



Book Review

K. DAMSHOLT. 2002. **Illustrated Flora of the Nordic liverworts and hornworts**. Hardback, format 19.5 × 27.0 cm. 837 pp., 296 pls, 316 distribution maps. Nordic Bryological Society, Lund, Sweden. ISBN 87-986781-2-4. Price: 152 €.

The splendid run of luck in European hepaticology still continues. After publication of the monumental hepaticoflora of the British Isles (Paton 1999) and the key to European and Macaronesian hepatics and hornworts (Schumacker and Váňa 2000), bryologists have received the third fundamental work devoted to these plants in the Nordic countries. This name refers to the states which are traditionally designated as Scandinavian comprising Norway, Sweden, Finland and Denmark, as well as Iceland, the Faroës, Jan Mayen Island, Bear Island and Spitsbergen. They cover a huge area which is highly differentiated phytogeographically and contains most of the main climatic and vegetational zones of Europe, from Atlantic-Mediterranean to High Arctic. This key position of the Nordic countries implies that the present Flora is a universal treatment, containing most of the species of liverworts and hornworts known to occur in Europe. Consequently, it may successfully be used for the determination of these plants both in the Iberian Peninsula and France, as well as in Central Europe and Greenland.

In principle, the present Flora replaces the first volume of the Illustrated Flora of the Fennoscandian bryophytes which was published in 1956 by S. Arnell and is now out of date and print. It is the result of over 20 years' work by Kell Damsholt, who for many years was a scientific worker at the University of Copenhagen and for a long time cooperated on the Greenland hepatics with, among others, Rudolf M. Schuster, the world's leading hepaticologist. This cooperation left an ineffaceable impression on him and this is clearly visible in the typical Schusterian style of the present book, apparent not only in the acceptance of his classification and taxonomic concepts, but also in the form of taxon descriptions, the way of presentation of various data as well as in the style of illustrations. In the introduction the author presents his ideas regarding the taxonomic concepts of the higher taxa, species and infraspecific taxa. This explanation facilitates the understanding of his taxonomic philosophy and it is clearly based on Schuster's (1988) essay in which he explained his views on that subject. Additionally, in the short introduction, the author provides some basic information regarding the distribution patterns of the liverworts and hornworts of the study area, with particular reference to relict taxa. Moreover, habitats occupied by these plants in the Nordic countries are reviewed and the lists of characteristic species to each of them are especially interesting and useful.

Almost the whole book, *i.e.* over 800 printed pages in A4 format, is taken up by the taxonomic treatment of all taxa detected in the Nordic countries. As in other similar Floras, it begins with the general characterization of the studied groups of organisms. The author

considers hornworts as the separate division Anthocerophyta and contrasts it with the division Bryophyta which is subsequently divided into two classes, namely mosses (Bryopsida) and liverworts (Marchantiopsida). Following generally accepted concepts, the latter class is subdivided into two subclasses, Marchantiidae with the single order Marchantiales and Jungermanniidae consisting of three orders, Calobryales, Jungermanniales and Metzgeriales. This classification reflects the essential differences in morphology, anatomy and development among the main lineages in this plant group and their most important diagnostic characters are summarized on p. 18 in the key to subclasses and orders of the Marchantiopsida.

The hepaticoflora of the northern European countries is very rich and in total it consists of 296 species, comprising 294 hepatics belonging to 77 genera and 34 families and two species of hornwort representing two genera and one family. However, it must be remembered that *Anthoceros punctatus* comprises two subspecies, subsp. *punctatus* and subsp. *agrestis*, which are most often considered to be separate species. Thus, the total number of species in the Nordic countries is exactly the same as that discovered in the British Isles, some small differences in the taxonomic consideration of the taxa concerned cancelling one another out. In addition, the author has recognized many subspecies as well as varieties and forms in some protean species which are usually neglected in modern Floras, unjustifiable approach because the infraspecific taxa perfectly reflect the variability of the species in question.

The keys to determinations are very diverse in the present Flora and this is strictly associated with the size of the group concerned. For obvious reasons the most complex is the key to genera in the Jungermanniales, which is the largest order of the Hepaticae, comprising about 80% of all species discovered in the study area. The author has constructed a synoptic key to suborders and separate artificial keys to genera and characteristic species which are based on very distinct and easily observable morphological characters. On the other hand, for the Marchantiales a synoptic key to suborders and families is presented and is accompanied by two keys to genera, natural and artificial, the latter being based mostly on the characters of the anatomical structure of the thalli. Likewise, the keys to species within genera are very differentiated. In the case of some large genera such as *Lophozia* and *Jungermannia*, as well as some smaller ones, for instance *Nardia*, two- or three-stage separate keys are given. This means that first the keys to subgenera and/or sections are offered, followed by the keys to species within them. It does not seem to be a particularly helpful arrangement because if one wishes to determine, for example, any of the four species of subgenus *Barbilophozia* within the genus *Lophozia* (often considered as a genus in its own right), it is necessary first to determine a subgenus and subsequently a section and only then can a species within this section eventually be determined. This procedure seems arduous, especially for budding hepaticologists. Nevertheless, to the author this is evidently inconsequential and in the case of some large genera, for instance *Anastrophyllum*, *Calypogeia*, *Marsupella* and *Scapania* which, additionally, have well-developed infrageneric classification, only a single key comprising subgenera, sections and species is presented. Keys to infraspecific taxa, including subspecies, varieties and forms, are always presented separately.

All taxa, from orders to forms, are fully described and for obvious reasons species are characterized in greatest detail. In addition, for each species, an extensive taxonomic discussion is provided in which diagnostic characters are listed, comparison with closely re-

lated or other species for which it is likely to be confused presented and variability described. Descriptions of species are accompanied by superb line drawings which are designed with exceptional artistic skill but at the same time perfectly render essential features of the details illustrated. The taxonomic discussion is followed by detailed descriptions of ecological requirements and global and local geographical distributions. The latter is presented on distribution maps on which the occurrence of the species is marked in the provinces of each major Nordic country. For every taxon name bibliographic data are given along with citation of the nomenclatural type, although the author does not indicate herbaria in which the relevant type specimens are preserved.

There are not many taxonomic novelties in this Flora and in practice they refer to the change of status of various taxa at the level of varieties and forms. In total, about 20 new combinations are introduced, the most remarkable of which are the reduction of *Anthoceros agrestis* to a subspecies within *A. punctatus* and recognition of the separate subg. *Heteromorphae* to accommodate *Lophozia murmanica* and *L. debiliformis*. It is unfortunate that all nomenclatural novelties have not been listed separately at the end of the book, a frequent practice in various Floras or botanical journals devoted to taxonomy.

The nomenclature of taxa is generally very correct, although one may doubt whether sect. *Verrucosae* in the genus *Mylia* is the correct sectional name. This section comprises *Mylia taylorii* which is a lectotype species of the generic name *Mylia* and automatically must be considered as the type section of this genus which should correctly be named sect. *Mylia*. The correct name for the variety of *Cephaloziella varians*, called by the author var. *arctica*, is rather *Cephaloziella varians* (Gottsche) Steph. var. *kaalaasii* (Douin) Ochyra, *comb. nov.* (Basionym: *Cephaloziella alpina* Douin var. *kaalaasii* Douin, Mém. Soc. Bot. France 29: 71. 1920) because the epithet *kaalaasii* is the oldest available name for this taxon in the rank of variety, whereas the author reduced the species *C. arctica* to variety and this specific epithet has never been given varietal status.

Geographical distribution is described in detail for each species, although the author has committed some errors. *Cephaloziella divaricata* certainly does not occur in Antarctica as suggested by the author and the genus *Cephaloziella* is represented there by two species, namely *C. varians* and *C. hispidissima*. According to the author *Anthelia juratzkana* occurs in Antarctica only on Livingston Island but in fact this species is much more common on King George Island in the South Shetlands and on Signy and Coronation Islands in the South Orkney Islands and, additionally, the author overlooked the occurrence of this species on Mt. Meru in East Africa. Likewise, he did the same with *Scapania obcordata* in Antarctica. The author could easily have avoided these mistakes had he consulted the recently published liverwort Flora of Antarctica (Bednarek-Ochyra *et al.* 2000).

At the end of the book a glossary, key to symbols and abbreviations, references and an index to the Latin names of taxa are provided. In the last some names are lacking, for example *Lophozia groenlandica* which appears on pp. 97 and 110 in the text, while *Jungermannia cordifolia* is cited on p. 209 in the index but it actually appears on p. 210.

The book is excellently published, the clear text layout greatly facilitating understanding its perception. Considering the great importance of the present Flora, one can state without exaggeration that it will become a standard reference book for European hepatology which should find a place on the library shelf of every bryologist. It should serve for the determination of hepatics and hornworts in both boreal and temperate as well as polar zones and it must be stressed that, apart from Shlyakov's (1976–1982) *Liverworts of the*

northern U.S.S.R., it is the first modern Flora of liverworts and hornworts to cover the European Arctic. Unfortunately, for some potential users of this Flora, its exorbitant price may place it beyond reach. Nonetheless, the book should be present in the libraries of all self-respecting botanical institutions.

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