

Book Reviews

Zoological Catalogue of Australia Vol. 34. Hemichordata, Tunicata, Cephalochordata

Editors A. Wells and W.W.K. Houston
1998
CSIRO Publishing, Melbourne
298pp.

The *Zoological Catalogue of Australia* was conceived as a comprehensive database recording the current taxonomic and biological knowledge of the Australian fauna. This massive undertaking is to be accomplished in the form of over 100 volumes and sub volumes which are prenumbered in taxonomic sequence. (Thus although this is numbered Vol. 34 it is in fact only the 17th in the series to appear.)

All volumes in this series follow a similar, computer-generated format. This consists of brief introductory sections defining the groups being considered and reviewing the state of knowledge of their taxonomy from a historical perspective. This is followed by a series of similar definitions of component classes and families and a comprehensive listing of recognized genera and species within each. Individual entries list such data as the type specimens, type localities and distributions plus some ecological notes and a full bibliography.

In brief this, and its companion volumes, are invaluable resources for taxonomists, museum curators and the like who are involved in research on the Australian fauna. They are, however, extremely unreadable and of limited utility to workers in other areas. This particular volume is likely to be a particularly poor seller, given the very small number of taxonomists interested in these groups worldwide.

South African readers will find the family definitions useful, as most of the families occur in our area. There are, however, very few individuals or libraries who would be tempted to purchase this book and even for them this would be a resource to be referred to, not read!

CHARLES GRIFFITHS

Biodiversity dynamics and conservation: the freshwater fish of tropical Africa

Christian L  veque
1997
ISBN 0 521 57033 6
Cambridge University Press, Cambridge
 55.00 (US \$84.95)

Africa straddles the equator and encompasses more of its landmass within the tropics than any other continent at the present time. The continent stands out for its biodiversity, and is particularly well known for the diversity of its terrestrial wildlife and natural ecosystems. Somewhat less exposed to the world at large is the wealth of African aquatic life and ecosystems. In spite of its natural wealth Africa has suffered at the hand of man and nature and is also well known for the devastations wrought on its wildlife and ecosystems through drought, human overpopulation, greed and, of course, con-

flict. African aquatic systems have not escaped this onslaught. Dr Christian L  veque's terrific book exposes, with insight and in great depth, the wealth and the forces both sustaining and confronting the freshwater fish fauna of tropical Africa. This is the major work of its kind yet to be published, and will be a great source of information in the struggle to conserve this natural resource for future generations.

In terms of its approach the book's opening sentence is apt – 'This book takes a holistic view of biological diversity, from the molecular, through the organismal to the ecosystem levels of organisation'. It is a long read in fine print – and in my view the print size is too small for comfort. The book is systematic, well organised and works descriptively through five sections, the first covering the diversity of African freshwater fish including the diversity of ecosystems, the fish fauna itself and the mechanisms of genetic and species evolution. The second major section examines the past as key to understanding the present, focusing on the concepts of species and species evolution, the classification of diversity and biogeography. The third division considers diverse lifestyles from the point of view of growth and feeding, reproduction and life histories and responses to environmental constraints. Community aspects are covered in the fourth section starting with fish assemblages, equilibrium processes, the diversity of habitats, the dynamics of change through time and ecosystem functioning. The last section of the book deals with conservation issues from the threats facing African biodiversity to economic pressures and conservation options. There is an excellent bibliography, and separate species and subject indices.

The concept of 'biodiversity' is not always well understood by either professionals or the lay public but this book gives a pretty comprehensive coverage of the concept and after reading it, it will be hard for anyone to not understand and appreciate exactly what biodiversity is all about. Historically Africa has been divided between the French and the English spheres of influence. This has left a legacy of poor interaction between these spheres over the years and this has permeated the scientific exploration of the continent as much as anything. As a professional African ichthyologist I appreciate the extent to which the author has entwined the great volume of English and French contributions to African ichthyology into one seamless account. The author is French and the book is written in English, which says much for the way things in Africa have changed in recent times. This is a very welcome state of affairs to report because it is quite surprising just how much fact both sides of the African experience bring to the table that is generally unexposed to a broader audience through the consequences of the language barrier. There are other reasons why information doesn't reach all who would benefit from it, often because it is either buried in the avalanche of scientific productivity emerging in this information age of ours, or is simply overlooked in the narrowness of focus that has descended on most professional pursuits these days. I believe that one of the lasting contributions of this book will be the way it re-exposes so much of the literature on African fishes within the context of the history and current understanding of the literature.

The text is well written and generally well organised and illustrated. I did encounter typographical errors – mostly minor

and not worth mentioning but there are a few that should be pointed out if only so they can be corrected in future. One embarrassing mistake is the printing upside down of the Figure 9.5 (p.200). By incorrectly referring to Figure 6.4 instead of 6.5 in the text on p.99 some confusion results. A printers registration on the bottom of p.281 is a slip no doubt but does create a negative impression when seeking standards of production. Generally though the many line diagrams and charts are clear and well presented. For a book on biodiversity there are surprisingly few depictions of fish – and no photographs at all. This is a pity because unless the reader is an ichthyologist familiar with the African fauna the many examples giving scientific names of species are devoid of the flavour of the animals themselves. Fishes are not nearly as familiar to people, even trained biologists, as so many terrestrial vertebrates.

So much fact and case history are presented that it is inevitable for erroneous or challengeable statements to occur. Again some of these are probably unintentional slips whereas others involve interpretation of theory that needs challenge and debate lest they be taken as acceptable doctrine. Simple errors to correct include the statement (p.33) 'Two million years ago during the late Triassic ...' – two hundred million years ago is more like it. In Table 2.6 (p.34) the Precambrian is indicated as being less than 570 million years whereas it should be more than 570 million. Coming from a systematic background I have problems with some of the views given in the section dealing with intercontinental affinities of the African fish fauna – primarily because they reflect outdated dispersalist views that are no longer tenable as valid explanations, but also because more recent important works on the phylogenetic relationships of certain groups of fishes have changed the original premises on which such earlier views were originally formulated. The claims (p.37) that, of the otophysan (not the ostariophysan as is now understood) fishes, the characoids are 'generally considered to be the most primitive', and the Cypriniformes are the 'most modern', have been effectively rebutted by the cladistic hypotheses of Fink & Fink (1981, 1996). I was gratified to see that more recent views actually followed the presentation of earlier literature in the same chapter, but the problem of accepting uncritically outdated science, remains.

Indeed this last point touches on what is possibly one of the major drawbacks of this otherwise remarkable work. The author seldom provides firm commitment to a particular interpretation of an issue – and prefers rather to present all the literature around a subject leaving the readers to draw their own conclusions where diverse opinion is involved. To some extent this neutrality is an acceptable approach but it is always valuable and important when the author is as senior a figure as is Dr L  veque to know what his preferences actually are.

The great value of this work is, as already pointed out, its very broad and thorough treatment of biodiversity as a concept. Both the African and the fish foci of this book are gap-filling strengths that make for a refreshing change from the authoritative literature drawn from first world situations or which deals with the more conspicuous and familiar large mammal and other terrestrial components of the biosphere. Fish are an important economic resource in tropical Africa but this is so often overlooked because the value of the re-

source is greatest to the relatively poor, rural communities. The linkup between biodiversity and human needs and impacts is another reason why this is such an excellent account that will be of value to a readership way beyond those with an interest in Africa or fishes alone. The issue of biodiversity inevitably gravitates towards aspects of conservation as it does in the present work. Again the detail and extent of coverage given to the issues is striking and that makes this account stand out. All the issues are dealt with, right from goals and principles of biodiversity conservation to ethics, the need for new management strategies, in situ *versus* ex situ conservation, aquatic parks and reserves and international conventions currently driving the biodiversity focus. The bibliography backing all of this up is extensive and comprehensive and is in itself a valuable resource.

The quotation from Soul   (1986) heading the final chapter makes a most pertinent point, 'Administrators, policy makers, and managers have a right to ask for the bottom line ... and biologists have the right and sometimes the obligation not to give an oversimplified misleading answer to such a question'. L  veque has given us here a most comprehensive source and model of the biodiversity of African freshwater fishes, making it so much easier to honour this obligation. Anyone seriously interested in understanding and conserving global biodiversity can hardly afford not to have it close on hand.

References

- Fink, S.V. & Fink, W.L. 1981. Interrelationships of the ostariophysan fishes. *Zoological Journal of the Linnean Society* 72: 297–353.
- Fink, S.V. & Fink, W.L. 1996. Interrelationships of Ostariophysan Fishes (Teleostei). Chapter 11., 209–249. In: *Interrelationships of Fishes*. (Eds) M.L.J. Stiassny, L.R. Parenti, G.D. Johnston. Academic Press, San Diego.
- Soul  , M.E. (Ed.) 1986. *Conservation biology, the science of scarcity and diversity*. Sinauer Associates, Sunderland, MA.

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Biology and ecology in southern African estuaries

Alan K. Whitfield

Ichthyological Monographs of the J.L.B. Smith Institute of Ichthyology, No.2

1998

ISBN 0-86810-333-0

Hardcover, 223 pp

R150.00

Alan Whitfield is the leading authority on southern African estuarine fish ecology so the completion of his most important work on estuarine fish ecology to date has been awaited by aquatic biologists in South Africa and abroad. This book is the most up-to-date and authoritative synthesis of information available on estuarine fish ecology in Africa. Whitfield's thorough review of estuarine fish ecology published over the last 25 years combined with his considerable insight and un-

derstanding of this most complex of subjects makes this a truly definitive work.

The opening chapter provides a fascinating introduction to southern African estuaries in all the complexity and variety of form and function followed by an absorbing account of estuarine ichthyology from the first pioneers of 1912 through to the 1990s which represent the 'coming of age' for estuarine ichthyology in the region. Clear diagrams, tables, maps and photographs provide the reader with a wealth of useful information. Each chapter is liberally supplied with superbly accurate fish illustrations, maps, charts, tables and photographs where appropriate, all of which combine to inform and provide a convenient and comprehensive reference for the reader.

The second chapter entitled 'Fishes of southern African estuaries' examines the life-history patterns of estuarine associated fishes and gives a detailed coverage of the physical adaptations and behavioural attributes required by fishes using estuaries for parts of their life cycles. How fish larvae recruit into estuaries in terms of possible cues and timing is treated here as is the ability of recruits to tolerate the extremes of physical conditions which characterise many southern African estuaries. The third section of this chapter includes a very useful discussion on energy pathways within estuarine foodwebs and the interaction of abiotic and biotic factors on fish biology. The chapter concludes with a thought provoking examination of the possible part played by estuaries in evolution of fish, and the reasons why the estuarine environment is unfavourable for speciation to occur.

The third chapter is the longest and provides comprehensive species-by-species profiles of the 100 or so fish species, both marine and fresh water, utilising estuaries on the subcontinent. Each species profile includes a distribution map, an accurate illustration and several anatomical features to aid identification. These, together with an up-to-date synopsis of published biological information, make the book an essential quick reference for anyone involved in estuarine fish research.

Chapter four assesses the importance of southern African estuaries, coastal lakes and river mouths as convenient places of shelter for juvenile marine fish species along an otherwise uniform and high energy coastline. The ichthyofaunal composition and environmental regimes of temporarily open or closed estuaries are contrasted with conditions prevailing in permanently open systems such as estuarine lakes and river mouths. Simplified trophic structure charts of the main fish species in several of the better studied estuarine systems are useful and practical features of this section is the final diagram of the ichthyofaunal structure that can be expected between one estuarine type and the next.

Chapter five entitled, 'Environmental and anthropogenic impacts' provides a balanced and reasoned account of the present and future effects of man's increasing demands on the limited fresh water supplies in southern Africa. A wealth of supporting data illustrating anthropogenic impact on estuarine systems as well as some useful biological indicators for measuring estuarine 'health' are presented.

The final chapter on conservation of fishes completes the body of the text. The five major categories of fishes utilising estuaries are described followed by a very useful Table 13 giving the geographical range, distribution and degree of de-

pendence on estuaries of each species. These and other data provide substance to powerful arguments for the conservation and preservation of estuarine habitats as the main methods for conserving endemic and migratory fish species in southern African estuaries.

An extensive reference list, a glossary, an index and two appendices, one with photographs of selected estuaries and the other listing scientific and common names of estuarine fishes, completes this outstanding and up-to-date scientific review. As Paul Skelton remarks in his Forward, 'It is the first of its kind in Africa ... it will become the standard work and an essential reference on estuarine fishes, for southern Africa and beyond'. It certainly fills an important place in ichthyology and is a benchmark for any future work on estuarine fishes.

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The Southern synthesis. Fauna of Australia Vol. 5

P.L. Beesley, G.J.B. Ross & A. Wells

1998

CSIRO Publishing, Melbourne

Many countries will envy the production of this benchmark publication reviewing the Mollusca of Australia. It is a truly monumental piece of work split between two volumes and totalling over 1200 pages. The funders are to be commended on a lavish production that will be a standard reference for decades into the future. The book begins with an astounding 144-page overview of the phylum as a whole, covering classification, history of discovery, morphology and physiology, life histories, the major habitats (marine, terrestrial and fresh water), economic significance, biogeography, fossils, methods of study and conservation. Following this, the text systematically works through the classes with Aplousobranchia, Polyplacophora, Bivalvia and Cephalopoda being covered in Part A, and a separate volume, Part B, being devoted to the Gastropoda.

A formidable list of 70 authors indicates the depth of expertise drawn upon, and the editors must be congratulated on welding the individual contributions into a unified and united whole. The book is liberally illustrated with photographs and line drawings, and the artists deserve special recognition for the quite outstanding calibre of the illustrations.

The growth of studies on Mollusca in Australia is quite staggering. The book cites some 7700 papers, of which almost 50% were published after 1980. A huge amount of information is synthesised. No-one should fall into the trap of thinking that the Australian focus of this book defines it as being of colloquial interest only: every marine research-library and every serious malacologist should own a copy. It is very much a reference book – it should not be buried inaccessibly in the innards of a library, but readily available on the shelves of research workers. My starting point was to dive straight into my pet group – the Patellogastropoda – and found the text to be glory-box of information.

The text is particularly strong on phylogeny, morphology and classification, and both up-to-date and thorough on these aspects. Coverage of biology and ecology tends to be weaker.

I have two central criticisms of the book. The first is that it is unlikely to reach its self-proclaimed market – ‘a broad non-specialist clientele’. This really is a technical book, not one for the non-specialist. The latter could learn a lot by reading chapter one – but after that I fear that the average person will get bogged down. Try this out, for example (p.639): ‘... the character trends appear to be paedomorphic ... and suggest progenesis of post-displacement as processes, rather than neoteny ...’ Hardly the stuff of popular writing! There is an extensive glossary, but even so, terms such as ‘cross-lamellar’ and ‘foliar’ are used several times without definition.

My other criticism is that I would have hoped that a book of this size would allow ready identification of at least the more common species. In this respect the text varies substantially from section to section. The cephalopods, for example, have a detailed family key and a large number of (quite extensive) line drawings of the most important species. For some of the other groups, it would be very difficult to use the book to identify species with any confidence. I’d have thought that each section could have had a series of black-and-white plates or line drawings allowing ready comparison and identification of species. Perhaps that is an unfair criticism as it was not one of the stated objectives of the book, but I suspect many people will be disappointed that identification to the level of species hasn’t been made easier.

I would not want to end on these carping criticisms. The two volumes have too many strengths not to return to earlier remarks that they will remain a remarkable source of scientific reference for decades – and not just for Australians.

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The Kingdon field guide to African mammals

Jonathan Kingdon

1997

Academic Press (locally available at Russell & Friedman,
Box 73, Halfway House)

465pp.

£29.95.

ISBN 0-12-408355-2

This is a beautifully illustrated field guide to African mammals, however the title is a bit misleading because the marine mammals are not included. Anyone who has seen other books by Jonathan Kingdon will know of his skill as an artist and of his extensive knowledge of African mammals. He is therefore well qualified for the dual role of writing and illustrating this book.

Many of the illustrations contained in this field guide are not only informative but a real joy to look at – Kingdon captures the character and postures of his subjects and they are dynamically alive. Particularly pleasing to me are his portraits and illustrations of the smaller primates and also many of the other small mammals. In so many other texts, the drawings of

small mammals are little more than slightly animated study skins, Jonathan Kingdon does quite often manage to capture those subtle features of a rodent or insectivore that make it recognisable. He does not always succeed – sometimes because there is no scale to most of his drawings, even those on the same page. An example of this is on page 184 where the common mole-rat, *Cryptomys hottentotus* (mass about 100 g) appears larger than the dune mole-rat, *Bathyergus suillus* (ca 800 g) – a pity too, that he calls all these mole-rats blesmols.

This is an ambitious book, Kingdon attempts to cover all the terrestrial mammals of Africa. Because of this, identification to species level is not possible for the more extensive genera of small mammals, particularly the rodents. He does, however, list most of the species in the text. The book provides an overview of the diversity and distribution of African terrestrial mammals and will be excellent for wildlife tourists who want an easily portable book that is more than a conventional field guide. Kingdon includes information on the evolutionary relationships, special adaptations, conservation status, general biology and behaviour of African mammals. The book often provides unusual and thought provoking insights, it is a useful source of information for both the zoologist and layman. The level of coverage varies considerably and at times the detail seems too great for a book of this type and it is not always clear why he chooses to home-in on a particular aspect. Almost a quarter of the book is devoted to the Primates, but this is perhaps understandable because they have always been of special interest to him.

Because of its scope, it is hardly surprising that some errors have crept in, but these are minor and do not detract from the overall usefulness of the book. It is a book that will provide pleasure and a wealth of information to a wide diversity of readers.

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Cooperative breeding in mammals

Edited by Nancy G. Solomon and Jeffrey A. French

Cambridge University Press, Cambridge, UK

1997

390 pp.

£50.00 (hardback)

ISBN 0521 4591 3

Although this book is devoted to mammals, it is a must for anyone interested in the proximate and ultimate issues in cooperative breeding in vertebrates. The book arose from a symposium conducted by the Animal Behaviour Society in 1992, but its strength lies in the decision to make it more than just the proceedings of the symposium. The authors of the 13 chapters in the book were asked to not confine their chapters to their own research, but to synthesise a large body of literature on their chosen topic. Each chapter therefore provides the reader with a rich source of references to the literature. The main themes that run through the book are alloparental care, delayed dispersal and reproductive suppression.

There are two chapters devoted to marmosets and tamarins. In the first of these Suzette Tardif looks at functional and adaptive explanations for why individuals, other than the mother, care for the young. Jeffrey French then focuses on proximate factors regulating delayed or suppressed reproduction in these primates. These chapters are followed by two on canids. Patricia Moehlman and Heribert Hofer review canid life-history traits and examine the ways in which body mass, resources and behaviour interact to facilitate the development of cooperative breeding. In the following chapter Cheryl Asa discusses what she terms a unique interplay of features of the social organisation and reproductive physiology of canids that may serve to enhance both social accord and reproductive success. Dwarf mongooses, are the focus of two chapters in which Scott Creel and Peter Wasser examine the interplay between evolution and proximate mechanisms in reproductive suppression and then, with Jeffrey Lucas, use field data on dwarf mongooses to examine the future fitness consequences of the crucial decision made by all cooperative breeding mammals, of whether to disperse instead of remaining at home.

Nancy Solomon and Lowell Getz devote the first of four chapters on rodents to examining various hypotheses for cooperative breeding in rodents. In the process they show that the study of cooperative breeding in rodents is still in its infancy. They end their chapter by listing eight areas that particularly merit further research. Sue Carter and Lucille Roberts, in a chapter entitled the psychobiological basis of cooperative

breeding in rodents, use the prairie vole as a model system to identify a variety of proximate processes that may contribute to cooperative breeding. The last two chapters on rodents are devoted to naked mole-rats. Eileen Lacey and Paul Sherman provide an overview of their social structure, include comments on sociality in other subterranean rodents, and briefly look at similarities between sociality in vertebrates and invertebrates. Chris Faulkes and David Abbott focus on the pivotal role played by the breeding female in regulating reproduction in both males and females in the colony, they also review the situation found in other cooperative breeders.

Most of the book is devoted to social mammals that are singular breeders (a pair is responsible for all the reproduction), Susan Lewis and Anne Pusey broaden the scope by looking at the factors influencing communal care in plural breeding mammals (all adults breed). The final chapter, by Robert Mumme, compares cooperatively breeding mammals and birds and ends by suggesting areas where the study of mammalian cooperative breeding systems, in particular, may lead to important advances in our understanding of cooperative breeding in the vertebrates.

Overall this is an excellent book and well worth adding to your library.

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