

**Cichlid Fishes: Behaviour, Ecology and Evolution. Based on a Symposium
Held in Bangor, Wales, July 1986.**



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notes on biology. Species accounts contain a primary synonymy, a diagnosis with color notes, usually a description and figure of a representative otolith, a list of localities and a distribution map, and a Remarks section that summarizes whatever is known about the biology of the species, as well as any systematic problems that may have arisen. With three exceptions, each species or subspecies is illustrated with good to excellent pen-and-ink figures.

The quibbles I have with this book are few and minor. The figures for myctophids are bare outlines with the occasional small patch of stipple, unlike the vast majority of the others, which are stipple-shaded for both depth and color pattern. In cases where net-abraded specimens were used, the figure captions should state that missing scales or scale pockets were not reconstructed (e.g., p. 109, Fig. 3 of *Bathylagus gracilis*, where some scales and scale pockets are shown and others are not, creating the impression of a variably scaled fish; and p. 105, Fig. 1 of *Nansenia antarctica*, where no scales are shown, yet the family diagnosis states that they are present). The decision to publish the description of a new genus of triplefin by a researcher who is not an author will result in rather clumsy future citations [*Helcogrammoides* Rosenblatt 1990 (p. 400)].

The editors, however, have done an excellent job in standardizing formats and descriptions, and the book provides a wonderful and comprehensive single source of information for biologists interested in this fascinating, if limited (272 species), fauna.

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SYSTEMATICS OF THE NEOTROPICAL CHARACIFORM GENUS *STEINDACHNERINA* FOWLER (PISCES: OSTARIOPHYSI). *Smithsonian Contributions to Zoology, Number 507.*

By Richard P. Vari. *Smithsonian Institution Press, Washington, D. C.* Price not available (paper). iv + 118 p.; ill.; index. No ISBN. 1991.

CICHLID FISHES: BEHAVIOUR, ECOLOGY AND EVOLUTION. *Based on a symposium held in Bangor, Wales, July 1986. Fish and Fisheries Series, Volume 2.*

Edited by Miles H. A. Keenleyside. *Chapman & Hall, London and New York.* \$69.95. xxi + 378 p.; ill.; author, fish name, river name, lake name, and subject indexes. ISBN: 0-412-32200-5. 1991.

The family Cichlidae contains approximately 1500 species from South America, Africa, Madagascar and India. This group of perch-like fishes is not

only rich in numbers, but also contains much more variation in terms of morphology, ecology and behavior than most other families of fishes; cichlids hence receive considerable scientific attention. For decades cichlid fishes have been used in ethological research for questions ranging from the ontogeny of behavior, aggression and communication, to questions regarding sexual selection and the evolution of mating systems and parental care patterns. Perhaps the most notable characteristic of the Cichlidae is that they have formed so-called species flocks of hundreds of endemic species in each of the Great East African Lakes. Because of this, much work and many of the chapters of the book deal explicitly with these species flocks. Some species, mostly those allied to *Tilapia*, particularly *Oreochromis niloticus*, have gained worldwide importance as sources of protein through aquaculture. Cichlids are easily kept and bred in aquaria, and have been and should be used increasingly to study more phenomena of relevance to general biology. There are many good reasons for studying cichlids.

In fourteen chapters, an Introduction and a Foreword, written by 19 authorities from around the world, this book summarizes much of the current knowledge about cichlid fishes from various subdisciplines of biology. The subjects and authors of the book include: systematics (Stiassny), ecology and feeding (Ribbink; Lowe-McConnell; and Yamaoka), speciation (Greenwood), genetics (Kornfield), functional morphology (Liem), behavior (Barlow; Keenleyside; Noakes; and Nelissen), sexual selection (McKaye), Lake Victoria cichlid species flock (Barel et al.), and aquaculture (Pullin). In its approach, this book is similar to other good books that have attempted to collect current knowledge about particular groups of fishes, e.g., *Ecology and Evolution of Livebearing Fishes (Poeciliidae)* by G. K. Meffe and F. F. Snelson (Prentice Hall, Englewood Cliffs, 1989). Space limitations do not permit me to comment on all chapters individually. Overall, the book presents a very interesting synthesis of current knowledge; even better, some chapters present previously unpublished data and new hypotheses. Books like this one tend to be halfhearted write-ups and summaries of old research. Fortunately this book is current for the most part, and most of the chapters are written with care.

The "comparative method," used to study behavioral, ecological, or morphological characters in a phylogenetic context, is advocated in some chapters. This approach is unfortunately hampered by a scarcity of phylogenetic hypotheses (from morphological or molecular data). Stiassny's chapter is a most welcome first attempt at a phylogeny for the whole family, although homoplasy raises its ugly head in cichlid morphology and

makes phylogenetic hypotheses derived from morphological characters more difficult and less reliable. On a sadder note, Barel et al.'s chapter documents the decline and most probable extinction of the Lake Victoria species flock. A unique natural experiment in evolution with more than 300 endemic species has been destroyed by the planned introduction of an unnatural predatory species.

The biggest drawback of this book is the number of typographical errors. The distribution of typographical errors seems to follow a Poisson distribution with a mean of more than one typo per page for some chapters. My copy had a list of errata glued onto page xxi, but this list is incomplete. Some references are cited that are not in the list of references, and some references listed do not appear to be cited in the text. Still, this book is a "must read," and will certainly be an important addition to every cichlidophile's (professional or otherwise) library and, it is hoped, will inspire other biologists to discover cichlid fishes as their new study objects or model systems.

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REPRODUCTIVE SEASONALITY IN TELEOSTS: ENVIRONMENTAL INFLUENCES.

Edited by Angus D. Munro, Alexander P. Scott, and T. J. Lam. CRC Press, Boca Raton (Florida). \$155.00. vi + 254 p.; ill.; index. ISBN: 0-8493-6875-8. 1990.

The study of the early life history of fishes is currently one of the most active areas of fish biology. In addition to the obvious applied fields of population management and fish culture, early life history studies are of interest to systematists and to students of community structure and interspecies dynamics. Thus this review of what is known about the effects of environmental factors on the reproductive seasonality of fishes is both timely and important.

The book starts with a brief General Introduction to the reproductive patterns of teleosts. I found this chapter stimulating because it contains assumptions that should be examined further, and many statements that I would like to challenge. It is the sort of summary that would stimulate a graduate seminar where final answers are neither forthcoming nor expected, and it forces the reader to at least think about topics from an evolutionary viewpoint.

The second chapter is an examination of the general concepts of seasonal reproduction and, interestingly, it reviews concepts of reproductive periodicity that are derived almost exclusively from studies on birds and mammals. Not only does this

indicate the generality of this area of study, but it eloquently demonstrates the state of our knowledge of reproductive periodicity of fishes.

The remaining six chapters deal with specific groups of fishes. Chapters 3, 4 and 5 discuss salmonids, cyprinids and sticklebacks, respectively, while Chapters 6, 7 and 8 deal with estuarine and intertidal teleosts, temperate marine teleosts, and tropical freshwater fishes. In each chapter, the author distills the literature and ties it into the general principles reviewed in the introductory chapters. This gives the book a cohesiveness that is often lacking in books of this sort. The last chapter is accompanied by appendices summarizing the literature on nine major groups of fishes. Each chapter has an extensive bibliography, and the last chapter cites more than 400 references.

Overall the volume is well edited, with a clear, easy-to-read and useful style. It should be consulted by anyone interested in the reproductive biology of fishes.

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AUKS AT SEA. *Proceedings of a symposium held in Pacific Grove, California, 17 December 1987. Studies in Avian Biology, Number 14.*

Edited by Spencer G. Sealy. Cooper Ornithological Society, Los Angeles (California). \$16.00 (paper). vi + 180 p.; ill.; no index. ISBN: 0-935868-49-6. 1990.

Auks (Family Alcidae) are marine birds mostly of high northern latitudes and, while intriguing in their bizarre forms and quaint names, they have remained among the most elusive subjects of ornithological studies. This is partly because the birds spend most of their time at sea (often far from land, feeding on fish and a wide range of zooplankton), and partly because some nest in the most remote locations, such as scree slopes high on arctic mountains or high up in the trees of dense coastal forests. Some information gaps are partially redressed in this publication, which assembles papers from a 1987 symposium by researchers working in western North America from California to Alaska, and in the east from Newfoundland to Hudson Bay.

The contributors directly address some of the less tractable of the problems in alcid biology. A variety of newer techniques have been employed: aerial surveys of feeding and breeding birds, radio tagging to trace alcid movements, doubly labeled water to examine field metabolic rates and energy demands, and clever bird-attached devices that record subsequent dive depths. In addition, the more traditional observation of foraging birds via boat