
Book Review

Nordic Lichen Flora Vol. 6. Verrucariaceae 1. By Roland Moberg, Sanja Tibell and Leif Tibell (eds) 2017. Museum of Evolution, Uppsala University and Naturcentrum AB. Pp. 85, 21 colour plates, 250 × 195 mm. ISBN 978-91-85221-33-2. Hardback with illustrated, laminated cover and CD-ROM with photos. £49.99, \$67, €57 approx. (quoted from NHBS), SEK275 (quoted from Naturcentrum AB website). doi:10.1017/S002428291800004X

The volumes of the Nordic Lichen Flora have been appearing at intervals of two to five years since 1999. All have been very welcome, whether they cover relatively well-known macrolichens (*Parmeliaceae*) or include some difficult crustose taxa (small cyanolichens). However, it is exciting that the sixth volume has begun the task of dealing with the family *Verrucariaceae*, notorious for difficulties of identification and the large number of poorly known species that have been described.

This volume uses the insights from recent molecular and morphological studies. It covers most of the foliose and squamulose *Verrucariaceae* (but not *Endocarpon*), and a selection of crustose taxa, mainly those with muriform spores and no hymenial algae, thus *Polyblastia s.s.* and some segregates of *Polyblastia s.l.* accepted in recent years (*Atla*, *Henrica*, *Sporodictyon*), but not the various ‘*Polyblastia*’ species which are in the *Thelidium*-group of the family. The genera treated here are simply those which are now sufficiently well-known to be presented to the public. The bulk of the family is still to come in further volumes.

Although insights from molecular studies are leading to a more natural classification of the family, one result is that some genera no longer have much value as an identification aid. Newly circumscribed genera may no longer be separated by simple morphological characters, or are separated by none at all. This is a problem that we all have to accept, but it is a particular problem for the writers of modern floras. Near the start of the volume, an annotated phylogenetic tree shows the position of the treated genera within the family as a whole, a very useful visual device which will surely become standard in future floras.

Identification keys follow the traditional pattern of keys to genera (only those treated in this book), followed by keys to species in each individual genus. In the generic key the foliose and squamulose taxa are well-behaved and key out easily. However, in the key to crustose genera, *Henrica* is keyed out 3 times, *Sporodictyon* 4 times, and *Atla* 6 times. This is not really a key to genera! If a primary aim of a flora is to give the user the means to identify specimens, I suggest it would be more effective to key directly to species, so that very similar species placed in different genera can be compared. For instance, the text acknowledges that *Atla tibelliorum* and *Sporodictyon arcticum* are similar in appearance, and it is

certain that the flora user will struggle to place them correctly using the generic key. Cautious users will probably find themselves keying their specimen using the species-keys under each of these two genera, with the result that there will in effect be a final, ‘missing’ couplet which they have to create for themselves, namely the couplet which would separate *A. tibelliorum* from *S. arcticum*. In this case, the use of the genus seems to be a barrier to practical identification. With the continuing splitting or rearrangement of morphologically-based genera into natural genera, authors of floras now have to decide whether the genus should still be given its traditional prominence.

The treatment of *Polyblastia s.s.* is based on the study of Savić & Tibell (2012), which introduced major changes into the taxonomy of this group. Of the 43 names listed under *Polyblastia* in the checklist of Santesson *et al.* (2004), 27 are excluded from this volume of Nordic Lichen Flora either because they do not belong in *Polyblastia s.s.* or because their status is unclear, and a further 5 are treated but in other genera. However, there are 15 names not found in the 2004 checklist, mostly representing species only described in 2012. *Polyblastia cupularis* is a name that has been widely used for species with medium-sized spores, but is now considered not to occur in the Nordic region.

The taxonomy of Nordic *Polyblastia* is now on a firm footing, but is it easy to use? I had only one sequenced Nordic specimen to hand (*Polyblastia dimidiata*), which is so similar to *P. neglecta* that I would have felt uncertain about the identification had the sequence not been available. Three unsequenced Nordic specimens would formerly have been placed in *P. cupularis*, but I failed to convince myself of their new identity after trying for a short while. It is not the fault of the authors that *Verrucariaceae* species can be difficult to identify by morphology. Learning to become familiar with critical species takes a little experience and adequate material. It will be tempting for users outside the Nordic region to use these new keys on their local material but this has to be done with caution. One British specimen would key out as *Polyblastia plicata* but an ITS sequence suggests that it is related to, but not conspecific with, the Nordic material. Another specimen is similar to some of the species with medium-sized ascospores but an ITS sequence does not match any sequenced Nordic specimen.

The degree of septation of the muriform ascospores of *Polyblastia* is an important character to separate species in this treatment, so the description of this feature needs to be clear. It is stated that 'septation is indicated as follows: 5-7/4-5 indicates that 5-7 trans-septa are discernible along the long side of the ascospore and that the central part of the ascospore has 4-5 longi-septa'. I wonder whether this means that all cell junctions that meet the edge of the spore are counted as transverse-septa, or only those which separate well-defined tiers of cells? Tiers are not always clear in cases where septa are not strictly transverse and longitudinal. The number of longitudinal septa in a tier may also be difficult to assess in 'optical section'. Perhaps the total number of cells meeting the apparent edge of the spore would be an easier way of expressing the degree of septation. A diagram of two or three spores would have been a useful addition to the description.

Constraints on space are fewer here than in single-volume floras. When volume 7 is published, the total thickness of the Nordic Lichen Flora (excluding covers) will already have exceeded the thickness of the current edition of the British and Irish flora (Smith *et al.* 2009). The Nordic flora has the luxury of having space for a distribution map, a photograph, and a citation of the basionym and the type specimen. I appreciate being able to see the latter information; to cite the basionym and type in a flora without sufficient research on typification could lead to errors being perpetuated, but this volume is based on recent revisions, making the data reliable.

There is some repetition in the descriptions, though when space is not critical there is an argument for clearly stating a character state for every species. Thus the hymenium in each species of *Atla*, *Henrica* and

Polyblastia is said to be 'I + red, KI + blue', which is true of all the *Verrucariaceae* that I have seen. This feature is not mentioned for the squamulose genera, and under *Dermatocarpon* the gel is said to be 'amyloid and stains blue with iodine'. However, this is unlikely to lead to any identification problems.

Colour photographs are provided for each species, printed at the end of the book. Most species are illustrated with a more distant view and with a good close-up view, giving a good impression of the appearance of the species. Some earlier volumes of the Flora had photographs taken at too low a magnification, but that is not a problem here. The photographs are also supplied on a CD attached to the inside back cover.

Anyone with an interest in *Verrucariaceae* will wish to have this volume. Surely anyone identifying lichens in north temperate regions will wish to buy every volume of this Flora.

Alan Orange

REFERENCES

- Savić, S. & Tibell, L. (2012) *Polyblastia* in Northern Europe and the adjacent Arctic. *Symbolae Botanicae Upsalienses* **36** (1): 1–69.
- Santesson, R., Moberg, R., Nordin, A., Tønsberg, T. & Vitikainen, O. (2004) *Lichen-forming and lichenicolous fungi of Fennoscandia*. Uppsala: Museum of Evolution, Uppsala University.
- Smith, C.W., Aptroot, A., Coppins, B.J., Fletcher, A., Gilbert, O.L., James, P.W. & Wolseley, P.A. (eds) (2009) *The Lichens of Great Britain and Ireland*. London: British Lichen Society.