

Preface Acknowledgements

Almost any freshwater or brackish water site will contain one or many species of algae. Although they are mainly microscopic and therefore not as visually apparent as larger aquatic organisms, such as higher plants or fish, algae play an equally important role in the ecology of these water bodies. Their presence can sometimes be noticed when they occur as dense populations, colouring the water and in some cases forming massive surface scums.

Freshwater algae constitute a very diverse group of organisms. Their range of shapes and beauty when viewed through a microscope have delighted biologists for more than a hundred years. They have an enormous range of size from less than one micrometre to several centimetres (for the stoneworts) – equalling the size span (10^4) for higher plants seen in a tropical rainforest. Algal morphology is diverse, ranging from single cells to complex colonies and filaments. Some species are capable of active movement. The term 'algae' embraces a number of phyla (e.g. Cyanophyta, Bacillariophyta and Chlorophyta) of chlorophyll-containing organisms with different growth forms and cytologies. Algae are important primary producers in both freshwater and marine systems. In many lakes and rivers they generate biomass which is the foundation of diverse food chains. Although algae have beneficial impacts on aquatic ecosystems they can also have adverse effects. When present in very large numbers they can produce 'blooms' that, on decomposition, deoxygenate the water – causing fish death and other ecological problems. Some algae produce toxins that are lethal to both aquatic and terrestrial organisms. It is important to be aware of these impacts and to monitor waters for the presence of these potentially harmful organisms. Algae can be used to flag up and assess a range of

human and natural impacts in aquatic systems because of their often rapid response to changes in the environment. Examples include nutrient enrichment (eutrophication), industrial pollution and changes to the hydrological regime of the water body. Some groups of algae preserve well as fossils in geological deposits such as lake sediments, analysis of which gives us information on past environmental changes.

This book comes at a time of increasing concern over the widespread effects of human activities on the general environment of this planet. Monitoring shifts in algal population gives us an insight into these changes. We need to be able to assess the 'health' of aquatic systems such as lakes and rivers, since water is vital to both human and general ecosystem survival. Knowledge of algal population dynamics can help us develop effective management strategies for those systems. Included in this book are sections on the general features of the main freshwater algal groups with notes on their ecology, methods of sample collection and enumeration, using algae as indicators of environmental conditions and, finally, a key to the identification of the more frequently occurring genera. The authors have tried to combine descriptive material with original colour photographs and line drawings, where possible, to help the reader. We would also like to gratefully acknowledge the help and encouragement of colleagues and students, and particularly appreciate the direct contributions of postdoctoral workers and research students mentioned in the list of copyright acknowledgements. We would also like to thank our families for their understanding and patience during the preparation of this text.

We hope that all those using the book will find it useful, and will enjoy the numerous colour photographs of these very beautiful organisms.