the book ends with an overview over the worrying future of the cichlids, with overfishing, changed water chemistry and the introduction of new species threatening their existence. How the future will turn out largely lies in the hands of mankind.

If some criticism has to be raised it would be that sometimes too many examples are presented at the cost of more information on other examples. This occasionally makes it hard to see the big picture, how the diversity has evolved in interplay with the ecology. Only rarely are the different behavioral specialization related to the ecology of the habitat. However, this may largely be due to our ignorance of how the great diversity has evolved – large gaps in our knowledge still exist, which prevents a more comprehensive synthesis. Some researchers may also disagree with Barlow in his strong dismissal of the possibility of sympatric speciation and the role that sexual selection may have played.

Nonetheless, this book is a rich source of information on cichlid behavior and will surely be an important reference book to cichlid researchers and hobbyists as well as to anybody interested in the evolution of mating behaviors and social systems. Complex theories and ideas in evolutionary biology are explained in an unusually clear way. The most important use of this book will probably be in inspiring new research. One can hardly turn a page without getting a new research idea. Sometimes the ideas are explicitly stated by Barlow, but more often they are indirectly hinted at in the text. This gives the reader the possibility to formulate the exact question himself and figure out the best research plan. This will invariably result in many different solutions and research ideas and thereby promote a diverse research approach, which is how science should proceed. Without doubt, this book will do much in stimulating new research and increase the importance of the fish group as a model system in behavioral and evolutionary ecology studies.

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The Cichlid Fishes: Nature's Grand Experiment in Evolution

George W. Barlow, Perseus Publishing, 2000. 335 pp.

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Cichlid fishes are among the most diverse living taxa both in terms of the number of species and the diversity of their behaviour. They have become a classic example in evolutionary biology and, had Darwin been travelling in the Great Lakes of Africa instead of sailing to the Galapagos Islands, they most certainly they would have inspired him as much as the Darwin's finches did.

In this book George Barlow shares his love and enthusiasm of cichlid fishes with the reader. It is written in a popular science style and technical terms are either avoided or explained which makes it very accessible not only to the specialist but to the lay person as well. The book is organized into an introduction followed by 13 chapters, plus a glossary of biological terms at the end. The ethological background of the author is reflected in the structure of the book. Five out of the 13 chapters deal with different aspects of cichlid behavioral biology in an evolutionary framework.

The introduction sets the stage for the following book chapters. Using a simple comparison between tropical reef fishes and cichlids, Barlow elegantly demonstrates cichlid fishes are by far more numerous and diverse in their habits.

In the first chapter the author introduces the reader to the taxonomy of fishes and defines the specific morphological characters of cichlid fish and their geographical distribution. Although this may sound a tedious chapter the author manages to present the facts in a very vivid way that keeps the reader attention. As an example, Barlow relates the story of the man who choked to death when, as a joke, he

tried to swallow a Jack Dempsey - the story may have had a happier ending had the unfortunate performer been more keenly aware of fish taxonomy (it would have worked with goldfish, Barlow points out!).

The second chapter reviews the diversity of feeding habits of cichlids and explores the idea that the pharyngeal jaw of cichlids may explain their evolutionary success. In the third chapter the reader is confronted with the environmental sex determination mechanisms of cichlids, that can be controlled by social status (i.e. dominance relationships), temperature or even pH.

From the fourth to the eleventh chapter the behavior of cichlids is described in a great detail. The fourth chapter is about mating systems and again the wide variation of mating habits in cichlids is reviewed. In fact, cichlid fishes are one of the most diverse, if not the most diverse, family of vertebrates when it comes to mating strategies. Strategies range from monogamous-biparental to lekking-promiscuous species, which offers a beautiful opportunity for conducting comparative studies among closely related species, one that has not been explored often enough. Chapter five concentrates in aggressive behavior (mainly between males). The occurrence of feeding territories in cichlids is discussed and the fighting behavior is analyzed in the framework of conflict escalation and information gathering during fights. The following chapter (Chapter six) deals with the signaling behavior and, although acoustic behavior is also covered, special attention is paid to visual communication. Chapter seven looks at sexual selection and sex discrimination in cichlids. The building behavior of nesting structures and the evolution of spawning pits, named bowers, in the context of species-recognition during mating is discussed. In chapter eight the topic of monogamy and pair bond formation is examined and again the problems of species recognition and sex discrimination are discussed. Then chapter nine is a thorough review of spawning behaviour, in which particular attention is paid to the specialized modes of fertilization that have evolved in cichlids. For example female African mouth-brooding cichlids suck sperm from the male's genital papillae into their mouth and fertilization occurs inside the female's bucal cavity. Apparently, males of these species have evolved ornaments in their ventral area to guide females in this behavior, such as an elaborated tassel in the genital papillae or eye-spots in the anal fin that mimic eggs. This chapter ends with an overview of sperm competition and male alternative mating tactics. Chapters ten and eleven look at parental behavior. Topics discussed in these two chapters include the sharing of parental investment between the sexes, fry behavior and parent-fry interactions, alloparental behavior, the occurrence of crèches, helpers at the nest and catfish cuckoos that exploit the parental abilities of some cichlid species (female catfish lays their eggs in cichlids nests and catfish eggs hatch earlier and the fry eats the cichlid larvae).

Chapter 12 deals with the evolutionary biology of cichlid fishes, in particular with the cichlid assemblages of the Great Lakes of Africa. The roles of sexual selection and trophic specializations on speciation are carefully discussed. Evidence for the occurrence of three separate cichlid radiations, with similar species being "reinvented" in each of the three lakes, is presented.

In the last chapter the author draws the attention of the reader to the conservation problems that cichlids are currently facing. The case of the introduction of the Nile perch in Lake Victoria and its impact in cichlid biodiversity in the lake is used as an example.

Considering the length of the book, the reasonable quality of the drawings and the fact that it includes color plates that help to illustrate the many examples used in the text, the book is not expensive. However a paperback edition in the future may help it to reach an even wider audience. Overall this is a highly readable book that has the merit of conveying scientific arguments in an understandable way to a wide audience. There are other recent publications in cichlid biology but none has covered the behavioral ecology of this group in such an accessible manner.

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