

A FUNCTIONAL BIOLOGY OF STICKLEBACKS

FUNCTIONAL BIOLOGY SERIES

General Editor: Peter Calow, Department of Zoology,
University of Sheffield

A Functional Biology of Free-living Protozoa

Johanna Laybourn-Parry

A Functional Biology of Sticklebacks

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For Siobhan and Sean, sceptical of sticklebacks

FUNCTIONAL BIOLOGY SERIES: FOREWORD

General Editor: Peter Calow, Department of Zoology,
University of Sheffield, England

The main aim of this series will be to illustrate and to explain the way organisms 'make a living' in nature. At the heart of this – their *functional biology* – is the way organisms acquire and then make use of resources in metabolism, movement, growth, reproduction, and so on. These processes will form the fundamental framework of all the books in the series. Each book will concentrate on a particular taxon (species, family, class or even phylum) and will bring together information on the form, physiology, ecology and evolutionary biology of the group. The aim will be not only to describe *how* organisms work, but also to consider *why* they have come to work in that way. By concentrating on taxa which are well known, it is hoped that the series will not only illustrate the success of selection, but also show the constraints imposed upon it by the physiological, morphological and developmental limitations of the groups.

Another important feature of the series will be its *organismic orientation*. Each book will emphasise the importance of functional *integration* in the day-to-day lives and the evolution of organisms. This is crucial since, though it may be true that organisms can be considered as collections of gene-determined traits, they nevertheless interact with their environment as integrated wholes and it is in this context that individual traits have been subjected to natural selection and have evolved.

The key features of the series are, therefore:

- (1) Its emphasis on whole organisms as integrated, resource-using systems.
- (2) Its interest in the way selection and constraints have moulded the evolution of adaptations in particular taxonomic groups.
- (3) Its bringing together of physiological, morphological, ecological and evolutionary information.

P. Calow

PREFACE

Writing this book in the *Functional Biology Series* has allowed me to combine two of my major academic interests, research on the biology of the sticklebacks and teaching courses on theoretical ecology. The purposes of the book are twofold. The first is to demonstrate that the theoretical framework in ecology and evolutionary biology that has been developed, much of it over the past two decades, can be used to illuminate our understanding of the ways in which animals function in everyday life. The second is to show that the knowledge that can only be gained by a close and detailed study of a taxon will be required to test critically this theoretical framework.

In writing this volume, I have been greatly helped by the advice of my colleagues. I would like to thank P. Calow, G.J. FitzGerald and F.A. Huntingford, who commented on the complete manuscript. M.A. Bell, J. Gee, H. Guderley, M. Milinski, D. Wharton and F. Whoriskey read sections of it. Their criticisms improved both the accuracy and clarity of the text. The mistakes of fact and interpretation that remain are my responsibility. I also thank Denise Long for her excellent drawings and R. Matthews for help with the word-processing. Finally, I thank my wife, Maureen, whose help and advice at all stages in the writing of this book were invaluable.

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Aberystwyth

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