, performance and strategies employed by moving animals. The rest of the book is divided into three parts. Part 1 (Chapters 2-4), entitled 'Large-Scale Patterns of Movement', includes the aforementioned overview of the taxonomic and population-wide patterns of migration across several taxa (Chapter 2). Migration is an extraordinarily diverse behavior, and this chapter does an admirable job compartmentalizing the various inter- and intra-population patterns (leapfrog, chain, partial, etc.) and spatiotemporal patterns (diadromous, latitudinal trends, etc.) of migration across multiple taxa. Chapter 3, continuing where the previous chapter left off, explores animal movements in a changing world, and provides not only numerous cross-taxa examples of how terrestrial and aquatic habitat change and global warming have affected the migrations of animals, but also examples of how changing biotic interactions due to global change can have cascading effects across ecosystems. The last chapter in Part 1 (Chapter 4) discusses animal movements through modern agricultural landscapes, stressing that species' responses to increased loss and fragmentation of high-quality habitats depends critically on their mobility through such landscapes, but that not all species can respond to the same conservation 'recipes' of reducing fragmentation and/or increasing connectivity.

Part 2 of the book, 'Movement Strategies and Adaptations', contains four chapters that move beyond general patterns of movement to focus on movement as an optimization strategy. What are the benefits that movement confers to the mover, and what strategies optimize these benefits? Chapter 5 examines data from recent tracking studies to explore the benefits of very long over-water movements of some shorebirds, loxodrome- versus orthodrome-directed flights over land by some songbirds, and soaring flight in larger species like white storks and raptors. Within species, different behavioral syndromes influence individual movement strategies as discussed in Chapter 6. This intriguing chapter explores movement dynamics in the burgeoning field of animal personality. A highlight of this chapter contrasts foraging strategies of bold versus not-bold individuals in black-browed albatrosses (*Thalassarche melanophrys*) and great tits (*Parus major*). Whereas bold albatrosses foraged closer to the colony than their non-bold conspecifics (presumably because competition is more intense close to the colony), bold fast-exploring great tits foraged further from the study area, exploring new foraging areas at higher rates than their not-bold conspecifics. The authors explore the consequences of differences in personality in regards to metapopulation dynamics, range expansion, and invasive species and reintro-ductions, and how personality can influence population-level migration patterns (i.e., partial migration) and varying migration routes. Movement of course is not limited to migration, and Chapter 7 explores the causes and consequences of dispersal especially as it relates to phenotypic plasticity. Chapter 8 discusses the adaptive features of movement as related to pathogen exposure and risk reduction, and the spread of pathogens across space. The authors relate, for example, that very long non-stop journeys, such as those undertaken by bar-tailed godwits (*Limosa lapponica*), are possible because of low exposures to pathogens on the breeding and wintering grounds, providing 'fitness fuel' for week-long non-stop flights.

The third and last section of the book, 'The Mechanisms and Codes of Navigation and Movement', comprises five chapters. From desert ants counting their steps back to their Saharan nests to honeybees using a time-compensated sun compass, chapter 9 synthesizes past and current knowledge of the fascinating study of animal navigation, the 'theory and practice of charting a course to a remote goal.' Chapter 10 explores the use of a geomagnetic compass in animals, focusing on the two major magnetoreception mechanisms that have been demonstrated in animals: the presence of magnetic particles and reactive ferrominerals, both of which help animals detect the strength of Earth's magnetic field. Many animals inhabit an 'olfactory landscape' and direct their movements via odor-tracking, and this is the subject of chapter 11 which discusses this in relation to insects, crustaceans, fish, mammals, and birds. Chapter 12 reviews the genetics of migration, focusing on migratory direction and timing, the molecular toolbox of techniques currently in use, and future perspectives on the identification of the elusive 'migratory gene'. The final chapter in this third section explores in detail the physics of animal locomotion, comparing the cost of transport between different taxa and the differences between moving across a surface and moving through air and fluid. The authors of this chapter assert that technical and methodological improvements in the modeling and measuring of animal movements and fluid dynamics will lead to a better understanding of how differences in morphology and motion are associated with differences in performance, providing us with a better understanding of 'one of the most important selection pressures shaping animal performance'.

This book fills a niche in movement ecology literature – a much needed cross-taxa synthesis and review of the patterns, strategies, and genetics of animal movement, while also charting the way forward. The authors are experts in their field, and a reader gets the sense throughout the book that they really love what they study, and enjoy writing about it too. The editors have done a fine job of organizing the book into three relevant sections, and each chapter acts as both a review of the topic in question and a springboard for future work. Though there is a heavy avian component to much of the literature and examples cited, that is more a reflection of current research; mammals, fish, insects, and to a lesser extent reptiles and amphibians are all represented here. The book is aptly suited for advanced undergraduates and graduate students enrolled in movement or spatial ecology courses, but also provides enough fodder for current movement ecologists and biologists interested in movement and migration.

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Migration: The Biology of Life on the Move, 2nd edition

Hugh Dingle. Oxford University Press, 2014. 326 Pp.
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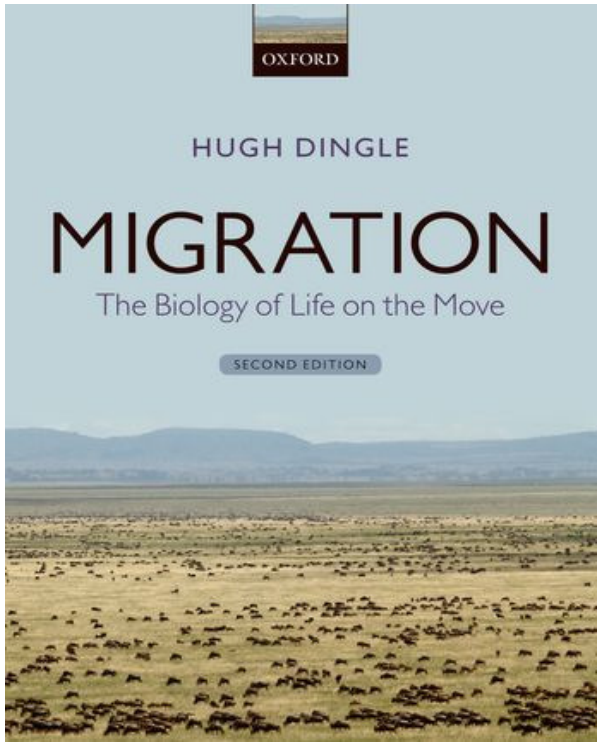
ISBN 978-0-19-964039-3 (paperback)



Hugh Dingle's first edition of *Migration* was well received, quickly establishing itself as one of the primary sources for undergraduates and graduate students interested in behavioral studies on migration. With the most recent 2nd edition of this book, Dingle again successfully presents a broad, overarching view of migration while touching on many facets across multiple taxa individually. Few fields have seen such strong growth and development in both research and public interest as migration, and this is well reflected in the revised edition, as much of this book contains additional or even completely new information in particular areas from the original. While this large amount of original material makes this book feel as much a sequel as a revision, a similar user-friendly structure and organization help make this work as accessible and enjoyable as the first, and in the end successfully fills its role as a thorough reference book on general migration just as the 1st edition of *Migration* did nearly two decades prior.

One of the more notable aspects of this book is how Dingle chooses to not center on any particular taxa or species, instead focusing on the concept of migratory movement itself and using research from multiple avenues in the attempt to address both how and why migration occurs. Instead, the author has the book divided into four major parts – an overview of movement and migration, factors influencing migration, life histories of migrants, and lastly migration and human biology. By approaching migratory movement in this way, the author is able to take so much more material and have it seamlessly flow together into a comprehensible, informative, and overall enjoyable manner. The selected references used for each section throughout are updated and strong representative works within their respective fields, really showing the breadth of this book and the care Dingle put into this revision.

Part I, *Migration and Methods for Its Study*, begins simply with a brief discussion on movement. This initial focus is more broad of an opening concept than seen in the first book, highlighting how new information is allowing us to better define and understand migration. It seems the goal of this introduction is to place migration within the larger picture, even addressing and clearing up the common confusion between it and dispersal. Additionally, spatial and temporal aspects of some routes of migration are summarized to showcase the large diversity in migration pathways. Focusing on the large differences in migratory pathways, this book illuminates the similarities of migration characteristics and behaviors that span migrant taxa. Part I concludes with an elaboration of the methods used for the study of migration with explanations of new technologies being utilized.

Part II, *Proximate Factors in Migration*, touches on some of the most important and influential factors that have had the strongest evolutionary impact on shaping current migration. At the beginning of this section, a table of definitions including pertinent meteorological and oceanographic events has been added. This is a welcomed addition to the section, and changes in the new edition such as this make the book much more user-friendly and accessible. The focus then switches to the effects of atmospheric and oceanic conditions on migration, which take place over a spectrum of spatial scales. Information on these conditions is organized cleverly for the readers by addressing each in a decreasing order of magnitude. Additional topics are covered in detail within this section, including physiological components of migration and current progress among various fields, constraints on migrants—either biomechanical or bioenergetics—and how individuals and species respond and adjust to meet these evolutionary constraints, and mechanisms of orientation and navigation. It is within this last section, orientation and navigation, where a large amount of exciting new research has unfolded since the first release of the book, and is covered in more detail. Improvements in research methodology and sensory technology are continually allowing a greater understanding of the mechanisms and information migrants use to position themselves along their migratory routes, and this section does a very nice job of accurately detailing these new innovations in a manner which highlights their complexity with a clear approach.

Part III, *Migratory Life Histories and Their Evolution*, steps back from the proximate factors associated with Part II and instead attempts to address the ultimate factors facing a species or taxa and how evolutionarily their migratory strategy may have formed and are altered. This information is critical if we are to truly comprehend the effects of changes in factors such as

season and habitat, and even the influence of these changes on a species' evolutionary trajectory. One major portion of this section explores the importance of resource acquisition, specifically resources highly influential role in selection of life history traits such as the timing or route of migration. Importance of the relationship between habitat and resources is presented in a manner that eschews any confusion. Further, it conveniently provides useful insight on the concepts that follow, helping the audience grasp the crucial link between movement, necessities for living, and changing habitat. In addition to resources, habitat is also explained as closely connected to meeting other demands, such as those concerning breeding, security, and physiology. Part III concludes with an interesting look at the relationship between environment and genetics and how it impacts migratory syndromes. Most importantly, the diversity of migratory patterns is explained as being influenced by environmental causes of selection, genetic variation, and the results of their interplay on various phenotypic expressions.

The final section of the book, Part IV, *Migration and Human Biology*, lays a sufficient foundation for the consideration of migration into issues of conservation and pest control. Although Part IV was also the shortest section in the first edition, the information presented in this edition has even been reduced into only one chapter. This was not at the expense of quality, though, as it successfully raises interest and awareness on the role that migration plays in modern, man-made issues. Using eye-opening examples from a variety of taxa, the book illustrates how anthropogenic effects influence migratory species and how migrants are responding to an ever-increasingly urbanized world. Although future work is needed regarding these conservation issues, some progress has been made in the nearly two decades since the first edition came out. In the first edition, for example, the author mentions the importance of international collaboration and cooperation in dealing with pest management and forecasting, and since then the United Nations has created a system for predicting and tackling outbreaks of Desert Locust swarms. Still, the importance of future research into these areas of concern is furthered illuminated by the sparse data available on the likely effects of climate change on migratory bird populations.

While this book is not necessarily an "all-encompassing" coverage of migration, and some areas addressed deserve more attention than given, this work is arguably one of the best references for a student, graduate, or young professional interested in migratory movement. Dingle's far-reach explanation of migration across organisms has not only continued in successfully explaining migration with an inclusive approach, its modifications have transformed this book into one that can further captivate readers' interest with its more accessible layout and additions of new, relevant research examples. Dingle focuses on the patterns of migration that affect the behavior, ecology, and evolution of organisms across taxa within this book, proving useful to anyone who is working in the field of migration or those who simply wish to introduce themselves to the concept as a whole.

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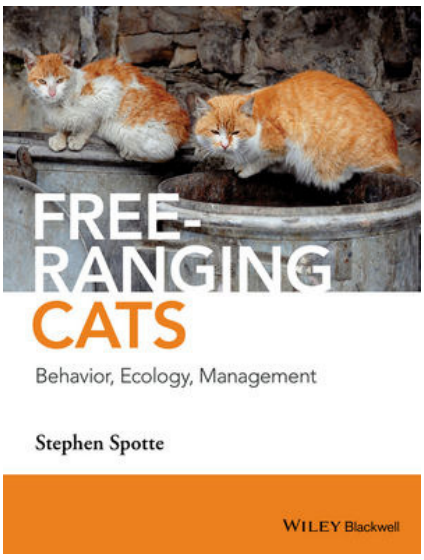
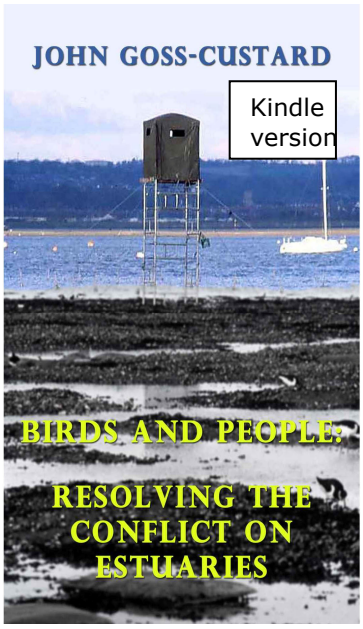
BOOKS FOR REVIEW





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The due date for the review is September 20, 2015.

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The following titles are available for review from Oxford University Press

Title	Author
Aquatic Entomology	Lancaster & Downes
Dog Behaviour, Evolution, and Cognition 2e (December 2014)	Miklos
Free-Ranging Dogs and Wildlife Conservation	Gompper
Plant Behaviour and Intelligence (August 2014)	Trewavas
Quantitative Genetics in the Wild	Charmantier, Garant, & Kruuk
Shallow Subterranean Habitats	Culver & Pipan
The Evolution of Insect Mating Systems	Shuker & Simmons
The Evolution of Sex Determination	Beukeboom & Perrin

The following titles are available for review from Cambridge University Press

Title	Author
Animal Communication Theory	Stegmann
Animal Contests	Hardy
Animal Teeth and Human Tools	Turner II
Anthropological Perspectives on Tooth Morphology	Scott
Behavioral Genetics of the Mouse	Crusio
Behavioral Genetics of the Mouse	Pietropaolo
Bioarchaeological and Forensic Perspectives on Violence	Martin
Biosocial Becomings	Ingold
Causes and Consequences of Human Migration	Crawford
Cephalopod Cognition	Darmaillacq
Divided Brains	Rogers
Evolutionary Biology and Conservation of Titis, Sakis and Uacaris	Veiga
Evolving Human Nutrition	Ulijaszek
Extractive Industries and Ape Conservation	Arcus Foundation
From Clone to Bone	Asher
Giraffe	Dagg
How the Snake Lost its Legs	Held, Jr
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Mammoths and the Environment	Ukraintseva
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Oxytocin, Vasopressin and Related Peptides in the Regulation of Behavior	Choleris
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The Foragers of Point Hope	Hilton
The Politics of Species	Corbey
The Politics of Species	Corbey
The Social Life of Greylag Geese	Scheiber
Tool Use in Animals	Sanz
Tooth Development in Human Evolution and Bioarchaeology	Hillson
Understanding Evolution	Kampourakis
Wild Cultures	Boesch