

Riccia hunting and detangling in Austria and around Europe.

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Bryophytes of the genus *Riccia* are known as difficult to recognize. Many of them appear only momentary in wet years, others live on rocks or in dry grasslands. They are tiny and all look more or less the same in first glance.

So, it is not surprising that even many scientists do not have a clear picture of the species delimitation in this genus. There are currently 36 different species known in Europe, most of them in the Mediterranean and Western Europe. However, the perception of the delimitation of the species varies in different regions, so that the exact distribution of the species is also insufficiently known.

It is not unlikely, that the overlap of the characteristics of the species may also have natural causes. It seems that this is a relatively young species formation. There may also be hybridization and backcrossing events. In this respect, the genus is also an interesting model for population development and postglacial evolution parallel to the spread of humans. Many *Riccia* species are found in sites that have been altered considerably by humans, such as arable fields.

Our project, consisting of an international network of moss friends, would like to clarify these questions in the next few years. Finally, we should come to a better species delimitation and description, and to a better understanding of bryophyte evolution.

All started in autumn 2018. All of Europe suffered from the drought, only in south-eastern Austria it rained more than usual. Suddenly many places in the country were covered with short-lived liverworts and hornworts, among them *Riccia* and species of the genus *Anthoceros*, *Phaeoceros*, *Notothylas* and *Fossombronia*. At first, we just wanted to identify the *Riccia* species. Due to the great diversity in that year, we encountered the problems described above. The need grew slowly to get a deeper insight into the problem.



Fig. 1. *Riccia* hunting on arable fields in Styria, Austria.

Since then we have been travelling a lot in autumn and winter to "hunt" *Riccia* plants, predominantly from arable fields in Styria. Many colleagues from Portugal to Kola peninsula, and from Greece to Scandinavia, send us material. After many days in the field, we have developed a feeling for the best locations for *Riccia*. Thus, we could continue our sampling. Meanwhile we have an extensive living collection at the *Botanical Garden of Graz*, which currently includes 18 species, as well as a database with measurement data and characteristics of individual samples.



Fig. 2. Part of the living *Riccia* collection in the Botanical Garden Graz.

Besides thallus morphology we investigate the spores in detail. From cross-sections and spores light microscopic photos are taken, for the spores also REM pictures are made. We also get fresh material from many collectors across Europe during the year. Since the beginnings in 2018, we now have data from 250 samples of 13 different countries. From each sample vouchers were made and restored in the bryophyte collection of the *Universalmuseum Joanneum Graz* (GJO). Starting this winter, we will also try to add molecular data. Perhaps this inconspicuous genus will open up new insights into bryology.

In Estonia, the genus *Riccia* is represented by eight species. For example, we provide photos of that species growing on open and disturbed habitats like arable fields or forest tracks.



Fig. 3. *Riccia glauca* (left): The name is more common than the species, and *Riccia bifurca* (right): The species is more common than the name.



Fig. 4. *Riccia sorocarpa* (left): one of the distinct species which are more or less clear. *Riccia cavernosa* (right): a representative of the species with moister habitat near water bodies.