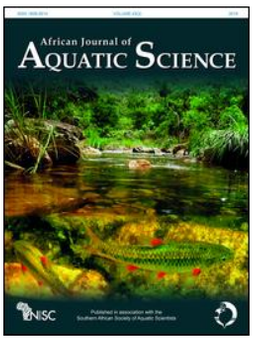

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Diatoms from the Congo and Zambezi Basins – Methodologies and identification of the genera

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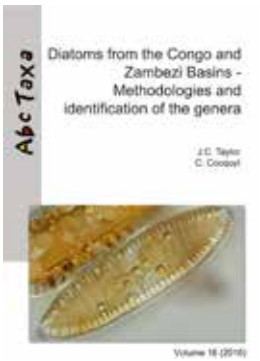
Book Review

Diatoms from the Congo and Zambezi Basins – Methodologies and identification of the genera



JC Taylor and C Cocquyt

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Traditionally, most diatom taxonomic studies had been focussed on either Europe or North America. However, recently many interesting studies have emerged from some of the lesser-studied regions of the world, for example, many parts of Asia and Africa. Studies from parts of Asia and Africa not only add new taxa, but also provide vital missing parts of the diatom tree of life. Moreover, studies from these regions strongly support the presence of a unique diatom diversity, which was earlier masked by a 'force-fitting taxonomy'. The book under review deals with one of the biodiversity-rich regions of the Africa, the Congo and Zambezi River Basins.

'Diatoms from the Congo and Zambezi Basins – Methodologies and identification of the genera', written by Dr Jonathan C Taylor and Dr Christine Cocquyt, is one of the best guidebooks on the common diatom genera currently available. It is published in the ABC Taxa series and available as either a soft (pdf) or hard copy. The pdf is freely available from the ABC Taxa website (http://www.abctaxa.be) and the hard copy can be purchased for just €16, to meet the printing costs.

Taylor is one of the key contributors in documenting the diatom diversity of Southern Africa. He curates Cholnoky's collection at North West University in South Africa. Cocquyt has been studying the diatom flora of the African ancient lakes and Congo region for many years and has uncovered many new taxa from this region. Taylor and Cocquyt are the authorities best suited to write on the diatom flora of Africa and their study was supported by numerous collections left to them by earlier researches.

The Congo River basin is the second largest in the world, after the Amazon, and the Zambezi River is the fourth largest river in Africa. Accordingly, this book makes an important attempt at understanding the diatom diversity of globally important riverine ecosystems.

The authors offer an overview of the most common diatom genera found in the Congo and Zambezi basins in central Africa. They encourage the study of diatoms as a tool for water-quality monitoring, and this book is a first step towards that aim, by presenting the taxonomy in a simple and straightforward manner. Although this volume is tailor-made for ease of central African diatom studies, it is equally useful for other parts of the globe. Most of the genera illustrated in this book are widespread and it will be useful for diatom students across the world.

The book is organised into sixteen sections. In the 'Introduction', the authors give a very concise account of diatom research in central Africa related to diatom taxonomy and water quality monitoring. The introduction offers a comprehensive review of diatom research in this region since 1880 CE (Common Era) and concludes with outlining the purpose and general features of the book.

The next five sections are devoted to the details of diatom biology illustrated with some good scanning, and live cell images. The authors also unravelled different types of siliceous structures that can be found other than diatom frustules in diatom samples, such as spicules, phytoliths, cysts and lorica. This might be the first time in the diatom literature that these other organisms are highlighted.

In section 7, 'field collection methodology', the authors clearly explain the different habitat types of diatoms and procedure to collect samples. Cleaning subsamples, preparation of permanent slides and stubs, storage samples and slides in herbarium for cross-referencing and diatom analysis are discussed in later parts.

They then proceed to explain diatom terminology using a bilingual (English and French) glossary with reference diatom ultrastructure images. Ninety-one diatom genera are illustrated following a modified classification derived from Round et al. (1990). Each genus page has (1) the type species for the genus; (2) its characteristic features; (3) its plastid structure; (4) the characters used for identification of species; (5) general ecological notes for the genus; and (6) the schematic set of computer-generated drawings. One of the key features of the book, which is detailed in this section, is the usage of a 'red colour' line that highlights the important taxonomic characters for that particular genus.

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Cleaned material from the Congo and Zambezi basins are used for the light microscopic pictures, and to decipher ultrastructural details they provide good scanning electron micrographs in the case of every genera. The most interesting thing in this section is that authors try to provide live cell images whenever possible for each genus. No book on taxonomic studies is complete without a reference part, which is provided in section 13. There are three final sections: the 'Acknowledgements', a short biography of each author and finally a taxonomic index.

The main strength of this book are the excellent images of live material, as well as clean light microscope and scanning electron microscope images. For example, on p 88 (Figure 28 F), the linking spines of *Aulacoseira* sp. showing the small reniform apical part; on p 320 (Figure 181 F) a broken valve of a *Rhopalodia* sp. shows the complex structure of the areolae; and on p 132 (Figure 56), the cell images of live *Actinella brasiliensis* with their mucilaginous stalks. The live images presented in this book offer an amazing amount of new information.

The schematic computer-generated drawings are innovative and presented in meticulous detail (e.g. pp 131 and 146). Usually, as a beginner, one is faced with the problem of relating line drawings or light micrograph to the scanning electron micrograph of any particular taxon. This problem can be easily tackled using this schematic diagram, because it is a product of an amalgamation of findings from the three sources: line drawing, light and scanning electron micrograph. The colour of the live cells are well captured and processed carefully to maintain their original colour. The production is of high quality and there are almost no typographical errors. An exhaustive bilingual glossary is included and all scientific names are given correctly. The glossary section is strongly supported with light and SEM photographs.

In dealing with such a vast amount of information and with thousands of images, it should be expected that some errors would occur. In certain figures, the scale bar is missing (for example, Figures 9 and 10). In many genera, the computer-generated diagram is never cited and it might put the students in a dilemma if the characters are not important or so! The schematic diagrams are not cited chronologically in the text and these diagrams are referenced with Roman numbers (I, II, III), so it is sometimes difficult to coordinate, because some diagrams are never mentioned. Although, a taxonomic index is provided, a listing of genera is needed in a table of content by page number for a quick access. There is no mention about the origin of the images (location, habitat, etc.), it might not be an important for the beginners, but a critical taxonomist will look for the sample details or accession number of a collection. It is a great initiative to provide this piece of work in soft format as a pdf file, but it would be great if the genus names could be hyperlinked to DiatomBase (Kociolek et al. 2018), so that the taxonomic changes can be captured in real time; but that probably lies in the future.

This might be the first time somebody has attempted to create a unique guidebook on diatom genera found in central African water bodies. Without a doubt, this guidebook is an important contribution to diatom identification. It will be a standard guidebook on common diatom genera for taxonomists, hydrobiologists, ecologists and students, as well as useful for all libraries in scientific institutes and universities. This book will be a one-stop place for anybody who want to begin research on freshwater diatoms in any part of the world. Furthermore, as it is freely available it will be a standard text for students across the globe, in particular students from developing nations.

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