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Book review

Aquatic and Wetland Plants of India, C.D.K. Cook, Oxford University Press, New York, 1996, 385 pp., ISBN 0-19-854821-4, US \$165 (hardcover).

The subtitle of this volume indicates that it is, “A reference book and identification manual for the vascular plants found in permanent or seasonal fresh water in the subcontinent of India south of the Himalayas.” The current work greatly expands the taxonomic coverage of Indian water plants in a format similar to that used by Christopher Cook in his worldwide treatment of aquatics (Cook, 1990). In his Preface, Cook discovers that the writing of a flora is a scientific endeavor that requires the hand of a professional botanist. We are fortunate that he decided to undertake this much needed work and provide the necessary elements of a professional, scientific treatment.

The coverage in two older manuals emphasizes just how comprehensive this new treatment is. Cook includes nine species of *Aponogeton* in contrast to ‘BC’ (i.e. Biswas and Calder, 1954) with three species and ‘S’ (i.e. Subramanyam, 1962) with two species. Cook treats six species of *Lemna* in comparison to BC (three spp.) and S (one sp.). For *Potamogeton*, the number of species is six (Cook), four (S) and three (BC). However, the enhanced taxonomic coverage is most evident in more technically difficult groups such as *Utricularia* (Cook = 27 spp.; BC = nine spp.; S = 3 spp.), *Eriocaulon* (Cook = 34 spp.; BC = three spp.; S = one sp.), and *Cyperus* (Cook = 40 spp.; BC = six spp.; S = four spp.). In essence, this is the first book to provide a realistic taxonomic coverage of Indian aquatics. I checked a few thoroughly monographed taxa such as *Lemna* which satisfyingly contained all of the appropriate species for the region of coverage. Nevertheless, the need for continued taxonomic work is evidenced by groups like *Coldenia* (p. 75) with ‘1 or \pm 40 species (depending on generic delimitation)’.

In brief, this is an outstanding taxonomic work on an extremely difficult region. For the most part, it is of exceptional quality and belongs on the shelf of any botanist seriously interested in aquatic plants (although the price is intimidating). Without question, it would be merciless to be too critical of a first edition on such a difficult flora. Instead, I will try to point out some of the inevitable oversights that occur in a new text which might be considered when a later edition is prepared.

I found a few phrases that might be confusing to persons not fluent in English. For example, ‘plankton’ (p.3) are defined as plants that occupy a ‘... zone between the bottom and lower surface of the water.’ A few terms use vernacular rather than technical

terminology. Even though the book is intended to serve an audience with 'little botanical training', it is still preferable to avoid terms that are not universally recognized. Couplet #1 on p. 29 describes trichomes of *Salvinia molesta* as '... looking like an egg-beater' which is certainly true, but such terms cannot be looked up for clarity. In fairness, Cook does his best to describe what he means and I'm not sure what a Latin equivalent for 'egg-beater' might be anyway (ovuvindiciform?).

A few statements are cryptic. The phrasing of couplet #4 on p. 15 describes "Leaves compound or simple divided into secondary linear or capillary segments." Do simple leaves key here? If so, then they cannot be divided. If not, wouldn't a 'simple divided' leaf necessarily also be compound? The term 'simple divided' is not in the glossary for clarification.

Minor discrepancies occasionally appear. Although leaves of *Najas* are 'often appearing to be opposite' (p. 267), this genus keys only in Key 5 – leaves whorled (p. 14). Furthermore, *Najas* keys out under the second lead of couplet 4 (p. 15) for plants with 'Leaves simple and entire' even though it has leaves '... with toothed margins' (lead 11-a, p. 15). The usage of the term 'gynodioecious' (p. 218) is misapplied to *Hydrilla* which is (p. 219) 'monoecious or female'. As defined in most textbooks on plant reproductive biology, gynodioecy applies to plants with hermaphrodite and female flowers.

Cook presents a balanced taxonomy based on current literature, but there are a few places where he is vague, possibly to preserve older nomenclature. He agrees that placing the Indian species of *Podostemum* into the genus *Zeylanidium* (p. 321) 'is probably correct', yet retains them in the genus *Podostemum* anyway. He includes only *Ruppia maritima* and regards *Ruppia cirrhosa* as a synonym (p. 338). Yet the name *Ruppia cirrhosa* is used for Fig. 345 to which he adds (p. 338): "My illustration shows a plant with long spirally wound fruit-bearing stalks which would usually be called *Ruppia cirrhosa*." Consequently, readers will have a difficult time deciding on what to call their specimens of *Ruppia*.

The keys are strictly dichotomous and mostly incorporate contrasting features. Helpfully, the keys emphasize vegetative characters. There is a starting key to 10 different keys representing 'major groups' of aquatics. The group keys resolve families in some instances and genera in others. In either case, families contain keys to genera and each polytypic genus contains a key to species (and occasionally infraspecific taxa). I used several of the keys and found them to work well for most of the groups that I tried.

Some portions of the keys could be improved. There are several instances where 'not' is used rather than a specific contrasting lead, e.g. (p.20): 'Flowers not in compact, spherical to discoid heads'. In such cases, I prefer being presented with the actual choices that remain in the lead. There is a problem with the treatment of leaf venation in some genera. Leaf venation that is '... almost regularly rectangular' (p. 19), separates Aponogetonaceae from Ranunculaceae, Alismataceae and Limncharitaceae (couplets 410–12, p. 19). However, a later illustration of *Caldesia* (Alismataceae) on p. 38 shows the inset of a leaf emphasizing what clearly appears to be a rectangular pattern of venation (Fig. 18-e). Many other alismatids have a more or less rectangular pattern of venation in the leaves, and I am not sure that it differs in any specific way from that of

Aponogeton. Rectangular venation is also evident on the book's cover illustration of *Cryptocoryne wendtii* (Araceae). On the other hand, one needs flowers to identify the genus *Vallisneria* (Hydrocharitaceae) despite its fairly characteristic leaf venation (with a broad lacunal band) which could be emphasized as a diagnostic vegetative character.

I noticed a few other trivial things. The book lists but excludes marine angiosperms. Because there are only 11 species listed, it would have been useful to include them. The epithet for *Thalassia hemprichii* is misspelled as '*hemprichtii*'. Another error is for the epithet of *Nymphoides hydrophylla* which is spelled correctly in the key and description (pp. 263–264), but is misspelled as '*hydrophila*' in Fig. 274 (p. 265). The petals of *Hygrophila* (p. 30) are described as 'white to purple' which is true in living material; however, petals on dried (herbarium) specimens often turn bright yellow. *Acorns* is still included in Araceae despite more recent arguments (including several molecular studies) to segregate the genus in its own family Acoraceae.

So, those are my criticisms which one can clearly see are relatively minor. None of them detract in the least from this otherwise outstanding taxonomic coverage of Indian aquatics which will undoubtedly become another classic in water plant literature. Christopher Cook is good at writing such classics and we can only hope that now that he has the flora 'bug', he will continue to use his extraordinary abilities to make taxonomic sense of water plants from other regions. Hmmm. I don't think that Africa has a comprehensive aquatic flora yet.

There is one last thing. Most illustrations were drawn by the author and were prepared on a table believed to have once been owned by the 19th century artist Dante Gabriel Rossetti. There are 374 figures in the book, but this is the only table cited.

References

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- Subramanyam, K. 1962. Aquatic angiosperms: a systematic account of common Indian aquatic angiosperms. Botanical Monograph No. 3. CSIR, New Delhi. 190 pp.

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