

BOOK REVIEW

Wu Jiunn-Tzong, Bakthavachalam Babu, Chuan-Ling Chou and Sundaraju Jothi Saraswathi. 2011. Freshwater Diatom Flora of Taiwan, Vol. I, iii+392 pages and Vol. II, ii+356 pages, hardcover. Biodiversity Research Center, Academia Sinica, Taipei. ISBN 978-986-02-7105-8 (vol. I), ISBN 978-986-02-7106-5 (vol. II), NT\$1500 per volume. For information – biodiv@gate.sinica.edu.tw, <http://biodiv.sinica.edu.tw>

Diatoms with their distinctive, ornate siliceous frustules have been tapped lately as useful indicators of environmental conditions in aquatic ecosystems, and indirectly so, of nearby terrestrial habitats. Global biogeochemical cycles may be impacted by the silicon and carbon dynamics from diatom cells. Due to the presence of extensive diatomaceous deposits and well preserved diatom fossils formed for thousands of years on the bottom of lake and marine ecosystems, they have become important resources for paleo-limnological and paleo-oceanographic investigations. This feature has been quite useful and relevant for scientists engaged in the ever important climate and environmental change research.

The development of advanced optical instrumentation, specifically SEM, pushed taxonomic studies beyond the era of classical light microscopy first employed when diatoms were just beginning to be known and characterized two centuries earlier. In this modern age and time, taxonomic studies of diatoms without the use of SEM are unable to provide sufficient information on detailed morphological features currently employed in the contemporary taxonomy of these unicellular algae. This represents a major hindrance for reliable diatom taxonomic research especially in technologically disadvantaged countries and partly explains the paucity of diatom taxonomic studies in these countries. On the other hand, the use of SEM has caused many more diagnostic features to be elucidated and evaluated leading to the redefinition of diatom taxonomic concepts, paving the way for ultrastructural and molecular approaches to be used in the taxonomy of these beautiful unicellular algae.

Because diatoms have started to play important roles in the study of climate change, aquatic ecology and geochemistry, the study of diatom diversity serves to foster a greater appreciation for the myriad variations of morphology and adaptations as influenced by evolutionary processes. It is this whole range of morphological assortment that makes the work of diatom taxonomists a delightful task and a visual feast.

The volume under review is a celebration of the ultrastructural beauty and immense diversity of diatoms found in various freshwater environments around Taiwan. This ground-breaking work is issued in two handsome volumes representing a collection of 350 species classified under 32 families of centric and pennate species. The volumes are in actuality photographic

atlases consisting mostly of SEM photos and a sprinkling of light micrographs. For each species illustrated, the standard valve and girdle views are presented. Individual species descriptions are preceded by a generic description and each is supplemented with short notes on its biology, locality or habitat (Taiwan) information, global distribution, basionym and synonyms (where applicable) and a list of cited references. The locality or habitat information is general and all encompassing, negating the possible existence of endemic species or those with narrow ecological tolerance and distribution. The classification of Round et al. (1990) is used in this work. Volume II (but not Volume I) has an impressive list of diatom taxonomic references numbering approximately 650 and representing practically all geographic regions around the world except for Taiwan. In the Preface of the book, the authors declared that a checklist of diatoms of Taiwan has indeed been published but without citing the specific work. A quick perusal of Google Scholar points to the work of Wang and Chen (2000) as the publication most likely referred to. Furthermore, there is curiously no single reference among the list that was contributed by any of the four co-authors of the volume under review. Turning again to Google Scholar, there appear to be some significant works on Taiwan freshwater diatoms that were omitted and they were even co-authored by the first author of the volumes under review, such as the three-part freshwater diatom flora of Mystery Lake in northeastern Taiwan (Wang & Wu 2005; Wu & Wang 2002, 2009) and of Liyu Lake in eastern Taiwan (Wang et al. 2010).

The separation of this freshwater diatom treatise into two volumes presents some unnecessary inconveniences to users. For example, the constant perusal of the References List that is printed only at the end of Volume II (and not in Volume I) is a source of annoyance; the same way as having to constantly flip through the pages of both volumes to locate one's species of interest. The authors should have considered publishing following conventional style, i.e., Volume I for all introductory materials, texts, species descriptions and references list, while Volume II could have been devoted entirely for all photographic plates. That way, a user may be spared the agony of endless page flipping and save precious time by opening and displaying the desired species description page on one volume and the corresponding figures/plates on another, one volume neatly laid open beside the other.

A monumental work on the freshwater diatom flora of Taiwan as this work attempts to be should ideally be prefaced by sufficient background information to introduce the topic and to define the framework of the research problem at the very least. In a monographic work like this, a brief historical review of the researches on freshwater diatoms in Taiwan and neighboring regions is needed and should have been an easy task for the authors given the variety of references from around the world consulted by them. Instead, the authors made do with a lackluster preface and a two-page mediocre introduction that are akin to didactic paragraphs extracted straight from a phycology textbook. While emphasizing that a taxonomic volume of this nature uses "a great deal of terminology" in describing valve structure and

markings useful in species discrimination, the authors did not provide a glossary of these complex terminologies to guide the uninitiated.

Notwithstanding the many gaps noted in this work, the authors should be encouraged to further pursue and publish their research on the freshwater diatom flora or to incorporate most of the suggestions in later editions. In the meantime, this two-volume flora can contribute further to the taxonomic study of freshwater diatoms in many sub-temperate regions or even in the higher elevations of the tropical regions where diatom biodiversity may be rich but poorly known.

LITERATURE CITED

- Round, F.E., R.M. Crawford and D.G. Mann. 1990. *The Diatoms: Biology and Morphology of the Genera*. Cambridge University Press, Cambridge, 747 pages.
- Wang, L.-C., T.-Q. Lee, S.-H. Chen and J.-T. Wu. 2010. Diatoms in Liyu Lake, eastern Taiwan. *Taiwania* 55: 228-242.
- Wang, W.-L. and P.-C. Chen. 2000. Checklist of freshwater diatoms from Taiwan. Chinese Phycological Society, Taipei. 196 pages.
- Wang, Y.-F. and J.-T. Wu. 2005. Diatoms of the Mystery Lake, Taiwan (II). *Taiwania* 50: 40-56.
- Wu, J.-T. and Y.-F. Wang. 2002. Diatoms of the Mystery Lake, Taiwan (I). *Taiwania* 47: 71-96.
- Wu, J.-T. and Y.-F. Wang. 2009. Diatoms of the Mystery Lake, Taiwan (III). *Taiwania* 54: 231-240.