

## BOOK REVIEW

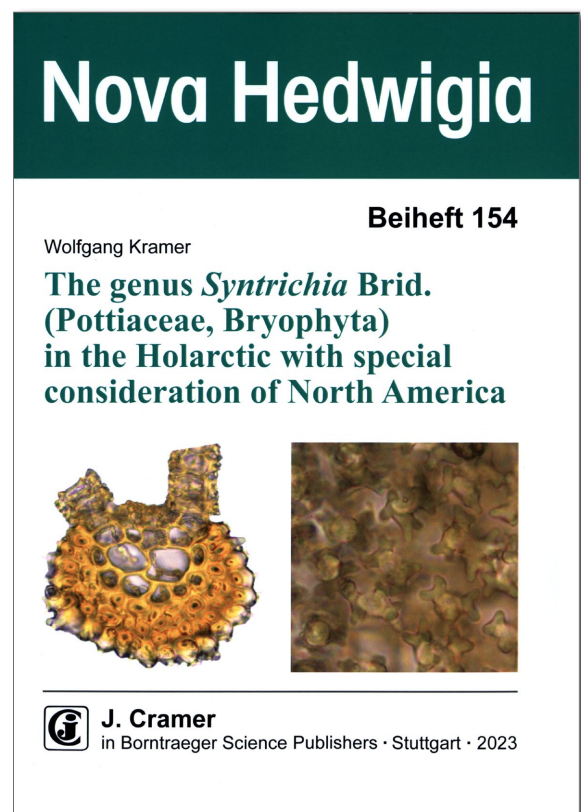
Kramer, W. 2023. The genus *Syntrichia* Brid. (*Pottiaceae*, *Bryophyta*) in the Holarctic with special consideration of North America. Nova Hedwigia, Beiheft 154, 234 pp., with 93 figures, including 63 black and white line drawings and 30 photographs in colour. Paperback, size 24 × 17 cm. Effectively published on 28 March 2023. J. Cramer in Borntraeger Science Publisher, Stuttgart, Germany. ISBN 978-3-443-51083-1, ISSN 1438-9134. Price: 129 € + shipping. Available from E. Schweizerbart'sche Verlagsbuchhandlung (Nägele u. Obermiller) Science Publishers, Johannesstr. 3A, 70176 Stuttgart, Germany, web: [www.schweizerbart.de](http://www.schweizerbart.de), email: [mail@schweizerbart.de](mailto:mail@schweizerbart.de), fax: +49(0)711-351456-99, phone: +49(0)711-351456-0

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Although *Syntrichia* Brid. belongs to one of the oldest moss genera, which was distinguished as early as 1801, it did not gain the general acceptance of bryologists for nearly two centuries. Almost until the last two decades of the twentieth century, the species belonging to this genus were placed in the genera *Barbula* Hedw. or *Tortula* Hedw., within which they were usually classified in separate sections or subgenera. The few bryologists who accepted *Syntrichia* as a genus in its own right in the nineteenth century were, amongst others, J. W. P. Hübener in his *Muscologia germanica* of 1833, W. Mitten in *Musci Indiae Orientalis* from 1859 and J. Juratzka in *Die Laubmoosflora von Oesterreich-Ungarn* of 1882. It was similar in the last century, when *Syntrichia* was occasionally recognised as a separate genus, for instance by J. J. Amann in *Flore des mousses de la Suisse* of 1918, W. Mönkemeyer in *Die Laubmoose Europas* from 1927 and J. Podpěra in *Conspectus muscorum europaeorum* from 1954.

The breakthrough in the resurrection of *Syntrichia* from obsolescence came in the late 1980s and early 1990s with Richard H. Zander (1989, 1993), who redefined this genus and separated it from the broadly conceived genus *Tortula*. He distinguished it on the basis of a characteristic combination of features, including brick red KOH reaction of the upper laminal cells, the lack of upper marginal border of narrowly elongate cells and the crescent-shaped to semicircular and prominently convex dorsal stereid band of the costa lacking the differentiated dorsal epidermis.

So circumscribed, *Syntrichia* is a cosmopolitan genus, consisting of about 85–90 species. They are known from



all continents but are predominantly distributed in temperate and cool to cold regions of both hemispheres, whereas in the tropics they occur mostly on high mountains. The genus has gained much attention in various regional taxonomic treatments and Floras, but no global revision is yet available. Regional studies are certainly very valuable, but they present only fragmentary information about morphological and genetic variability, ecology, physiological

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reactions and history of the taxa concerned, which are conditioned by local climatic, environmental, geological and historical factors. On the other hand, a global look at some taxonomic features that appear stable in local conditions and may be of high diagnostic value often reveals that they actually represent only a small fraction of their broader variability, thus reducing their value for the circumscription of the species concerned. Hence global taxonomic revisions are of special importance and value, although completing such treatments for large genera is a very time-consuming task.

The present study is not a worldwide taxonomic revision of *Syntrichia*, but it is a survey of this genus over a vast area of the Holarctic which is covering much of the Northern Hemisphere. Its author has been dealing with this genus for almost half a century, initially treating it as *Tortula* sect. *Rurales* De Not. At that time, he published a small paper on species with a bistratose lamina (Kramer 1978) and extensive studies on taxa of this section from the eastern Holarctic, primarily from the Near East and Central Asia (Kramer 1980) and some related taxa from the Southern Hemisphere (Kramer 1988), in which he presented the results of his doctoral thesis. After 35 years, the author of these studies broke his silence by handing over to bryologists the present study on Holarctic taxa with particular emphasis on North America, especially its Pacific part, which he considers to be the centre of the evolution of this genus. As support for his hypothesis, he considers the presence of a number of endemic species and intraspecific taxa, some of which have not been described before. Thus, to some extent this is a complementary work to the author's former study from 1980, but also containing some information about taxa from South America.

This treatment is a classic taxonomic revision based on extensive research of herbarium materials, although collections from several important North American herbaria, for example ALTA, CAS and UC, appear not to have been studied. The layout and presentation of the data is exactly the same as in the earlier works of this author. In total, he accepts 59 taxa in the study area, including 34 species and 25 subspecies and varieties. Of these, 16 taxa have been described as new to science, including five species (*Syntrichia cascadiensis*, *S. coloradensis*, *S. hermannii*, *S. novomexicana*, and *S. ovata*), eight subspecies, and three varieties. In addition, the work contains several other taxonomic and nomenclatural novelties, including the reinstatement of three species whose names were previously recognised as synonyms (*Syntrichia laeviuscula*, *S. leptotricha* and *S. subintermedia*) and changes in the taxonomic status of several taxa, as well as the reduction of the names of 24 taxa to synonyms. The arrangement of species is alphabetical. For each taxon, the nomenclatural type is quoted, synonyms are given, if they exist, with type citation, morphological description, information on general geographical distribution and the most important iconography. In addition, each taxon is illustrated with line drawings, usually showing the shape of the leaves, transverse sections of the costa and lamina cells, and the shapes of the papillae. These structures for many taxa are

also illustrated with colour micrographs from the light microscope, although many are not of good quality and SEM images would certainly be more valuable and useful here. The treatment of each taxon completes the list of specimens examined, although it is nowhere stated whether these are all or only selected specimens that the author studied followed by the taxonomic discussion.

The study ends with a short chapter in which the author discusses the infrageneric classification of *Syntrichia* and the problem of the relationships of some species of the genus, as well as their geographical distribution. The summary of the whole is a dichotomous key for the determination of all taxa. It is based mainly on the morphological and anatomical characters of gametophytes, and many couplets are very extensive, which is certainly helpful for users, as it allows them to check the diagnostic value of various traits in the case of critical taxa. As usual, the value and usefulness of the key will be verified by practice.

Kramer's study is a valuable contribution to the bryological literature concerning the difficult genus *Syntrichia* which still causes many problems for bryologists. Like any taxonomic revision or monograph, it is a very important tool for identifying species of the genus, which is an important element of the vegetation cover, especially in desert and arid areas. Such studies always contribute to the discovery of more species and better understanding of the biodiversity of poorly explored regions, and many areas of Pacific North America are certainly such. The best example of this is the discovery last year of *S. lithophila* (Dusén) Ochyra & R. H. Zander in Oregon (Brooks & Jauregui-Lazo 2022), a species previously known only from Antarctica and Patagonia. However, the identity of this species should be thoroughly investigated, also with the use of molecular methods, especially since *S. lithophila* is perfectly studied genetically (Sařuga et al. 2022). Detailed morphological and molecular studies may show that the Oregon specimens represent a separate species, as was the case with *Didymodon brachyphyllus* (Sull.) R. H. Zander, a Holarctic species reported from Antarctica (Ochyra & Zander 2002), which, however, turned out to be a species different from the Antarctic *D. gelidus* Cardot (Jiménez & Ochyra 2017; Ronikier et al. 2018). Therefore, Kramer's work does not require a special recommendation, as it is a summary of all classical taxonomic knowledge about the genus *Syntrichia* in the Northern Hemisphere. This is very important especially for researchers of the phylogeny of this genus via molecular methods, because they receive a ready classification of taxa in their hands, which they will be able to compare with the classification based on the results of DNA analyses.

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