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Book review

A Great Lakes Wetland Flora, S.W. Chadde. Pocketflora Press, Calumet, MI. 1998, 569 pp., paperback, US \$44.95, ISBN 0-9651385-2-6.

I was delighted to hear about this flora which covers the Great Lakes of North America, the region where I first studied water plants. The book begins with an introduction to aquatic plants and summarizes the common wetland types found with the area comprising northern Indiana, northern Illinois, northeastern Iowa, Michigan, Minnesota, northern Ohio, southern Ontario and Wisconsin. Aquatic plants are described as those having either a free-floating, floating-leaved or submersed habit. Wetland species include those with emergent habits and also a number of more marginal species adapted to wet or dry soils. Species have been included by virtue of their listing by the U.S. Fish & Wildlife Service (USFWS) as wetland status indicators. All plants recognized by the USFWS as either obligate or facultative wetland species in this region are included; in addition, a number of facultative or facultative upland species are included at the author's discretion. The result is a manual of 900 species from 114 families, a number that is substantially larger than what normally might be expected for aquatic and wetland plants from this region.

The coverage is comprehensive, but the book includes many species that are more typical of moist woodlands or shores than they are of true wetlands. Because this flora will undoubtedly be used to help delimit wetlands, this fact merits some caution. Inclusion of species such as *Aconitum noveboracense*, *Aesculus glabra*, *Artemisia biennis*, *Chenopodium glaucum* (and *C. rubrum*), *Lilium philadelphicum*, *Mertensia virginica*, *Oplopanax horridus*, *Populus deltoides*, and *Rubus idaeus* could bias the evaluation of whether a particular tract of land represented a wetland. As nearly any parcel of land in this region is likely to include at least some of the species in this book, its use for assisting with wetland delineation should take these factors into account. Users of this guide should realize the limitations of 'indicator' lists such as those furnished by the USFWS. A species that can grow on rotting logs (which are hardly wetland habitats) in a bog does not necessarily mean that its presence in an area indicates a wetland. On the other hand, some fairly characteristic wetland species such as *Juncus dudleyi* and *Polygonum cespitosum* are excluded from even this broad scope of 'wetland' plants.

According to the author, "the use of technical terminology has been minimized or simplified." Arguably, this allows the book to be used not only by professional botanists, but also by "the person simply interested in plants." Unfortunately, the dilution of

terminology in taxonomic treatments often yields definitions or descriptions that are vague to a student or simply incorrect.

Examples of improper terminology occur frequently. The definition of 'disturbed' (p. 549) is limited to natural communities altered by humans and does not include natural disturbance which is critical to many imperiled species. A 'floating mat' is defined (p. 550) as a feature where "plant roots form a carpet over some or all of the water surface" despite the fact that our most common usage of this term is for *Sphagnum* which does not possess roots. Even some basic terms such as 'alternate' are defined incorrectly (p. 548); e.g., as leaves that occur "at successively different levels on opposite sides of the stem." Many alternate leaved plants are not two-ranked as perhaps intended here; moreover, the definition is vague. The definition for 'opposite' (p. 551) is circular ("leaves or branches which are paired opposite one another"). The definition of 'whorl' (p. 553) is also inaccurate ("a group of three or more parts from one point on a stem"); this description would also include palmate structures, umbels, etc. Even so, these definitions do not explain why (p. 22): leaves of *Ceratophyllum* are described as palmately divided when they are actually dichotomously divided. The glossary defines palmate structures as being "divided in a radial fashion" which they are not. A drupe is described as "a fleshy fruit with a single large seed" which would also include any single-seeded berry. It is the stony endocarp that is diagnostic for drupes, but this attribute is not mentioned. *Butomus* is described as having a capsule fruit type (p. 342) when it actually possesses follicles. A caryopsis is described as a "dry, indehiscent seed" when it is a type of fruit. The definition of follicle does not mention that it is derived from a single carpel; thus, it would also apply to all capsules with a single line of dehiscence.

Other terms are oversimplified. Brackish is defined simply as "salty" which is not too informative. A barb is said to be a "downward pointing" projection when they can also be upward pointing (i.e. antrorse) such as in sedge perianth bristles. Unfortunately, other similar examples abound to the point where I would feel uncomfortable assigning this book to students for fear that their concept of botanical terminology might be adversely influenced. This is certainly a major weakness of the book.

Unusual applications of terms such as 'head' (which is not defined in the glossary) occur in some keys. The first couplet in the key to rushes (p. 432) contrasts "head from side of stem" vs. "head at end of stem" when only a few of the rushes have flowers aggregated into what might be described as heads. Apparently, the term 'head' is used as synonymous with 'inflorescence' in the Juncaceae, Cyperaceae and Poaceae. Then again, the inflorescence of Asteraceae is defined as a 'composite' (p. 549) rather than 'capitulum' or 'head' as in more traditional terminology. Ray flowers (florets) in the Asteraceae are said to be "joined at base" when actually it is the petals, and not the florets, that are fused. The species of subfamily Lactucoideae are described as having "heads with ray flowers only" whereas, botanists normally refer to these as ligulate florets (bisexual with 5-parted corollas) which differ from true ray florets (pistillate or neuter and with 3-parted corollas).

Keys are generally workable, but some have problems. The key to *Najas* (p. 455) incorrectly refers to leaf sheath features as leaf base features; none of the *Najas* species have lobed leaf bases that clasp the stem as suggested. Couplets of some keys are not parallel or contrasting (e.g. *Pilea*, p. 321). Some keys do not work well, e.g. the key to

genera of Alismataceae (p. 334) which primarily separates "leaves never arrowhead-shaped" (*Alisma*) from "leaves often arrowhead shaped" (*Sagittaria*). Consequently, vegetative material of *Sagittaria graminea* and *S. rigida* (which never have sagittate leaves) would key to *Alisma*. Here, the diagnostic floral features should be used as the primary lead to the couplet. Although many aquatics are found in vegetative condition, the keys do not particularly favor the use of vegetative characters in the primary leads. The first couplet of the species key to *Utricularia* requires flower color, even though a number of species can be distinguished readily by vegetative features. Similarly, the key to *Lycopus* begins with floral features rather than by unlobed vs. deeply lobed leaves that would quickly separate the common *L. americanus* from other species in the region. More effort could have been made to incorporate vegetative features for species identifications.

Most of the taxonomy is relatively up-to-date. *Nuphar* does not follow the outdated treatment of Beal and taxa are recognized in agreement with recent interpretations. However, for some groups, there has been no modification in species coverage from those included in E.G. Voss' "Michigan Flora", of which some portions (e.g. monocots) are already in need of revision. A good example is the Lemnaceae, where only two *Lemna* species (*L. minor*, *L. trisulca*) are included for the region. According to the 1986 monograph of the family by E. Landolt, six other *Lemna* species occur in this range, including *L. aequinoctialis* (Illinois, Iowa, Wisconsin), *L. obscura* (Illinois, Indiana, Iowa, Minnesota, Ohio, Wisconsin), *L. turionifera* (Illinois, Indiana, Iowa, Michigan, Minnesota, Ontario, Wisconsin), *L. perpusilla* (Illinois, Indiana, Minnesota, Ohio, Wisconsin), *L. valdiviana* (Illinois, Indiana, Michigan, Ohio) and *L. minuscula* (Illinois, Indiana). Additionally, *L. gibba* is known from one Illinois county. These other *Lemna* species (many of which are rare taxa) would simply key out as *Lemna minor*. *Wolffiella gladiata* is excluded but does occur in Illinois, Indiana and Ohio. *Wolffia brasiliensis* is included, but under the incorrect synonym *W. papulifera*. Traditional generic names are used in Cyperaceae despite a more recent tendency to split genera such as *Scirpus* into subordinate genera (*Bolboschoenus*, *Schoenoplectus*, etc.).

Some nomenclature is outdated. The name *Bidens beckii* is used despite the statement (p. 90) that it is "often (and perhaps better) placed in a separate genus as *Megalodonta*." Recent evidence supports the recognition of *Megalodonta* as a separate genus. Other recent studies place lake cress in the genus *Neobeckia* rather than *Armoracia*; yet the name *Neobeckia* is not even listed in synonymy. Water cress (*Nasturtium*) is included in *Rorippa* despite several studies that indicate its distinction from that genus. Synonyms provided for some nomenclatural changes (e.g. *Juncus articus*=*J. balticus*; *J. alpinoarticulatus*=*J. alpinus*) but some synonyms (e.g. *Myriophyllum exalbescens*) are not included in the index.

I found most of the illustrations to be acceptable, but some were odd, like that of *Utricularia vulgaris* (p. 210) showing what appears to be a distinct root system on this rootless plant. Overall, the printing quality was good, with only a few instances of broken type (e.g. p. 395) and unequal contrast of figures (e.g. p. 410 vs. p. 411).

As a reviewer, my negative comments are meant to express what one audience (the professional taxonomic botanist) expects in a floristic work. However, preparing a book of this scope is certainly a formidable task and it would be unfair not to comment on the many positive features of this flora. First, the selection of species does provide for a

comprehensive treatment of wetland plants. Most species that do occur in Great Lakes wetlands should be found in this book. The habitat and distributional information should also be extremely valuable to field biologists and taxonomists who study aquatic plants. This manual provides a much needed treatment that pulls together the taxonomic coverage of local and regional floras into one, portable, profusely illustrated manual that provides field botanists with a useful tool for wetland plant identification. Despite the shortcomings that often accompany first editions, this guide should find a widespread following among those who work in wetlands.

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