



# KEY TO IDENTIFICATION OF PHYTOPLANKTON SPECIES IN LAKES AND RIVERS

GUIDE FOR LABORATORY CLASSES  
AND FIELD RESEARCH

edited by  
Lubomira Burchardt

Kraków 2014

**KEY TO IDENTIFICATION  
OF PHYTOPLANKTON SPECIES  
IN LAKES AND RIVERS**

Adam Mickiewicz University in Poznań, Faculty of Biology  
W. Szafer Institute of Botany, Polish Academy of Sciences

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**Summary:** The key contains taxonomic and ecological descriptions of planktonic algae (pro- and eukaryotic) which are most often encountered in various kinds of aquatic reservoirs, lakes and rivers of Poland. Quick identification of those species was based on a dichotomous system (attached on a CD), which renders the key readily accessible during laboratory classes and in the course of phyco-logical research. The key follows the taxonomic system of algae formulated in the handbook "Algae. An introduction to phycology" (Van den Hoek et al. 1995), a framework widely used in Europe. The key may also be helpful in prompt assessment of ecological state of Polish lakes and rivers (Picińska-Fałtynowicz et al. 2006), carried out in accordance with the EU Habitats Directive (92/43/EEC, EU 1992). The selection of phytoplankton for the evaluation of ecological condition of aquatic ecosystems is associated with the conviction that the microscopic organisms which represent this ecological group are the first to respond to any changes and disturbances, be it climatic, environmental or anthropogenic.

**Key words:** phytoplankton, blue-green algae, euglenoids, dinophytes, cryptophytes, chrysophytes, dinoflagellates, diatoms, green algae

## **Publishing review**

The key submitted for review most certainly draws on the excellent, though regrettably unfinished series of monographs entitled *Freshwater Flora of Poland* and *The Plant Plankton of the Fresh Waters*, containing taxonomic descriptions and numerous drawing of algae, with contributions from outstanding Polish phycologists. The similarity to the above keys, results from the fact that this publication is a collective study, and an attempt to create a comprehensive compendium, by providing richly illustrated taxonomic and ecological descriptions of the most common species of our inland waters. It will certainly prove a very valuable aid for the students and a highly useful tool in environmental monitoring work. The key extensively relies on the most up-to-date knowledge on the taxonomy of individual algae groups. Furthermore, it fills a serious gap in our publishing market, as the latest monograph of this kind, written by Prof. Starmach, was published 20 years ago. Given all that, I am of the opinion that publication of the reviewed key is an exceedingly valuable initiative, and I feel bound to support it wholeheartedly.

I wish to emphasize that I was greatly pleased to find the traditional sense of the term “glony [algae]” retained, a notion introduced in the Polish scientific nomenclature at the beginning of the 20<sup>th</sup> century by Prof. Rostafiński, who borrowed it from the highland dialect. In its original meaning, the term encompassed several unrelated evolutionary lines of thallic organisms, including blue-green algae, and this very meaning is employed in the title and the contents of the key.

*Andrzej Hutorowicz*

The Stanislaw Sakowicz Inland Fisheries Institute in Olsztyn

## Introduction

The key to identification of phytoplankton in lakes and rivers contains taxonomic and ecological descriptions of planktonic algae (pro- and eukaryotic) which are most often encountered in various kinds of aquatic reservoirs, lakes and rivers of Poland. Quick identification of those species was based on a dichotomous system, which comes attached on a CD. The latter format renders the key readily accessible during laboratory classes and in the course of environmental monitoring work. The key follows the taxonomic system of algae formulated in the handbook "Algae. An introduction to phycology" (Van den Hoek et al. 1995), a framework widely used in Europe.

The key may also be helpful in prompt assessment of ecological state of Polish lakes and rivers (Picińska-Fałtynowicz et al. 2006), carried out in accordance with the EU Habitats Directive (92/43/EEC, EU 1992). The selection of phytoplankton for the evaluation of ecological condition of aquatic ecosystems is associated with the conviction that the microscopic organisms which represent this ecological group are the first to respond to any changes and disturbances, be it climatic, environmental or anthropogenic. The ability of prompt reading of such phenomena, based on the varying species composition, the number and the biomass may also be utilised to determine the current ecological condition of an aquatic ecosystem and the direction of foreseeable changes in the future.

Publication of this key has been made possible thanks to tremendous support from prof. dr hab. Bogdan Jackowiak, Dean of the Faculty of Biology, Adam Mickiewicz University in Poznań, and the positive review from prof. dr hab. Andrzej Hutorowicz from the Stanisław Sakowicz Inland Fisheries Institute in Olsztyn.

Given the constant change of aquatic resources in our hydrosphere and consequent fluctuations of habitat conditions, biological structures and ecological systems within that sphere, it should be assumed that each aquatic ecosystem is an original and unique one. The assessment of the diversity of surface water reservoirs may therefore be illustrated by means of individual abiotic and biotic values of microhabitats developing in the littoral or pelagial zones or in the benthos of the studied lake, pond or river section. Consequently, the long-term physical, chemical and biological research offers the ability to arrive at increasingly refined values indicating narrower and narrower ranges of dependency between the microhabitat, the community of its inhabitants and the selected aquatic organism. The development of the research, also in the field of phycology, is associated with the research experience and the advances made with regard to the tools employed.

The contribution of the phycologists to the procedures suggested for the assessment of ecological state of a studied ecosystem relies on the hydrobiological values



determined for the pelagial, littoral and benthos. The most frequently utilised system of dominant species (Reynolds 1993) allows for a relatively fast evaluation of the trophic state of a given ecosystem. The system is based on numerous and widespread species, i.e. those which display broad tolerance to abiotic and biotic changes. Knowledge of such organisms seems to be necessary and indispensable in long-term monitoring and regional hydrobiological assessment of selected aquatic ecosystems.

The authors of this monograph do hope that the collection of species covered, which are most often encountered in water ecosystems, will be helpful in field work, in laboratory and experimental research. This specially prepared taxonomic key guides the reader to the species often found in our waters, as well as to their morphological, ecological and trophic descriptions.

*Lubomira Burchardt*

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*We are especially grateful to Professor Elliot Shubert (Natural History Museum, Life Sciences Department, London) for his important contribution to the final version of this publication and for polishing the English.*