



Burbot: Ecology, Management, and Culture.

Burbot: Ecology, Management, and Culture by Vaughn L. Paragamian; David H. Bennett

Review by: By Scott A. Bonar

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on basic dragonfly biology, as well as detailed instructions on how to create a dragonfly pond. For experienced odonatologists and academics, this book is a comprehensive volume summarizing information that was previously scattered in the literature and observations that may have been known, but were unpublished. By providing easily readable keys, plenty of accessible information, and colorful photographs, this book will undoubtedly increase interest in South African odonates, many of which are conservation-important. Several South African endemics are considered threatened, and this volume may help in the protection of these beautiful animals.

JESSICA WARE, *Invertebrate Zoology, American Museum of Natural History, New York, New York*

BIOLOGY OF FISHES. *Third Edition.*

By Quentin Bone and Richard H. Moore. New York: Taylor & Francis. \$82.00 (paper). xvii + 478 p.; ill.; subject and systematic indexes. ISBN: 978-0-415-37562-7. 2008.

The great diversity of fishes and their amazing features are impossible to cover in a single volume. The third edition of this book (first published in 1982) has more pages than ever, but still does not attempt to cover all aspects. In contrast, the authors choose to expand in some topics of interest to them, and give readers sufficient detail to understand the primary literature.

A common thread in each chapter is to compare the ingenious ways used by different species to cope with life in water, and herein lingers the major weakness of this volume. Not because comparisons are a bad thing, but because they need to be made in the right context. The problem is exposed in the first chapter, where the authors support the class "Pisces," a concept too deeply engrained to abandon, in spite of the commonly held view that it represents a polyphyletic group. As a consequence, in many chapters, treatment of any feature of interest for fish biology jumps from hagfish to lungfish to swordfish. Although the phylogeny of fishes is still an area of active development, the chapter covering their diversity and classification is antiquated and poorly documented. As a consequence, instead of offering powerful insights into comparative biology by well-grounded phylogenetic tree thinking, the approach used in this book is dangerously misleading. The vast coverage presented emphasizes swimming, buoyancy, respiration, circulation, and the nervous and sensory systems.

The presentation style is easy to read, but loaded with anecdotes and humorous digressions that may work better in a lecture than in a book. Many figures are of poor quality and lack sufficient in-

formation to be effective. This is a volume for undergraduate students interested in ichthyology or related aquatic sciences, and as such it is a useful reference. Fish researchers and postgraduate students are not the intended audience.

GUILLERMO ORTÍ, *Biological Sciences, University of Nebraska, Lincoln, Nebraska*

BURBOT: ECOLOGY, MANAGEMENT, AND CULTURE. *Based on a symposium held in Anchorage, Alaska, 13 September 2005. American Fisheries Society Symposium, Volume 59.*

Edited by Vaughn L. Paragamian and David H. Bennett. Bethesda (Maryland): American Fisheries Society. \$69.00 (paper). x + 270 p.; ill.; no index. ISBN: 978-1-888569-98-8. 2008.

Burbot, the only freshwater member of the cod family, are found throughout northern regions of the world. Although a widely distributed predator, burbot have never received their due respect. More charismatic fishes (such as salmon, trout, and black bass) have been studied with greater frequency. Until about 10 years ago, information on burbot biology and management was scarce. Then, Vaughn Paragamian worked with David Willis and a host of researchers to hold the first burbot symposium. Now Paragamian teams with co-editor David Bennett and 47 researchers to provide another concise, significant collection of articles that describe North American and European burbot research.

Many subjects are covered in this interesting volume. Eighteen chapters focus on the biology, status, culture, and management of burbot. The first chapter refines what is known about burbot genetics, recapping knowledge about populations worldwide, but focusing on those in western North America. The next chapters describe burbot habitat and their trophic relationships. Of note were studies of culture and reintroduction techniques, tools critical for rebuilding populations. Useful information on status and management of burbot stocks in Wyoming, Montana, Idaho, and the Great Lakes was also provided. Modeling of the Kootenai River (Idaho) population shows it to be declining rapidly, potentially ending in extinction unless immediate steps are taken. Final topics included techniques to measure growth, reduce mortality during capture, work with stakeholders to manage stocks, and the palatability of burbot.

This book contains articles that will appeal to biologists outside of the fisheries community. For example, invasion of nonnative fishes into the Great Lakes was related to change in burbot diets, growth, and potential toxin accumulation, information that will be useful to those investigating native and nonnative species interactions.

Time series, diet, and bioenergetics data from Oneida Lake, New York revealed that climate change might be limiting burbot populations at the southern end of their range, a finding useful for anyone studying climatological effects on species distribution.

I thoroughly enjoyed reading this diverse collection of relevant articles on burbot, which should be on shelves of all fish biologists working in northern freshwaters. Others interested in how recent genetic, aquacultural, biological, and management techniques can be used to help conserve an imperiled aquatic species will benefit as well. The editors and authors do a great service by bringing attention (before it is too late) to a unique, little-known species undergoing decline.

SCOTT A. BONAR, *Arizona Cooperative Fish & Wildlife Research Unit, U.S. Geological Survey, Tucson, Arizona*

GRENADIERS OF THE WORLD OCEANS: BIOLOGY, STOCK ASSESSMENT, AND FISHERIES. *Based on a symposium held in Lake Placid, New York, 11 September 2006. American Fisheries Society Symposium, Volume 63.*

Edited by Alexei M. Orlov and Tomio Iwamoto. Bethesda (Maryland): American Fisheries Society. \$69.00 (paper). xviii + 484 p.; ill.; no index. ISBN: 978-1-934874-00-4. 2008.

This volume attempts to present what is known about the biology and population status of grenadiers (family Macrouridae). In an introductory article, Iwamoto reviews the taxonomic history of the group. The remaining contents are separated into three sections: Species Contribution and Distribution (nine articles); Biology and Ecology (eight articles); and Fisheries and Stock Assessment (seven articles).

The grenadiers constitute the most diverse (400 species) and probably the most ecologically important group of slope and abyssal fishes. As the assault on the sea for protein has intensified, and greater depths have been explored, grenadiers have become a significant part of the catch, either as the subject of fisheries or as by-catch. The exploited species of grenadiers are slow growing, late maturing, and have relatively low fecundity. This suggests that they are not good candidates to withstand industrial fishing. The papers in this volume present data needed to manage grenadier populations. However, a great deal of the information in the Fisheries and Stock Assessment section will be of interest only to those concerned with grenadier populations and distribution. Anyone with more general questions about deep-sea ecology will find much of value in the papers by King and Priede on the biology of the abyssal *Coryphaenoides armatus*,

and Drazen's masterful review of the energetics of deepwater grenadiers.

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SALMONID SPAWNING HABITAT IN RIVERS: PHYSICAL CONTROLS, BIOLOGICAL RESPONSES, AND APPROACHES TO REMEDIATION. *Based on a symposium held in Quebec City, Quebec, Canada, 13–14 August 2003. American Fisheries Society Symposium, Number 65.*

Edited by David A. Sear and Paul DeVries. Bethesda (Maryland): American Fisheries Society. \$69.00 (paper). x + 376 p.; ill.; no index. ISBN: 978-1-934874-03-5. 2008.

Salmonid fishes (salmon, trout, and char) support important commercial and recreational fisheries throughout their native range in the Northern Hemisphere, and in the many areas where they have been introduced, including numerous locations in the Southern Hemisphere. Their dynamics include both the astonishing productivity of some populations (e.g., in Alaska) and also the extinction or serious declines in many other areas (e.g., Atlantic salmon in much of their range and Pacific salmon in the southern portions of their range). Complementing the recent interest in the importance of ocean conditions (including those related to climate) in the ecology of salmon, the current book takes us back to the start of their life history. Based on work presented at the 2003 American Fisheries Society meeting, Sear and DeVries have edited a remarkably rich series of 16 papers on the spawning habitat of salmon and trout, the factors affecting the survival of developing embryos in the gravel environment, and the prospects and challenges for remediation in the many areas where this environment has become degraded.

In addition to the overall quality of the writing and editing, this volume is notable in two respects. First, the papers truly integrate different perspectives (geology, hydrology, engineering, and biology) to yield real insights into the physical processes that produce and degrade the gravel environment that salmon embryos need for survival. This was accomplished because the papers were written specifically for the book rather than merely as text versions of papers presented at the meeting. The editors asked individuals with different backgrounds to collaborate on the papers. Thus, the papers include diverse kinds of data and perspectives, and the collection as a whole is remarkable in the breadth of approaches. Second, the papers represent the current lines of investigation from Europe (chiefly Scotland) and North America (almost exclusively the west coast), and