

Taxonomische und Ökologische Revision der Ciliaten des Saprobiensystems - Band IV: Gymnostomatea, Loxodes, Suctoria. (Taxonomic and ecological revision of the ciliates of the saprobian system) by W. Foissner, H. Berger, H. Blatterer and F. Kohmann. Informationsberichte des Bayer. Landesamtes für Wasserwirtschaft.

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This is the fourth and the last part of the remarkable "ciliate atlas" on morphology and ecology of ciliated protozoans used as indicators of water quality.

Ciliates are certainly the most interesting group as potential indicators of organic pollution. They are found in all types of aquatic habitats ranging from the unaffected to the most heavily polluted. The amount of organic matter is perhaps the most important environmental factor that indirectly determines their distribution. Ciliates are particularly important on the more polluted side of the gradient where they are abundantly represented by a large number of morphologically diverse forms. Hence, it is quite natural that ciliated protozoans have got an important place in the saprobian system since its very beginning.

Their wider use in the practice of bioindication, however, has been seriously hindered by two reasons. The first one is that working with ciliates is technically more difficult than with other groups like diatoms or invertebrates. The second and the more important reason is the lack of a comprehensive key enabling accurate species identifications. Since the work of Kahl (1930-35) an immense amount of taxonomic work has been accumulated, however, this important information is scattered among a multitude of scientific journals. Consequently, species identification is extremely difficult if not impossible for anyone not doing research on ciliate taxonomy. The monumental 4-volume 'ciliate atlas' by Foissner et al. (1991-95) fills an important gap in ciliate literature and will significantly reduce these difficulties.

This last volume of the series begins with an abundantly illustrated key to all ciliate species treated in volumes I-IV. The key occupies 75 pages and includes

all the partial keys known from volumes I-III. It is an original and in my opinion successful attempt to make a practical and easy-to-use key. It will be particularly helpful for beginners and anyone without much experience in ciliate identification.

As the key concerns only selected (indicator) species for an accurate identification the user has to consult the precise diagnoses given in the descriptive part of the book. The diagnoses are accompanied by additional information on similar species (not treated in the atlas) that potentially could be confused. Such approach makes actually feasible the correct determination of species, which significantly distinguishes this book from other guides of indicator species.

The main body of this volume is composed of monographic descriptions of about 60 species representing Gymnostomatea, Suctoria and the genus *Loxodes*. This presentation complements the survey of almost 300 ciliate species with known indicator values covered by the whole atlas. The information on each species is ordered according to the same general scheme: list of synonyms, taxonomy, descriptive diagnosis, note on similar species, and ecological data. All the available taxonomic literature on a given species is thoroughly reviewed.

Each individual description is accompanied by numerous line drawings and micrographs. The amount and the remarkable quality of illustrative material is the most striking feature of the book. Many interesting pictures are reproduced from the older literature, however, most of them are original or taken from previous publications by the same authors. Each detail of ciliate morphology,

illustrated with various techniques. The life aspect is presented with beautiful line drawings as well as phase- and interference-contrast micrographs. Details of ciliary structures are illustrated with a variety of silver methods. Additionally, many scanning electronic micrographs are provided, which help our understanding of ciliate morphology.

Both keys and descriptions are prepared in a way to enable identification *in vivo* whenever possible. This is very important as most often it is impossible to apply staining techniques during routine analyses of samples. It should be stressed that in many cases a live observation may be sufficient for an accurate identification of ciliates provided detailed descriptions of the kind given in this atlas are available.

The ecological sections in each description contain faunistic and autecological data. Information on distribution, abundances and water chemistry data are synthesized from a multitude of scattered literature sources. The amount of literature reviewed is truly amazing. Volume IV itself contains more than one thousand references. The quantity of detailed taxonomic and ecological data accumulated in this atlas makes it a real encyclopedia on ciliated protozoans.

The general part of the book contains a tabular summary of saprobic values of all the species treated in Volumes I-IV. This table contains also the exact location (volume/page) of where the detailed description of a given species can be found. This is very helpful as the index at the end of each book applies only to the species

presented in that particular volume. Another table offers a concise summary of basic ecological features (biomass, preferred food, habitat ...) of all species considered in the atlas. The table may be very helpful for a quick ecological interpretation of any species list. In this last volume of the atlas we also find a collection of beautiful graphic tables representing characteristic ciliate communities from a variety of habitats including activated sludge. Readers experienced with monitoring pollution will welcome the table aligning ciliate names from the list of Sladeček et al. (1981) with the names revised in this atlas.

The book is mainly addressed to the people interested in practical use of protozoans in water quality assessment. It will also be very useful in monitoring the function of biological wastewater treatment systems. Without any doubt, the atlas will significantly improve the quality of this kind of analyses. However, the overall significance of this work goes far beyond the problems of bioindication. The quality and the quantity of the information assembled in these four volumes make them absolutely indispensable for any researcher or student of taxonomy and ecology of ciliated protozoans. Perhaps the only significant disadvantage (for some people) will be the fact that the book was written in German. Of course, the authors cannot be blamed for that. In fact they ought to be commended for their well-ordered presentation of the data and the large number of illustrations which make the book accessible even to those with very limited knowledge of German.

Krzysztof Wiąckowski, Kraków, Poland