

## PREFACE

This volume is a result of a symposium on Algal Biofouling convened by the editors and sponsored by the Phycological Society of America at a meeting organized in conjunction with the American Institute of Biological Sciences (AIBS) at the University of Florida, Gainesville, in August 1985. Probably for the first time this symposium provided the opportunity for both freshwater and marine workers (and to a lesser extent, workers on micro- and macroalgae) to gain an update on current research activities within the field of biofouling on a broad front and to benefit from a synthesis and exchange of ideas. There were eleven oral presentations and five posters given at the symposium; additional contributions to the volume were invited by the editors, particularly in areas of the field not covered by symposium participants.

An important initial aim of the meeting was to achieve some understanding of the respective terminologies in use. For example, it is necessary to realize that the words "fouling", "biofouling", and "periphyton", like the term "weed" with reference to higher plants, are difficult to define. Round (The Ecology of Algae, Cambridge University Press, 1981) defined "fouling" as algal growth on man-made structures. In the present volume, as well as in the symposium, the term was used in a broader sense, for example "fouling" as a consequence of eutrophication. Moreover, useage could be broadened still further to include the settlement and growth of micro-or macro-organisms on any man-made or natural submerged substratum. Periphyton has been similarly defined in the literature on fresh waters.

The problems presented by freshwater versus marine algae in the context of fouling would superficially appear to be rather different. In the case of freshwater fouling, a basic ecological approach is applied to a myriad of questions related to community structure. Marine fouling studies on the other

hand comprise a focused, applied approach to a problem of glaring economic importance, viz. the prevention of attachment or successful development of fouling organisms on surfaces of all kinds immersed in seawater. However in general terms, colonization sequences, and the processes and mechanisms involved in attachment and growth on an individual or community basis are common to both. More specifically, underlying similarities include: (i) substratum surface phenomena (physical chemistry of the boundary layer, microdiffusion, chemistry of submerged surfaces); (ii) principles of adhesion (chemical structure of adhesives, physiological, biochemical and ultrastructural aspects of synthesis and secretion); and (iii) ecology (sequence of events- organic film, bacteria, microalgae, macroalgae; colonization/immigration; dispersal phenomena etc.). Common techniques include the use of artificial substrata, in situ incubations, bioassays, and electron microscopy.

Future research is likely to focus largely on gaining a better understanding of: (i) the physics and chemistry of biohesion in fouling organisms - bacterial, algal (especially microalgal) and invertebrate; (ii) whole-community phenomena, in particular the metabolism of the constituents in relation to diffusion and secretion of mucilages; and (iii) the ecology of the diatom constituent of the fouling sequence, i.e. colonization and community development. In addition, in marine fouling, increasing emphasis will be placed on research aimed towards improving methods of fouling prevention, in particular the development of environmentally-safe systems, based for example on non-biocidal ("non-stick") materials, or utilizing naturally-produced, non-toxic anti-fouling compounds.

Finally we would say this was a most enjoyable and rewarding "first encounter" between researchers from a variety of disciplines having algal biofouling as common ground. It was not possible to include bacterial studies on this occasion, but tremendous benefit would be gained by inclusion of this important area in future symposia on this topic. It is our

sincere wish to continue the type of inter-disciplinary exchange that has begun here. It is apparent that a thought-provoking body of literature exists in respect to both fresh-water and marine fouling organisms, the one rarely cited by workers in the other area presumably because of lack of awareness. It is hoped that this volume will provide a starting point for the development of such an awareness to the mutual benefit of workers in all areas of the field of biofouling.

We would like to thank the officers of the Phycological Society of America for giving us the opportunity to convene a symposium on this topic, Dr Lynn Hodgson for making all the local arrangements for participants, Dr Maureen Callow for computerising the Index, and especially the many anonymous colleagues who reviewed the contributions in this volume.

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