Book Reviews

Coelenterate Biology: Recent Research on Cnidaria and Ctenophora

Edited by R.B. Williams, P.F.S. Cornelius, R.G. Hughes and E.A. Robson

Kluwer Academic Publishers, Dordrecht, Netherlands, 1991
742 pages
Price £175.00

This book is a compilation of 97 selected papers, which were presented at the 5th International Conference an Coelenterate Biology, held at the University of Southampton (U.K.) in 1989. The volume is presented in 13 sections, each comprising a series of papers dealing with specific topics, and encompasses general reviews as well as important advances in research. The topics include: cellular biology with separate sections on nematocysts and skeletogenesis; developmental biology; reproduction; ecology; pelagic coelenterates; endosymbiosis; evolution and systematics with separate sections on palaeontology and biogeography; genetics, both molecular and population; physiology and behaviour, including transmitters, bioluminescence and sensory systems.

In addition, there is a short article on the history of international conferences on coelenterate biology, as well as a very useful paper which is a selected bibliography of collective works concerning cnidarians and ctenophores from 1961–1990. Further, a full list of titles presented at the conference (only 97 out of 230 presentations are published in the proceedings) together with the names and affiliations of the researchers is given. I found the taxonomic and, in particular, the detailed subject index most useful and the editors should be congratulated on a job well done.

This text is indispensable to any researcher or student active in the field of coelenterate biology. It is well-structured and all reproductions of diagrams, micrographs etc. are of a high quality. I, certainly, am pleased to possess this volume, and have already derived tremendous benefit from it. However, I have two major reservations with regard to the production of this volume. Firstly, the exorbitant cost (approx. R900!) will preclude many individuals and even institutions from acquiring this book. Secondly, one must, I feel, question the need for re-issuing proceedings which have previously been published in a reputable Journal (*Hydrobiologia*, Vols. 216/217, 1991). These criticisms aside, I would recommend this volume to any person or institution with an interest in invertebrate biology, provided they do not have access to the Journal *Hydrobiologia*.

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Comparative Ecology of Microorganisms and Macroorganisms

John H. Andrews

Brock/Springer Series in Contemporary Bioscience, Springer-Verlag, New York
302 pp.
Price DM118,00

Occasionally one comes across a book that is truly a pleasure to review, and this is one of them. Theoretical biologists are inclined now and then to disparage ecology as a science because of its apparent predictive inadequacies, which are hardly surprising in the face of the immense complexity of the living world. Andrews' book is a step in the right direction. His stated goal is '... [to] present ... ecologically significant analogies between the biology of microorganisms and macroorganisms'. As he rightly states, very few attempts have been made to develop conceptual syntheses of this kind, and yet certain themes are common to ecological interactions of all organisms. Furthermore, 'research done with either microbes or macroorganisms has implications which transcend a particular field of study'. By considering the very small as well as the very large, we may be able to see through the clutter caused by the great diversity of life and pinpoint common themes which will improve our predictive abilities. Andrews does not come up with anything startlingly new in his book but he does provide a beautifully clear exposition of an enormously wide topic.

Even the preface, a section that most readers would skip, is full of interest, throwing down a few gauntlets that ecologists might do well to pick up. 'Plant ecology was originally almost exclusively descriptive. It remains so to a large degree.' 'Animal ecologists have tended to study groups of ecologically similar species (i.e. guilds ...) ... .' 'Ecology as practiced (sic) by microbiologists ... has been mainly autecology, is typically reductionist in the extreme ..., and lacks the strong theoretical basis of macroecology.' In summary, 'To oversimplify, one could say that macroecology consists of phenomena in search of mechanistic explanation, whereas microbial ecology is experimentation in search of theory.' Fighting words, but worth considering.

The book is full of interest to a 'macroecologist' such as myself. (Since the organisms considered range in mass over 21 orders of magnitude, from the smallest bacteria at 10^{-13} g to whales at 10^{8} g or more, we are all indeed 'macro-ecologists', weighing in near the top of the scale at something around 10^{5} g.) Chapters are included on genetic variation, nutritional mode, size, growth and growth form, life cycles, and the environment. Topics of perennial interest are discussed briefly but usefully. What is an individual? Why is sexual reproduction maintained in the face of the obvious disadvantage to the individual? Does optimal foraging theory have any place in the world of microbes? How different is the microbe's-eye view of the world from that of an elephant? Why, indeed, are there macro-organisms? None of these topics is in itself original but the approach, the examples and the clarity of explanation make the book a pleasure to read. It is so full of quotable quotes that I have had to restrain myself from peppering this review with them.

Reviewers sometimes delight in searching for and enumerating typographical errors. I am not one of them, although a poorly produced book always irritates me. In this case, except that italic and roman type seem to be used somewhat randomly in two of the equations (and in the one concerning Reynolds numbers, 'μ' is replaced by 'u' in the explanatory notes), typos are few and far

between. The book is generally well produced and the illustrations are clear and appropriate.

In conclusion, this is a book worth owning. It will not go out of date easily and is full of useful information, as well as providing much food for thought. (As it costs about R200, though, it is probably out of the price range of most biologists.) I would like all of our undergraduate students to read this book because it gives such a useful overview of many important ecological issues, as well as providing insights into a new world of the very small as well as explaining so clearly the world of the very big. I would also recommend that professional ecologists, and indeed some other biologists, read it too. Sometimes we need to be reminded about the variety of organisms and ecosystems out there.

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Environmental Biology of European Cyprinids

W. Wieser, F. Schiemer, A. Goldschmidt & K. Kotrschal

Kluwer Academic Publishers, Dordrecht, 1992
233 pp.
Price US $115.00; U.K. £68.00; Dfl. 200.00
ISBN 0792314840

This book is a reprinting of the journal *Environmental Biology of Fishes* 33 (1–2), 1992 with the addition of a five page species and subject index. A brief introduction by Wolfgang Wieser is followed by three sections and a five-page epilogue.

Reproduction is of very good quality with micrographs, photographs and other figures having good contrast. The editors have done an excellent job and there are few typographical errors. The book ends with a species and subject index which is useful but I prefer an author index, a separate taxonomic index and a separate subject index. A spot check of the index indicated that not all pages where a term occurs in the book are indicated in the index, for example epigenesis also occurs on page 178 as epigenetic, similarly altricial occurs on more than one page as does precocial. These are several of the minor flaws compared to the excellent overall editorial work.

This book is based on papers presented at a workshop held at the University of Salzburg, Austria, in September 1989, which had the original title of 'Environmental biology of cyprinids'. The coverage was narrowed down for the book to only European contributions except for one on the New World cyprinids which was included as it 'neatly supplements' a paper by Kotrschal & Palzenberger.

The three main divisions are: 1. Feeding behaviour and ecophysiology (8 papers, 83 pp.); 2. Ecomorphology (5 papers, 69 pp.); 3. Distribution and field biology (5 papers, 54 pp.). The bulk of the book is therefore for people interested in feeding behaviour, ecophysiology and ecomorphology.

The feeding behaviour papers cover elegant laboratory approaches to a model of switching between particulate and filter-feeding, prey attack behaviour of larval and juvenile cyprinids, food searching decisions, and functional responses of five cyprinid species to planktonic prey. There is an emphasis on larval and juvenile fish feeding which is important and is frequently lacking in our work on African fishes. The study on switching between particulate and filter-feeding was influenced by the increased amount of zooplankton in natural habitats in The Netherlands, owing to eutrophication. In the second paper the authors used a laboratory video set-up to record the ontogeny of prey attack behaviour in three cyprinids. This paper is well worth reading for those interested in the interactions of young-of-the-year cyprinids and the abundance of littoral zooplankton. To anyone who is interested in experimental feeding studies this series of papers would provide good background reading.

The five papers in the ecomorphology section cover muscle fibres, the branchial sieve, taste buds and brain morphology. The papers on comparative neuroecology are quite stimulating and thought-provoking. The first by Kotrschal & Palzenberger compares brain patterns using quantitative histology of the brains of 28 cyprinids. This work demonstrated that cyprinid brains are diversified into four major groups which were termed basic cyprinid, abramine, octavo-lateralis and chemosensory. The authors could use their findings for both ecological and evolutionary interpretations and this paper contains some interesting speculations on the evolution of the different brain morphologies from the basic cyprinid brain. This paper is supplemented by a paper by Huber & Rylander comparing neural structures of 51 species of North American cyprinids related to turbidity.

In the last section of the book, in a paper on how man-made structures might have influenced hybridization, Balon pursues his epigenetic theme and the theory of 'alprehost' (altricial-precocial homeorhetic states). Balon presents an interesting case where he suggests that dams have interfered with the reproductive isolation between two cyprinids. The many inter-basin transfer schemes in southern Africa have also interfered with reproductive isolation and the known cyprinid hybrids deserve a closer look. Copp provides the southern African field ichthyologist with a useful approach to studying and quantifying the microhabitat of larval and juvenile fishes using a technique of 'point abundance sampling' by electrofishing. Winfield and co-workers studied the interactions of introduced fish and their competition with waterfowl. Exploitative competition for benthos reduced the numbers of a common overwintering waterfowl species and increased the numbers of piscivorous waterfowl species. For the more 'traditional' limnologist this is yet another case of how important a role fish play in the functioning of freshwater ecosystems.

For scientists working on African cyprinids sections of this book (or its counterpart, the special issue of the journal) are well worth reading. The reviewer's task is usually difficult in assessing a book with such a wide range of topics. I have highlighted several of the papers which I think are useful contributions for our work on southern African cyprinids. With the constantly changing environments of freshwater fishes owing to man's activities I found it quite amazing that in the index there is only one reference to conservation biology. Perhaps this is because many of these studies were conducted under controlled laboratory conditions. We need more field studies, as the freshwater environment is being changed so rapidly. The book is more suited to purchase by institutional libraries than individuals as it covers such a variety of topics.

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Cephalopodes

Edited by Katharina Mangold

Traité de Zoologie. Pierre-P. Grassé. Tome V Fascicule 4.
Masson, 1989
804 pages
Price FF 1100.00
(In French)

Cephalopods are a difficult group of animals and are the last large invertebrates about which relatively little is known. There are few detailed anatomical studies of cephalopods and what little is known of their physiology is based largely on three common inshore species. Fortunately for us Katharina Mangold has completed the cephalopod volume in Grassé's Traité de Zoologie. The Traité needs no introduction as it is a standard reference work in undergraduate studies. The cephalopod volume has been long in gestation and paging through the volume shows why. It provides an overview of most of the work done to 1988 and consequently provides a very valuable source book and reference to the primary literature, useful for both students and specialists in the field.

Aspects of this work that make it so useful include the careful acknowledgement of all sources, extensive index and detailed contents table, placed at the end of the volume as is customary in France. References are at the end of each chapter. The French is mercifully simple, so that with an elementary knowledge of the language the text is easily followed. The book has 22 chapters by nine authors and is profusely illustrated. Five of the chapters are co-authored by K. Mangold, A.M. Bidder and A. Portmann, illustrating the changes in editorships along the way.

The first few chapters put the cephalopods in perspective in relation to other molluscs. An outline is given of their orientation and the organization of body parts, and the importance of the shell in their evolution and classification. Although there are far more fossil than recent cephalopods the class is seen as illustrating progressive evolution, the small number of recent cephalopods (some 700 species) being in a dominant position in their marine environment. Buoyancy and locomotion of animals with chambered shells (*Nautilus*, *Sepia*) are dealt with in considerable detail, with squid buoyancy and locomotion described rather more briefly. The chromatophore system is also covered. This enables the cephalopods to produce their remarkable range of colour patterns, the meanings of which are only beginning to be understood; they can also change these patterns with amazing speed. The wide variety, functional morphology and distribution of photophores are also included here.

A large chapter is devoted to the nervous system and the giant nerve fibres and synapses. The extensive literature base describing the brain of various cephalopods, largely by J.Z. Young and his colleagues, is condensed with considerable skill into a single chapter. The extensive work on visual discrimination and learning are naturally also included here.

A chapter almost as large summarizes the work on the sensory organs, of which the most important are the statocysts and the eyes. The statocysts and statoliths are the subjects of extensive continuing work, of interest from the systematic standpoint as well as in studies on angular acceleration and age determination. The eyes of cephalopods are as efficient as those of mammals but have developed in quite a different way, by evolutionary convergence. The visual acuity of cephalopods is closely tied to the development of the nervous system, enabling jet locomotion, effective prey capture and rapid change of colour patterns.

The value of a volume such as this lies in the summaries of diverse and extensive current research. The functional morphology of all the major organ systems is described, as are studies in disciplines such as reproduction, embryology, predators, parasites, distribution and fisheries. The coverage of individual subjects and taxonomic groups is naturally patchy, reflecting the varying attention paid by research workers.

The last two chapters deal with the systematics of recent and fossil cephalopods. The recent classification is conservative, following that of Voss (1977). Much systematic work has been done on cephalopods since 1977 but is largely beyond the scope of this volume. Most of the characters used to classify recent cephalopods are not found in fossils and consequently palaeontologists have a very different view of the class. The last chapter, on the principal characteristics in cephalopod evolution, puts the recent and fossil cephalopods in perspective and serves as an introduction to the vast literature base dealing with fossil cephalopods.

This book is very good value. It is printed on glossy paper, is extremely well illustrated and cross-referenced and has remarkably few typographical errors. It serves as an introduction to the cephalopod literature (complementing the systematic work of Nesis 1987) and is highly recommended as a source and reference work on cephalopods.

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Population Biology of Passerine Birds. An Integrated Approach

Edited by J. Blondel, A. Gosler, J.-D. Lebreton & R. McCleery

Springer-Verlag, Berlin, 1990
496 pp.
Price DM236
ISBN 3-540-51759-6

Tits have long fascinated European ornithologists, especially those interested in field-studies of ecological processes. North Americans have also followed this tradition of studying *Parus* species, though preferring the onomatopoeic chickadee. Why tits? As Arie van Noordwijk says, referring to Kluyver's Great Tit studies starting over half a century ago, 'They are big enough to be observed as individuals, numerous enough to collect reasonable sample sizes and, because they are resident, it is possible to study the whole year cycle. These are still good criteria for choosing a study species of any taxon in any ecosystem.

This is an excellent book. It contains many papers (from a NATO Advanced Science Institutes Series workshop) in which the details of natural selection are investigated through detailed field studies which are strongly numerate. As is to be expected from studies in the northern temperate regions, there is a strong emphasis on reproduction which is seen as the event at which natural

selection is strongest. Nearly half the papers investigate a topic connected with some aspect of breeding in particular, or reproduction in general.

The are four features of this collection of papers which appealed to me. First, most of the studies were strongly quantitative, based on sound experimental design with the resulting data subjected to sophisticated statistical analyses. It is satisfying to see the regular use of generalized linear models (GLM) in place of linear regression. Secondly, there are six papers which investigate the contributions which recruitment, floaters and immigrants make to population ecology. Other components of the population life-cycle are now being subjected to detailed study. Thirdly, the value of long-term studies (i.e. greater than four or five lifetimes) is now being demonstrated. Fourth, and last, the volume is neatly summarized in papers by Perrins and van Noordwijk.

If you are into population ecology, avian field studies, natural selection, life-history traits or passerines, I can heartily recommend this book.

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