

BOOK REVIEW

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Delmarva Lichens: An Illustrated Manual by James C. Lendemer and Nastassja Noell. 2018. 386 pp. ISSN 2380128X; ISBN 978-0-9996525-2-7; e-ISSN 978-0-99965253-4 (hardcover), \$30, plus shipping. *Memoirs of the Torrey Botanical Society*, Volume 28. The Torrey Botanical Society, New York Botanical Garden, Bronx, New York, U.S.A.

Delmarva Lichens: An Illustrated Manual treats a total of 299 species of lichenized and allied fungi, including lichenicolous fungi, from the Delmarva Peninsula, covering an area of about 320 km north to south and 110 km at its widest point west to east, occupied by Delaware and parts of the eastern shores of Maryland and Virginia. The manual covers macro- and microlichens and not only presents complete keys for this particular peninsula but can also be used for identifications along the eastern U.S. coast from Virginia to Massachusetts.

The organization and layout of the book makes it easy to navigate for both the professional and experienced amateur lichenologist. It comes with a new twist, however: in addition to the alphabetical checklist of species, the authors use a phylogenetically arranged checklist that is mirrored in the species treatments. This may make it unusual to use at first, but it should not deter any lichenologist, new or experienced, from consulting this valuable new contribution to lichenology. The book begins with several informative introductory sections covering important aspects of the area's natural history, human settlement on Delmarva, Delmarva's lichen floristic elements, study methods and materials, and Delmarva's lichen conservation, as well as offering a synopsis of other useful lichen publications. To give a better understanding of the geography and physiographic regions, a map is provided inside the front cover. The chapter "Checklists and Excluded Species" is presented in two forms: the first itemizes an alphabetical list of lichens, allied fungi, and all lichenicolous fungi; the second follows mostly the above-mentioned, recently published phylogenetic arrangement (Lücking et al., 2016, 2017). This latter list includes numbers of specimens of lichens and "lichen allies" per state, the total number for Delmarva, and a conservation rank for each species. "Lichen allies" exclude those lichenicolous fungi that do not belong to lichen-forming and allied fungi, and these lichenicolous fungi are also not treated in the identification keys. The "Summary of Study Methods and Materials" outlines the extensive fieldwork that the authors undertook, which included the photography of selected species in the field. On the basis of these observations and the study of

herbarium specimens, 17 previously reported species were excluded from the Delmarva Peninsula checklists. In the chapter "Lichen Conservation on Delmarva," the authors describe the effort they made to assess the conservation ranks for lichen species. This very important attempt, tying field work, the study of herbarium material, and consultation of existing literature together, is crucial for lichen conservation since they are often excluded from conservation and management policies, resulting in only two federally protected lichen species to date within the entire United States. The conservation ranks distinguished by the authors range from "regionally extinct" to "least concern" and "data deficient."

The chapter "Identification Keys" includes a dichotomous "Key to Keys" and nine smaller keys that recognize easily identified morphological groups: Calicioid Fungi, Foliose Cyanolichens, Foliose Chlorolichens, *Cladonia*, Fruticose Macrolichens, Typically Asexually Reproducing Crustose Lichens, Crustose Pyrenolichens, Crustose Apotheciate Lichens with Hyaline Spores, and Crustose Apotheciate Lichens with Brown Spores. *Multiclavula mucida* and *Dibaeis baeomyces* can be keyed out directly in the "Key to Keys." All keys are well constructed and clearly arranged. The keys include macroscopic characters important for identification, microscopic characters, and chemistry (spot tests and reactions under UV light). The "Phylogenetically Arranged Species Treatments" are formatted into taxonomy, description, distribution and ecology, conservation, and discussion sections and include distribution maps for each species, separating findings before and after 1950. While at the beginning of each genus treatment a short description of key characters of the respective genus is given, each species description lists detailed morphological-key characters, information about the photobiont, spot test results for standard chemical reagents, and chemistry obtained through TLC. The distribution and ecology section explains how frequently each species occurs on the Delmarva Peninsula, where it can be found (location and substrate), and where the species limits lie. The conservation section lists the above-mentioned ranks, and the discussion concludes with notes on specific characters the researcher should pay attention to, similar-looking lichens, and other topics. Color images of the species' general habitus are not in this section but are compiled at the end of the book. The book closes with "Literature Cited" where interested lichenologists can dig deeper into past publications, and the "Figure Captions for Color Photographs" as well as the photographs themselves.

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This work is an important contribution to U.S. East Coast lichen identification. It is comprehensive, including lichenized, lichenicolous, and allied fungi, with the important addition of conservation rank for each species. Its size and durable construction make it convenient to use in the field as well as at the microscope work table. Challenging aspects

of the book for new lichen enthusiasts include its lack of a general introduction to lichens or glossary, and the unusual species treatment arrangement in phylogenetic order. But those issues should not prevent anyone from consulting this extremely valuable identification key for the Delmarva Peninsula and beyond along the East Coast.

LITERATURE CITED

LÜCKING, R., B. P. HODKINSON, AND S. D. LEAVITT. 2016. The 2016 classification of lichenized fungi in the Ascomycota and Basidiomycota. *Bryologist* 119: 361–416.

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