
A Guide to Bryological Hotspots in Europe. 4. The surroundings of Meran (Prov. Bozen, Italy)

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Summary

Since 150 years, the surroundings of Meran in the Etsch valley (Prov. Alto Adige (Südtirol), Italy) are known as an extraordinary place for rare bryophyte species. It is an attraction for bryologists, who collect species, which are found in Europe only in a few places in the southern Alps. The region is especially well known by the fieldwork of Julius Milde, who stayed there 2 years and described some species as new. In spite of the bryological importance of this region, descriptions of this area as well comments on the phytogeographical background seem to lack.

Phytogeographical importance

The so called insubrian region is usually known for their northernmost occurrences of Mediterranean species (Herzog 1926:257). The southern exposed slopes in the sheltered valleys offer good conditions for these species, which might be relicts of warmer postglacial climatic phases. This counts for species such as *Oxymitra palaeacea*, *Targionia hypophylla*, *Riccia ciliata*, *R. ciliifera*, *R. croszalsii*, *R. goettiana*, *R. intumescens*, *R. lamellosa*, *R. nigrella*, *R. papillosa*, , *Oxymitra palaeacea*, *Fabronia ciliaris*, *F. pusilla*, *Funaria muehlenbergii*, *F. pulchella*, *Fissidens limbatus*, *Leptodon smithii* and others.

Amongst Herzog's list are species, which are not at all Mediterranean but have their only records in Europe in the southern Alps such as *Braunia alopecura*, *Haplohymenium triste* or *Haplocladium angustifolium*.

Other species are found in the southern Alps as well as in the Pyrenees and other parts of the northern Mediterranean region such as *Campylopus oerstedianus*, *Frullania inflata*, *F. riparia* (*cesatiana*) and *F. parvistipula*. They occur also in East Asia and in part also in North America.

The extraordinary distribution of these species has not received much attention. Herzog (1926) list species such as *Braunia alopecura* simply as Mediterranean elements. *Frullania riparia* is called a Mediterranean element on one page and Eastern North American on the other page. The extraordinary disjunction of these species is not focussed. The combination of extremely rare species of such a distribution pattern together with Mediterranean elements plus the zonal bryoflora with its wide altitudinal zonation through all vegetation belts to the alpine makes the upper Etsch valley to a hot spot of biodiversity.

The first intensive study of the bryoflora of the surroundings of Meran was done by Julius Milde, high school teacher in Breslau, who suffered from tuberculosis and hoped to recover from his illness in the mild climate of the upper Etsch valley. He stayed in the village of Gratsch close to Meran from 1861 to 1864. In spring 1871 he travelled again to Meran, however, he could hardly leave his bed and died on July 3rd. He was buried on the protestant cemetery in Meran, where his grave existed until 1901. Details about his life can be obtained from Frahm & Eggers (2001). His scientific results during his stay were published by him (Milde 1862a, 1862b, 1864a, 1864b) and in more scattered publications. In his "Wissenschaftliche Ergebnisse meines Aufenthaltes in Meran, Milde (1862a, fig. 1) gave a detailed account of the vegetation, phytogeography, climate and also plants and animals (insects) with a focus on cryptogams including algae in the surroundings of Meran and a detailed account of the bryophytes. Another publication (Milde 1864b) gave a description of the cryptogamic vegetation, mainly mosses, but also ferns and lichens. He found several species as new to science (e.g. *Tortula pagorum*, *Campylopus schimperi*, *Campylopus subulatus*).

Although there is a checklist of the bryophytes of Alto Adige (Düll 2006), this publication consists merely of an enumeration of species, without indication of localities or references. Localities for the liverworts are found in the first edition of Karl Müller's *Lebermoose Europas* (Müller 1906-1911). A special hot spot is the steep south exposed slope between Gratsch and Algund, a citation which frequently shows up in the floristic literature due to the collecting activities of Milde, and therefore attracted later many bryologists, since it was an easy walk for bryologists staying in Meran. The vegetation of Mediterranean thalloid liverworts is found in the steppe vegetation on the S-exposed slopes in Meran on the "Küchelberg", a park with footwalks up to Schloss Tirol.

Type localities

Due to the activities of Julius Milde, several bryophyte species were described from Meran and its surroundings. This concerns:

Tortula pagorum

This species was collected for the first time on rocks of the "Küchelberg" in Meran, which is today a park. *Tortula pagorum* is still growing there. The habitat is somewhat extraordinary, since *T. pagorum* predominantly grows on tree trunks, although it is not unusual for related species of *Tortula* to grow on rock as well on tree trunks. The discovery of the species in the mild climate of the southern Alps seemed to indicate a thermophilous species and it in fact the species was first found in the northern Mediterranean. It was not before 1916 that *T. pagorum* was found for the first time north of the Alps in Germany. Since about 1988 the species is spreading northwards. Its northern limit is still in the south of Lower Saxony. The species is usually regarded as indigenous, especially with regard to its description in the 19. century, however, as explained else by the author, it seems to be an early neophyte due to the fact that it is found in Europe only as male plants and in North America as female plants. Both sexes are present only in Australia, where the origin of the species can be supposed.

Campylopus schimperi

This species is characteristic for alpine regions well above the forest line, but its type locality is close to Meran "Am Fuß der Zielalpe bei Partschins bei Meran 1600' am Wasser einer Wasserleitung. Milde (20.10.1863) *Bryoth. europ.* 658 (FB, FR, GOET, JE, U). Also the habitat is very strange. I was not able to locate the place on present topographic maps.

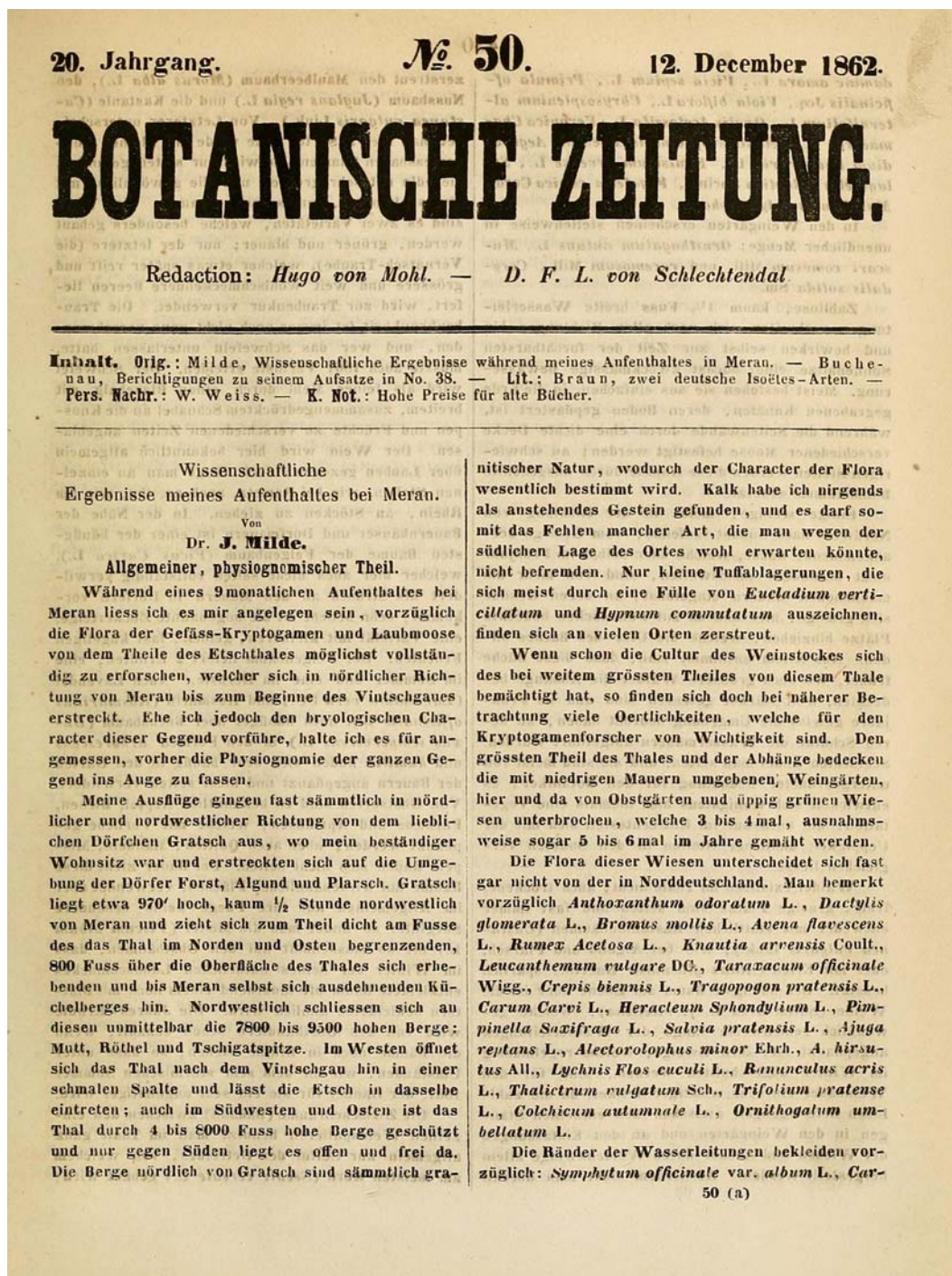


Fig. 1: "Wissenschaftliche Ergebnisse meines Aufenthaltes in Meran by Julius Milde (1862a), in which the author gave a full account of all mosses he collected there including the description of new species.

Campylopus subulatus Schimp. ex Milde

This species was collected for the first time by Milde in several places near Meran and recognized as a new species by Schimper.. Material was edited in Rabenhorst's *Bryotheca Europaea* 9: 451. 1861.

List of remarkable species*Frullania inflata*

In Europe only in Albania, Hungary, Austria, Czechia, and the southern Alps (only the surroundings of Meran and Lugano), else in North America, Mexico, Colombia and China. At the time of Karl Müller, the species was only known in Europe from the surrounding of Meran "An Silikatmauersteinen und Felsen, die stärksten Sonneneinstrahlungen ausgesetzt sind. Im Führjahr c.spor. In Europa nur in der Umgebung Merans. Hier an mehreren Stellen reichlich. Dorfmauern bei Algund, zwischen Gratscher Kirche und Algund, an Weinbergsmauern zwischen Gratsch und Dorf Tirol, an der Straße Meran – Schloss Tirol, Weinbergsmauern des Schloss Tirol" (Müller 1906-1911). It was collected there by Gottfried Schwab still in 1972 and 1976. All the localities cited above are situated close to Meran in a distance of 6 km along a S-facing slope.

Frullania parvistipula

Rarely in the southern Alps of Switzerland, Italy and Austria, Romania, Caucasus, Himalayas, East Asia. From Italy recorded from Schlern north of Bozen.

Frullania riparia (cesatiana), Plate 4e

Recorded from localities in the southern Alps of Switzerland, Austria, Italy and Croatia, east to Bulgaria, Pyrenees, Tenerife, North America, China and Japan. "Auf trockenem Urgestein oder Rinde an der Sonne ausgesetzten Stellen. Zwischen Gratsch und Algund an trockenen Felsen und Eiche. Ruine Maultasch bei Terlan." (Müller 1906-1911). In both places still frequent on rock and bark. It is usually smaller than *F. dilatata*, which is also blackish and which is the most common species. Growing on rock, it looks quite "miserable" and can be only be detached with difficulties. Under the microscope, the underlobes are much smaller than those of *F. dilatata*, often rudimentary, and the styli are narrower, uniseriate at tips.

Haplocladium angustifolium

A North American species, in Europe very locally in the southern Alps (Locarno, Merano, Istria). It was collected once by Milde in 1861 in a lawn near the church of Gratsch.

Haplohymenium triste (plate 4a)

A species known from Asia (Nepal, Tibet, China, Japan) and from Eastern North America. In Europe only in a few localities in the southern Alps in Switzerland, Lago Maggiore and Meran. There discovered by Milde (and published as *Anomodon fragilis*) and still occasionally on rocks between Schloss Tirol and Algund. The plants look inconspicuous, dull dark green (hence the name *triste*) in appearance like *Leskea polycarpa*.

Braunia alopecura

Distributed in few places in the southern Alps in Italy and Switzerland and in the Pyrenees. Furthermore in the Cape Verde Islands, Saudi Arabia and China. The species was frequent in the Vellauer Tal at the time by Milde and exists still in the surroundings of Meran on rocks in open habitats.



a. The Küchelberg above Meran (covered by a cloud), bottom right the village of Gratsch, where Milde lived .



b. View from Schloss Tirol westwards to the slope „zwischen Gratsch und Algund“



c. Schloss Tirol. Rocks and walls in the surroundings harbour species such as *Frullania riparia* and *Haplodymenium triste*.



d. The “Waalweg”, a footpath along an irrigation channel, where Milde found the rarities exactly 150 years ago.

Plate 1: Famous localities for bryophyte records in the surrounding of Meran.

Campylopus oerstedianus (plate 4d)

This species is known from Costa Rica (type), Jamaica, North Carolina, the Pyrenees, southern Alps and Chalkidike (N-Greece) as well in the Vosges Mtns., France. Around Meran it is growing between Küchelberg and Algund on exposed siliceous rocks, and looks like *Campylopus pilifer*, with shorter hairpoints, rectangular and not oval upper laminal cells and lacking dorsal lamellae at the costa.

Although described by Limpricht, a scholar of Milde, in honour of Milde, Milde did not collect the type, which was discovered by De Notaris at Lago Maggiore. Apparently Milde overlooked this species, which is not rare in the surroundings of Meran, but took it for *C. pilifer* (*polytrichoides*).

Scopelophila ligulata (Plate 2)

This rare moss is distributed almost worldwide but is always extremely rare. In Europe it is only known from the Pyrenees and the Alps, from where very scattered records are known (from

Switzerland only one, from Austria about half a dozen localities mainly in the Hohe Tauern). The species was discovered in the surrounding of Meran by Alex von Hübschmann in 1976. Although not published, the locality information was forwarded from one bryologist to the next and the place was visited by Gottfried Schwab in 1982 and later by Alfons-Schäfer-Verwimp, probably amongst others.

Scopelophila ligulata grows in the entry of a mine in the Finele valley just a few kilometres NE of Meran along the road to Jaufenpass. At the begin of the village Kuens, the road turns U-shaped around the Finele stream. Small ways go left and right of the stream uphill through apple plantations. Taking the left way, there is a bare rock at the left side of the valley after 4-500 m and below the entrance of the mine, two metres above the way, which is difficult to detect because it is overgrown. If the right way is followed, one has to cross a bridge to the left side and go back some 50 meters.

Syntrichia fragilis (plate4f)

This species is confined in Europe to the Alps. It has been discovered by Milde in the surroundings of Meran (as *Barbula alpina* var. *inermis*), where it still abundantly grows along the irrigation channel "Algunder Waal".

Localities

The best known place is the Küchelberg directly north of Meran. Although most of the area is cultivated like a park or a botanical garden, there are a few natural sites (below the chairlift) with open vegetation, in which the open soil is covered with crusts of thallose liverworts such as *Mannia*, *Oxymitra paleacea* and various rare species of *Riccia* such as *R. ciliata*, *ciliifera* and *R. gougetiana* (table 3).

From the Küchelberg leads a footwalk ("Tappeinerweg") west to the village of Gratsch, along which the rarities of this region can be easily be observed: *Braunia alopecura* and *Campylopus oerstedianus* on rock beside the path, *Frullania riparia* and *Haplohymenium triste* on rock in *Quercus pubescens* forest. It has to be considered that the South facing slopes were all forested but converted into vineyards, however, already before the time of Milde. For example, in 1907 the Austrian botanist Arthur Ladurner tried to establish mediterranean macchia vegetation. By this way the natural forest harbouring the rare species were reduced to fragments.

Most of the species are also found "zwischen Gratsch und Algund", which is a common phrase introduced by Milde. The footwalk called Algunder Waalweg follows an irrigation channel through native *Castanea* – *Quercus* forest with large granitic boulders. On the vertical walls of these boulders, masses of *Fabronia ciliaris* (plate 4b,c) are growing.

Discussion

Why several bryophyte species are confined in Europe to the southern Alps is a mystery. They are commonly regarded as relicts from the Tertiary and thus from a wide holarctic range, which survived the several glaciations during the Quaternary under favourite conditions only in the southern Alps. It has been argued that all these species cannot be relicts from the Tertiary, since the present localities are situated in former glacier valleys (Cortini Pedrotti et al. 1992). This is correct, however, the only alternative would be long distance dispersal. In this case, spores of half a dozen species must have been landed in the southern Alps, together in such a place like Meran, an not in any other places e.g. in Italy or the Mediterranean, which is very unlikely.

The relic status of the species mentioned is supported by the occurrence of *Radula visianica*, which has worldwide its only two known records in one place in the southern Alps (Piemont). This can only be a relict and not be dispersed from somewhere else because it is only found there..

The question arises whether the interesting species are concentrated in the surroundings of Meran or more widely distributed in the surroundings. Records of *F. parevistipula* from Schlern N of

Bozen and *F. cesatiana* from the ruin of Maultasch near Terlan suggest a wider distribution, however, most localities in question are situated on very steep slopes and are hardly to reach.

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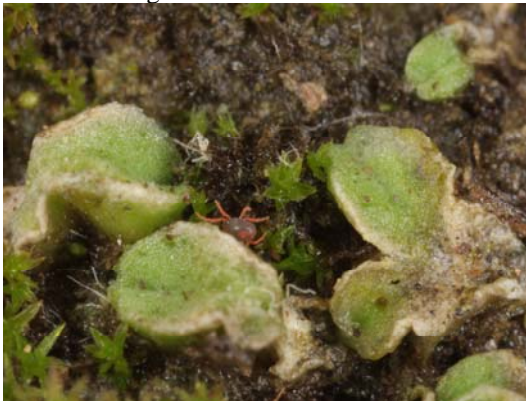
Table 2: *Scopelophila ligulata* at its locality in the Finele Valley NE of Meran.



a. *Mannia fragrans*



b. *Oxymitra paleacea*



c. *Riccia ciliifera*



d. *Riccia ciliata*



e. *Riccia gougetiana*



f. Blick vom Küchelberg auf Meran

Table 3: Liverworts from the steppe vegetation in the Küchelberg in Meran. All species except for *Mannia fragrans* are mediterranean species. *Mannia fragrans* is an eastern steppe species.

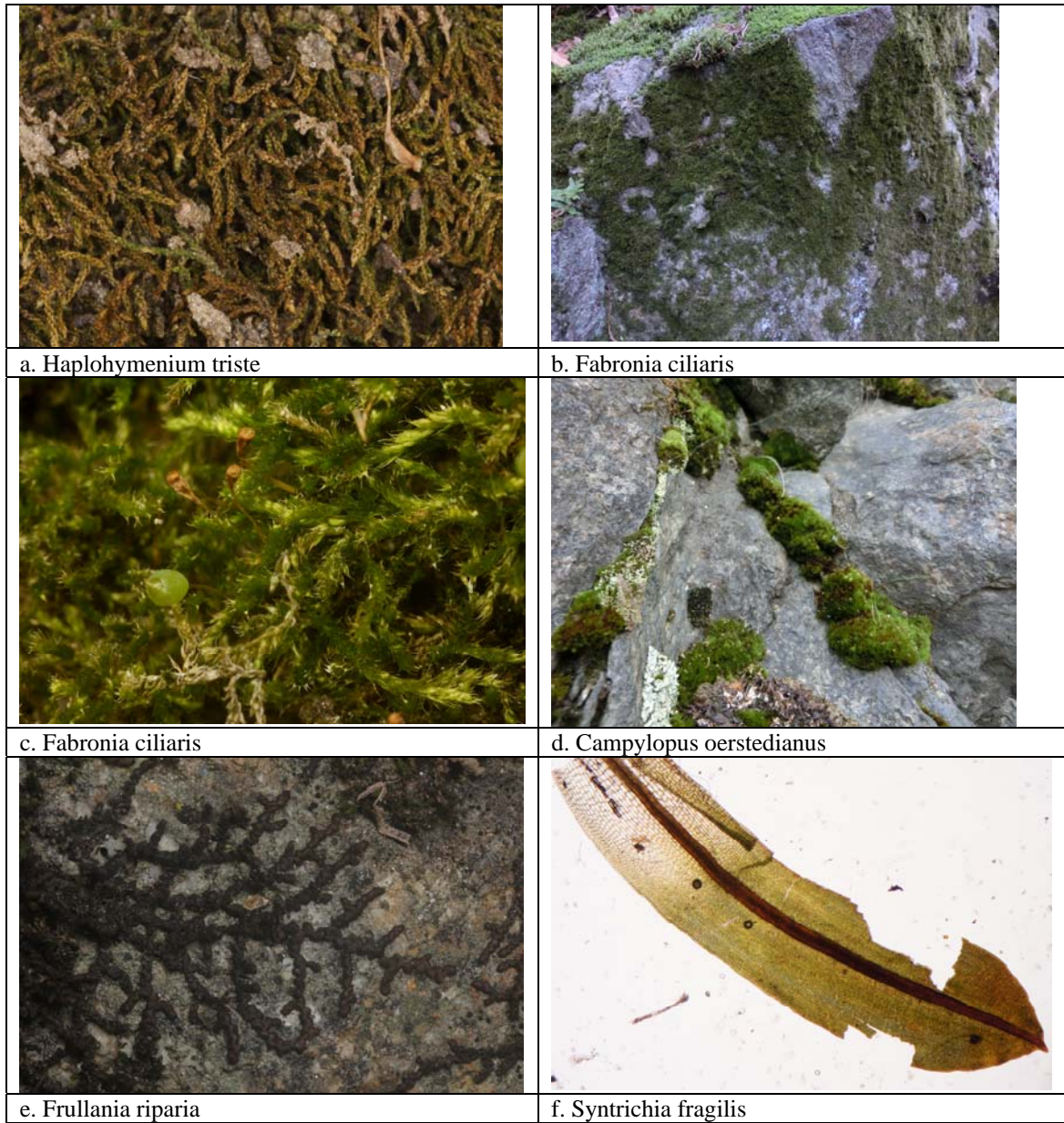


Plate 4: Remarkable bryophyte species from the surroundings of Meran.