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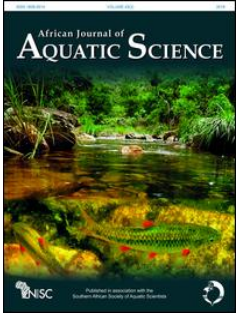


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Book Review

Aquaculture: Farming Aquatic Animals and Plants

John S Lucas and Paul C Southgate (eds)

2003, Blackwell Publishing, Oxford, UK
Paperback, 502 pages
ISBN 0-85238-222-7; price: £45.00

Do we really need yet another book about aquaculture? As far as this 502-page work goes, the answer is a resounding 'yes'. The experience and knowledge of 27 experts in their fields has been combined into one comprehensive document edited by Australians John Lucas and Paul Southgate. This book provides the latest information on the culture of fish, shellfish and algae in fresh and marine water, both to academics involved in aquaculture research and teaching and to fish farmers who need reviews of pertinent topics related to aquaculture.

Roughly the first half of the book reviews topics such as the environment of farmed aquatic animals and plants, their reproduction, genetics and nutrition, and the environmental impacts of aquaculture. The second half covers selected species or groups that are commonly cultured or have good culture potential. The authors — both well-established in their respective fields — identify, update and fill in knowledge that has not been provided in previous books.

Thematic chapters provide critical reviews of special topics, with theories and literature reviews followed by practical examples. Thus, rather than just providing mere facts for fish farmers, the text is often thought-provoking and the chapters are structured so as to teach and advise. Those chapters dealing with particular species are especially practical and will provide fish farmers with a tool for making decisions and improving farm management. Many species new to aquaculture, for example barramundi, pearl oysters and freshwater crayfish, are discussed by including the latest information on their culturing techniques and economics. Since aquaculture development is dynamic, and new species are continuously being tested for their potential, such updates and reviews are invaluable.

John Lucas' introduction sets the scene. It is interesting to read, for example, that 60% of fish production in developed countries comprises high-value carnivorous species that require fish meal for their production, that China alone farms 110 aquatic species, and that 168 million fingerlings of 73 species have been introduced into stock enhancement programmes in Japan.

The chapter titled 'General principles' points out why aquaculture ventures can (and often will) fail, and what problems farmers may run into as they start a new venture. Academics, funders of research and development and farmers will be helped by the description of the selection

process for a new aquaculture species and the time required to develop its farming technology. For example, at least seven years may be required to gain the confidence to invest in farming a new species. Together with the 'Economics and marketing' chapter, this review would be beneficial to investors. The authors provide many warnings that could help investors save money or channel investments in the right direction.

A chapter on water quality can be found in almost any book on aquaculture, but here the approach taken is both creative and novel. Rather than just listing water quality variables and their lethal limits, we learn about the interactions between different water quality parameters, find an interesting comparison between the properties of seawater and freshwater, and discover a comprehensive review of the physico-chemical characteristics of seawater, written for aquaculturists. I could well use such reviews for teaching purposes.

A chapter addressing the conflict between aquaculture and the environment offers many facts and maintains a balanced view. Examples of aquaculture ventures that combine farming with improvement of the quality of inflowing water might well contribute to interesting and useful discussions between farmers and policy-makers. Accordingly, policy recommendations to reduce environmental impacts and management guidelines are a valuable part of this chapter. Next, the chapter on desert aquaculture provides data for system designers, and other information that is useful for site selection.

Producing an 11-page overview on the reproduction, life cycle and growth of farmed species of several different phyla would seem like an impossible task. Lucas and Southgate have tackled this task brilliantly, the result being informative while providing practical advice to farmers. This chapter includes comparative endocrinology and even covers up-to-date research on species that are rarely reviewed, such as decapod crustaceans and bivalves. In line with the book's aim to fill gaps despite previous reviews, the chapter on genetics and stock improvement is comprehensive, and will be of practical value to farmers and students of aquaculture. Here again, there are critical assessments of recent developments, such as a discussion on genetic engineering and new results on the genetics of marine fish species.

Following on each other, the chapters 'Nutrition' and

'Feeds and feed production' work well together, with the first being mostly theoretical and the second addressing applications. The topics covered in the latter chapter (algae foods, live foods, live foods and microdiets) are all areas that require new reviews, given the increasing importance of mariculture. Also, the review on hatchery feeds makes another excellent contribution, with advice worth implementing.

'Diseases: the most common cause of bankruptcy in aquaculture' is the introductory quote of a chapter that focusses mostly on infectious diseases, with an emphasis on disease management. The factors driving the evolution of pathogens under culture conditions have rarely been discussed in other aquaculture books, and such a topic inspires further reading. This chapter also covers the diseases of molluscs and crustaceans, animals which also take their rightful place in a section about post-harvest technology. There is a fine review of the changes which the tissues of aquatic species undergo during frozen storage, and more on the biochemistry related to the quality aspects of aquatic products.

One author presents a combination of basic economic theories, tailored to aquaculture operations, and practical advice for anybody starting an aquaculture venture. Useful and well-chosen examples taken from aquaculture businesses around the world make the theories easier to remember and the consequences of poor planning easy to understand.

A book on aquatic animals and plants would not be complete without detailing production figures and culture techniques relating to macro- and microalgae. Here, this is done in another successful chapter that focusses on modern aquaculture, as farmers must look for new opportunities to use resources and develop markets.

The second half of the book deals with the culture of selected species. For example, several cyprinids (carps) are farmed as food fish in many developing countries. Aquaculture production of these is increasing and many previously-unexplored cyprinid species hold potential for further research and development. Reviews of important

salmonid species, tilapia and channel catfish provide many case examples for the guidance of both experienced farmers and those wanting to start a new venture. These chapters follow an informative and practical structure similar to the others: first by providing market figures, then by addressing the biology of the species, and finally by highlighting problem areas such as feed costs, disease control and invasive species, and marketing and product quality. Species new to aquaculture and species with a high market value are both given much-needed attention. There are excellent reviews on barramundi, six species of marine shrimp, 10 species of freshwater crustaceans, bivalves, such as pearl oysters and scallops, and three species of gastropods (i.e. abalone, conchs and trochus).

This book will definitely find a place in university libraries, in the offices of policy-makers and with economists looking for production and marketing figures. Throughout, there is ample realism in the writing approach and many real-life examples to back up the conclusions drawn. Fish farmers can benefit greatly from the thematic chapters, as well as from those pertaining to the specific plant or animal they are keeping or intending to farm. Also, they may explore new species, using the wealth of information supplied.

In the context of African aquaculture, the chapters on tilapia and the environmental impact of invasive species, on macroalgae, species of which are used for South African abalone culture, and on desert aquaculture in areas with water shortage, can be particularly appreciated. Tilapia, for example, comprises a group of species, of which some are promising aquaculture candidates and others (e.g. *Oreochromis niloticus*) invasive species to South Africa.

If the editors happen to have a second edition in mind, it could cover additional topics such as the cryopreservation of gametes, farm site selection, food security through rural aquaculture or the pros and cons of funding aquaculture ventures in developing countries. Meanwhile, I recommend this book to anybody interested in the practice, teaching and research of aquaculture.

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