

The Freshwater Algal Flora of the British Isles

R&D Technical Summary E1-095/TS

An increasing awareness of the importance of freshwater algae in environmental monitoring and management has led to an increased demand for their accurate naming. The Environment Agency use algal methodologies as part of their reactive and routine monitoring programmes to assess biological quality. Reactive cyanobacterial monitoring has provided important data about waterbodies that experience blooms (some toxic) and also informs the relevant bodies to aid their decision-making processes in order to protect animal and human health. Freshwater and marine phytoplankton monitoring surveys support the biological criteria within the Urban Waste Water Treatment Directive for designation of Sensitive areas and Polluted waters (eutrophic). Diatoms are increasingly being used as monitors by ecologists to assess ecological status, using the Trophic Diatom Index.

Annual training courses have been held at the University of Durham for ecologists in the water industry and water management in recent years. A number of problems with algal identification became apparent to the tutors and delegates during these sessions. These difficulties were also experienced by biologists and ecologists nationally whilst carrying out their algal monitoring programmes of work.

In order to make reliable identifications of all the species present in a range of mixed samples, well over 40 publications including guides, Floras, monographs and research papers were needed. Many of these are written in languages other than English and are not always easy to use, being mostly written for the professional taxonomist. Many focus on regions other than the British Isles, many are expensive and some are difficult to acquire. None are sufficiently complete to identify the majority the species to be encountered in mixed field samples taken in the British Isles, similar to those analysed by Agency ecologists.

G.S. West's 1904 account of the British freshwater algal flora was the first to be published in the twentieth century and marked a considerable advance on previous publications. Fritsch's revision (West and Fritsch, 1927) of this work included approximately 250 genera. Now over 550 genera have been recorded from the British Isles, excluding those in the Euglenophyta and Pyrrophyta, which were not included in the 1927 Flora. It was evident that non specialists required a user-friendly, well-illustrated identification guide written in English that describes as many of the British freshwater algae as possible.

In 1991 Dr. D. John (Natural History Museum) and Professor B. Whitton (University of Durham) submitted a proposal to the British Phycological Society suggesting the preparation of a modern synoptic account and identification guide to the freshwater algae of the British Isles. A committee was set up to plan and organise the "British Algal Flora Project". Taxonomic experts on the major freshwater algal groups were approached and almost all collaborated. In addition to the support from the British Phycological Society and the Natural History Museum, financial support was secured from several outside sources. Support for publication costs have been provided by the Environment Agency. Some of the staff of the Agency also assisted with providing material, images, literature and taxonomic advice.

The Flora deals with the British Isles, comprising Great Britain (England, Scotland, Wales), Ireland (Northern Ireland, the Irish Republic), the Isle of Man and the Channel Islands. All major groups of freshwater and terrestrial algae are included (apart from diatoms). Species of slightly brackish environments are included. As in most Floras of other parts of the world, all marine blue-green algae are included, because some species occur in both freshwater and marine environments. The arrangement of the phyla follows the Coded List of Freshwater Algae of the British Isles (Whitton et al. 1998).

It was decided that it was too unrealistic to include diatoms in this guide until further taxonomic research has been carried out on this large group. Comprehensive identification guides to the diatoms, however, do exist and these are described in a short chapter. Only the more common and regionally important desmids are described.

The aim of the keys is to aid the accurate identification of any sample containing freshwater or terrestrial algae collected in the British Isles. They are based in large part on taxonomically important characters clearly visible with the light microscope. It is sometimes more useful for comparing character combinations than a traditional key. Blue-green algae pose such a problem because so many of the characters are overlapping. Some of the keys in previous Floras are associated with problems and have in practice seldom been used. There is an electronic, interactive identification key available for all the blue-green algae. This has been updated regularly and versions produced since August 2002 relate closely to the names and information included in the present flora (contact Jane Jamieson, National Centre for Ecotoxicology & Hazardous Substances, for further information). The CD-ROM photo catalogue, included with the book, consists mostly of colour photographs of algal habitats, macroscopic growths and photomicrographs of living material taken under bright field illumination and/or differential interference contrast microscopy.

It is hoped that publication of *the Coded List of Freshwater Algae of the British Isles*, various interactive identification systems (including Blue-green algae, Green Algae and (in progress) Diatom CD-ROM identification keys) and the present Flora, should encourage many more people to make better use of the records collected in routine surveys. This means storing data on computer in a form which others can understand and assess (National EA Biology and Algology for windows database). The stored algal data will crucially aid in meeting the requirements of the Water Framework Directive, the largest piece of European water legislation in recent years and main driver of the associated Agency ecological assessment work programmes. This book is a unique modern account and it has a firm place on all freshwater (and some marine) ecologists' bookshelves. This book is recommended for all ecologists who wish to have a

ready source of information on freshwater algae of the British Isles.

John, D M; Whitton, B A; Brook, A J (Eds) 2002 **The Freshwater Algal Flora of the British Isles**. An Identification Guide to Freshwater and Terrestrial Algae. The Natural History Museum and The British Phycological Society. ISBN 0 521 77051 3 Cambridge University Press.

Internal Status: Book provided to all Area ecology laboratories for use in relation to algal monitoring and management.

External status: On sale in the public domain (contact Cambridge University Press).

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2002

References

Whitton, B. A., John, D. M., Johnson, L. R., Boulton, P.N.G., Kelly, M. G. & Haworth, E. Y. (1998). *A coded list of freshwater algae of the British Isles*. NERC, LOIS Publication Number 222. Institute of Hydrology, Oxon

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