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BOOK REVIEWS

Editor: K. T. Kiss

Bellinger, E. G. and Sigee, D. C. (2015): Freshwater algae: identification, enumeration and use as bioindicators. – John Wiley & Sons Ltd., West Sussex, UK, 275 pp. (ISBN 978-1-118-91716-9).

Almost any freshwater or brackish water site will contain at least one species of algae. Although they are mainly microscopical and not as visually apparent as larger aquatic organisms, algae play an important role in the ecology of the water bodies all over the world.

Freshwater algae constitute a very diverse group of organisms, such as lakes and rivers. They are typically present as microorganisms, which means they are visible only with light microscope. They have an enormous range of shape, from single cells to complex colonies and filaments, and range of size, from less than one micrometre to several centimetres. 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 as carbon fixers and 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. In very large numbers they can produce "algal blooms" that deoxygenate the water, causing fish death and other ecological problems. Because of this, it is really important to monitor the waters for the presence of the potentially harmful organisms. Algae can also 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, such as nutrient enrichment, industrial pollution or changes to 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 when there was no anthropogenic influence on the water body.

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There is an increasing concern over the widespread effects of human activities on the environment. Monitoring shifts in algal population gives us information about these changes. We need to be able to assess the "health" of aquatic systems, e.g. lakes and rivers, since water is vital to both human and general ecosystem survival. To develop effective management strategies for aquatic systems we need comprehensive and accurate knowledge of algal population dynamics.

In this book, there 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, this way they can help the reader.

Overall, this book is a really good and useful collection about algae. It provides a well-structured identification key with many colourful photos and drawings and it contains a lot of information about their ecology, collection and enumeration. It covers everything that a future algologist should know. It is also good for those, who are only interested in environmental or aquatic sciences but are non-specialists because the colourful photographs will show them how interesting and beautiful creatures can be found in our freshwaters.

V. Pozderka

Burchardt, L. (ed.) (2014): Key to identification of phytoplankton species in lakes and rivers. – W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków, 180 pp. (ISBN 978-83-62975-19-8).

The book's subtitle is "Guide for laboratory classes and field research", which refers to a guide book providing easy and quick identification of the most common phytoplankton species of our inland waters. There is a lack of modern phytoplankton guide books for students and beginner phycologists and this book helps to fill the gap.

It is not easy to kindle the students' interest in algology because of the enormous diversity and the hard identification of algae. This book makes the identification much quicker and easier for the users.

After a short introductory chapter containing general description about planktonic algae, such as characteristics and taxonomic classification, the main part of the book presents the main groups of algae: Cyanobacteria, Bacillariophyceae, Dinophyta, Euglenophyta, Chlorophyta and Desmidiales. At the beginning of each chapter summarisations can be found of the given group containing cytological, ecological or distributional information. The key follows the taxonomic system of algae formulated by Van den Hoek *et al.* (1995) and employs the most up-to-date knowledge in the taxonomy of given algal groups. The key ends several times in genus level, but in most cases some concrete species are also enumerated.

The most species are illustrated with colour micrographs and/or drawings, they do not only facilitate the identification, but also make the book spectacular. The algae are more or less well recognisable on micrographs.

We recommend this book first of all for students, but it can be useful for field workers and for experimental researchers, too.

A. Hidas

Frey, W. (ed.) (2015): Syllabus of plant families, A. Engler's Syllabus der Planzenfamilien, 13th edition, Part 2/1. Photoautotrophic eukaryotic algae: Glaucocystophyta, Cryptophyta, Dinophyta/Dinozoa, Haptophyta, Heterokontophyta/Ochrophyta, Chlorarachniophyta/Cercozoa, Euglenophyta/Euglenozoa, Chlorophyta, Streptophyta p.p. – J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, Stuttgart, 324 pp. (ISBN 978-3-443-01083-6).

Adolf Engler's Syllabus of Plant Families has been published since 1887. The aim of this series is to present a concise survey of plants and fungi describing systematic units down to generic level. The 12th edition published in 1954 set a standard. The completely restructured and revised 13th edition is in preparation and publication in five parts. The purpose of this edition is to provide an up-to-date evolutionary and systematic overview of the plant groups, hence molecular results are also considered beside morphological-anatomical data. Part 3 published in 2009 presented bryophytes and seedless vascular plants, Part 1/1 produced in 2012 characterised blue-green algae, Myxomycetes and Myxomycete-like organisms, phytoparasitic protists, heterotrophic Heterokontobionta and fungi. The current volume is Part 2/1 that describes photoautotrophic eukaryotic algae. Rhodobionta is not involved in this volume because it will be discussed in a separate volume (Part 2/2).

Photoautotrophic eukaryotic algae have great ecological importance, because they are the primary producers in the marine and freshwater ecosystems. These organisms represent a very diverse group. Recent molecular results provide a new insight into the relationships of the different phylogenetic lineages of the algae and lead to the better understanding of their systematics. Nevertheless, there is a decline in "classical" morphological and taxonomic expertise. Therefore, like the previous parts of the 13th edition, this volume provides a synthesis of the results of modern investigations and the classical knowledge.

From evolutionary perspective eukaryotic algae is a polyphyletic assemblage of six distinct phylogenetic lineages: the glaucophyte lineage (Glaukobionta), the red algal lineage (Rhodobionta), the chromophyte, dinophyte and cryptophyte lineage (Cryptophyta, Haptophyta, Dinophyta and Heterokontophyta), the chlorarachniophyte lineage (Chlorarachniophyta/Cercozoa), the euglenophyte lineage (Euglenophyta/Euglenozoa), and the green algal lineage (Chlorophyta, Streptophyta).

Each chapter of this book characterises a group within these lineages in two parts. The first subsection entitled Characterisation and relationships, briefly describes the cell morphology, ultrastructure and reproduction. This part also discusses the traditional classification of the groups and their systematics in the light of phylogenetic investigations. The second subsection, entitled Systematic arrangement of taxa features the taxonomic units within the group down to genera. Beside morphological description remarks on the distribution of taxa are also provided.

A separate chapter discusses the systematics of autotrophic Heterokontobionta. The Heterokontobionta name is applied to a diverse group of autotrophic and mixotrophic organisms that produce flagelled cells involving Heterokontophyta/Ochrophyta, Cryptophyta and Haptophyta. However, recent molecular data showed that Heterokontophyta was more closely related to Dinophyta/Dinozoa and Chlorarachniophyta than its previous group members.

Several illustrations including detailed drawings on cell structure, coloured light microscope photos, good quality scanning and transmission electron microscope micrographs help the understanding.

This volume is a good summary of the up-to-date information on photoautotrophic eukaryotic algae. Its importance lies in that it discusses the systematics of these groups integrating the results of recent studies with classical knowledge. It can be useful to everyone working with these organisms.

M. Duleba

Hausmann, K. and Radek, R. (eds) (2014): Cilia and flagella – ciliates and flagellates: ultrastructure and cell biology, function and systematics, symbiosis and biodiversity. – Schweizerbart Science Publishers, Stuttgart, 299 pp. (ISBN 978-3-510-65287-7).

All animals are motile or have motile stages. Motility includes locomotion, the creation of water currents, and intracellular movements. While the general mechanisms underlying animal motility are known, detailed explanations of the fundamental mechanisms are in many cases still unavailable or largely speculative.

Besides amoeboid movement, most types of motility are the result of the activity of cilia or flagella, like swimming, streaming of fluids, etc. Because of this, the topic of the book is cilia/flagella and ciliates/flagellates. Cilia and flagella are thread-like, motile structures with diameters of about 0.3 μm. They were already recognised by the early microscopists, like Dutchman Antoni van Leeuwenhoek.

Cilia originate from basal bodies (kinetosomes), which are usually located in the cortex. The ciliary or flagellar shaft (axoneme) is covered by the plasma membrane. The cilia and flagella of eukaryotes are therefore intracellular organelles, in contrast to prokaryote flagella, which are extracellular. Much of the knowledge about the structure and function of the axoneme originated from studies on flagellated and ciliated protists. The beating of cilia and flagella is a striking phenomenon, which has been observed since the dawn of protozoological studies of ciliates and flagellates. The first impression is that the movement of cilia seems to differ from that of flagella: flagella appear to beat in a three-dimensional wave pattern, whereas many cilia seem to beat in a two-dimensional plane. However, more detailed investigations reveal that cilia also beat in a helical or three-dimensional manner, and that some flagella move only in a single plane.

This book presents a contemporary and imaginative synopsis of diverse biological aspects of cilia/flagella and ciliates/flagellates. It comprises contributions by a dozen of renowned experts from all over the world, which summarise our current understanding, essentially the results obtained and progress made during the last five decades of research on cilia/flagella and on ultrastructure, cell biology, organellar function, motility, taxonomy/systematics, symbiosis and biodiversity of ciliates/flagellates. The contributions to this volume display a remarkable breadth of topics, reminding the reader of numerous (occasionally almost forgotten) methodological approaches to solving scientific questions.

Overall, the book provides various suggestions for future research. It is lavishly illustrated by numerous line drawings and light- and electron-microscopic images. It also contains a small humour chapter with funny cell biological comics, which cheers up the reader and helps to arouse interest. The book addresses advanced students of biology and zoology, and all scientists teaching and working in cell biology and protistology.

V. Pozderka

Lenarczyk, J. (2014): The algal genus Pediastrum Meyen (Chlorophyta) in Poland. – W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków, 104 pp. (ISBN 978-83-62975-22-8).

The green algal genus *Pediastrum* Meyen generally occurs in the littoral of eutrophic water bodies, chiefly in coastal lakes and fish ponds. The genus was described by the German botanist and physicist Franz J. F. Meyen in 1829 and since then more than 350 names of *Pediastrum* species, varieties and forms have been published.

In this study 23 *Pediastrum* taxa were investigated of the 32 *Pediastrum* taxa known from Poland; eight of those rate as rare on the world scale. Samples were taken all over Poland, the research covers nine Polish physiographic units called subprovinces. Each subprovince contains several sampling stations, which varied wide-ranging physical and chemical parameters of the water and composition of the phytoplankton. 71 littoral, benthos and metaphyton samples were taken representing 70 water bodies and peat bogs. The material was examined by LM and SEM. Material was also collected from selected sampling stations for culturing. The occurrence of *Pediastrum* and accompanying algal taxa at each sampling station is summarised in a big table.

The main part of the book presents each 32 *Pediastrum* taxa in detail. Prior to the taxa descriptions an identification key is provided based on coenobium morphology. In the taxa descriptions synonyms, general notes, literature data and information of the current records are given. The described taxa are illustrated on more greyscale light and scanning electron micrographs in good quality.

On the whole, this book provides a valuable collection of information on the genus *Pediastrum* living in Poland. Every expert working with this group of algae may have benefit from using this book and it can be useful for everyone interested in this area.

A. Hidas

Reavie, E. D. and Kireta, A. R. (2015): Centric, araphid and eunotioid diatoms of the coastal Laurentian Great Lakes. Sampling, taxonomic descriptions and environmental characteristics. – In: Lange-Bertalot, H. and Kociolek, P. (eds): Bibliotheca Diatomologica, Vol. 62. J. Cramer in der Gebrüder Borntraeger Verlagsbuchhandlung, Stuttgart, 184 pp. (ISBN 978-3-443-57053-8).

This guide book represents the first detailed description of the freshwater centric araphid and eunotioid diatom flora from the coastal ecosystems of the Laurentian Great Lakes. The Laurentian Great Lakes have several important uses, including drinking water, transportation, industry, recreation and angling. As a result of over two hundred years of human exploitation, agricultural, industrial and urban development in adjacent watersheds has resulted in hydrological changes, eutrophication, and various pollution impacts. This has caused damages in the environment and undesired changes to the lives of people who depend on these ecosystems, and there are now concerted efforts underway to restore impacted coastal systems. The Great Lakes Environmental Indicators (GLEI) project was initiated to assess coastal margin condition and water quality. This book summarises results of this investigation, examples of the common diatom taxa encountered during sam-

ple analyses for GLEI project. There have been provided light micrographs of diatom taxa, from 28 genera, recorded in 207 samples from 106 wetlands, embayments high-energy and deep, nearshore localities of the Great Lakes.

The taxonomic and iconographic sections of this book include descriptions and illustrations of the taxa encountered, as well as autecological information and palaeolimnological efforts.

It is not easy to determine centric diatoms in light microscope, consequently, this volume may be complementary beside electron microscope to help identify the given taxa in light microscope. So this can be a very useful book for the experts and students of the field.

Zs. Trábert