
A guide to bryological hot spots of the world 5. The Apuanian Alps (Tuscany, Italy)

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Hot spots are characterized by the occurrence of „hot“ species, rare, endangered, phytogeographically (for example highly disjunct) or ecologically interesting species (for example heavy metal species).

The Apuanian Alps (ital. Alpi Apuani) are a place of extraordinary botanical and also bryological interest. Although situated far from the west coast of Europe, many atlantic species are found there, which have isolated occurrences and show up next in Asturias, Macaronesia, Ireland or Scotland. Representative of the oceanic element in the bryoflora are *Dumortiera hirsuta*, *Lejeunea lamacerina*, *Lophocolea fragrans*, *Plagiochila exigua*, *P. bifaria*, *Saccogyna viticulosa*, *Harpalejeunea ovata* and *Marchesinia mackaii*, supplemented by ferns such as *Trichomanes speciosum* and *Hymenophyllum tunbrigense* (Cortini-Pedrotti et al. 1992). Reasons for the presence of such species in Italy are the extraordinary climatic conditions. Situated directly along the Mediterranean Sea, the climate is mild and due to depressions in the gulf of Genova, the rain is caught by the mountains resulting in a high precipitation of about 1400 at the foot of the region and more than 3000 mm in the summit region. This does, however, not explain whether these species are relics from the Tertiary or dispersed from the W-coast of Europe after the Pleistocene glaciations.

In addition to the rare atlantic species, the region has a typical mediteranean bryoflora. For that reasons, the region was repeatedly visited by bryologists.

The bryoflora of the region was treated in a special catalogue (Cortini Pedrotti et al. 1992) comprising literature records, herbarium revisions, results of intensive collecting, resulting in 128 species of liverworts and hornworts as well as 300 species of mosses. The study area is now part of the Parco Regionale delle Alpi Apuani, which is, however, hardly developed.

The rare species can be grouped into the following categories:

Single records for Europe

Helicodontium capillare

This species was collected by the Swiss Jean Étienne Duby “Bei Massa auf Schiefer” and described by Schimper as *Dubyella italica* (fig. 3), was later transferred to the genus *Helicodontium* by Fleischer and at least synonymised with the neotropical *Helicodontium capillare* by Buck. Massa is situated between the base of the Apuanian Alps and the coastal plain, which

can be excluded as type locality. The inland area (fig. 1) is very steep and difficult to access, here are only two roads in the interior of the mountains, one following a river and ending in a dead end, the other leading to a pass in 1067 m. Open schist is found in several places in the valley (fig. 2). It can be supposed that many bryologists have been searched for this species and the fact that it has never been found again leads to the suspicion that it does no more occur in Europe. The species looks similar as *Leskea polycarpa* (figs. 3, 4-7). It looks like as if this species was dispersed like other species from the neotropics such as *Anacolia laevisphaera* or *Heterophyllum affine*, perhaps by the same volcanic eruption, and disappeared after some time like the latter, Curiously, this species is not mentioned by Cortini Pedrotti et al (1992) in the catalogue of the bryophytes of the Apuanian Alps, although in her flora. In the neotropics, the species is said to grow on tree trunks but also in soil and rocks, preferably limestone (Buck 1998). Duby has also published contributions on neotropical bryophytes and therefore it cannot be excluded that the only record for Europe is based on a so called "label confusion".



Fig. 1: Massa at the edge of the Apuanian Alps. The locality of *Helicodontium* is supposed to be in the valley, which consists of schist, and where open rocky habitats are available.

Diplophyllum obtusatum

Collected only once by C. Roseti in 1891 near Forno Velasco rev. Schumacker. The species is East Asian in distribution and differs from the similar *D. obtusifolium*, as which it was determined, by sex conditions. Cortini Pedrotti et al (1992) refer to a publication Schumacker & Vana in press, which was, however, never published (Vana in litt.). The taxonomic value of a species differing merely by sex conditions is doubtful.

Heavy metal species

There are several habitats with heavy metal bryophyte species, all in the surroundings of Seravezza, apparently all except one (the last in the list) in the Valle Serra, where such species are found in various combinations:

- Min. del Bottino (Seravezza) 300m, Schumacker et al. 1988
- Valle Serra sopra Rio Magno (Rio Magno is a village not indicated in the topographical map, it is in the valley just above Serraveza), Schumacker et al. 1988

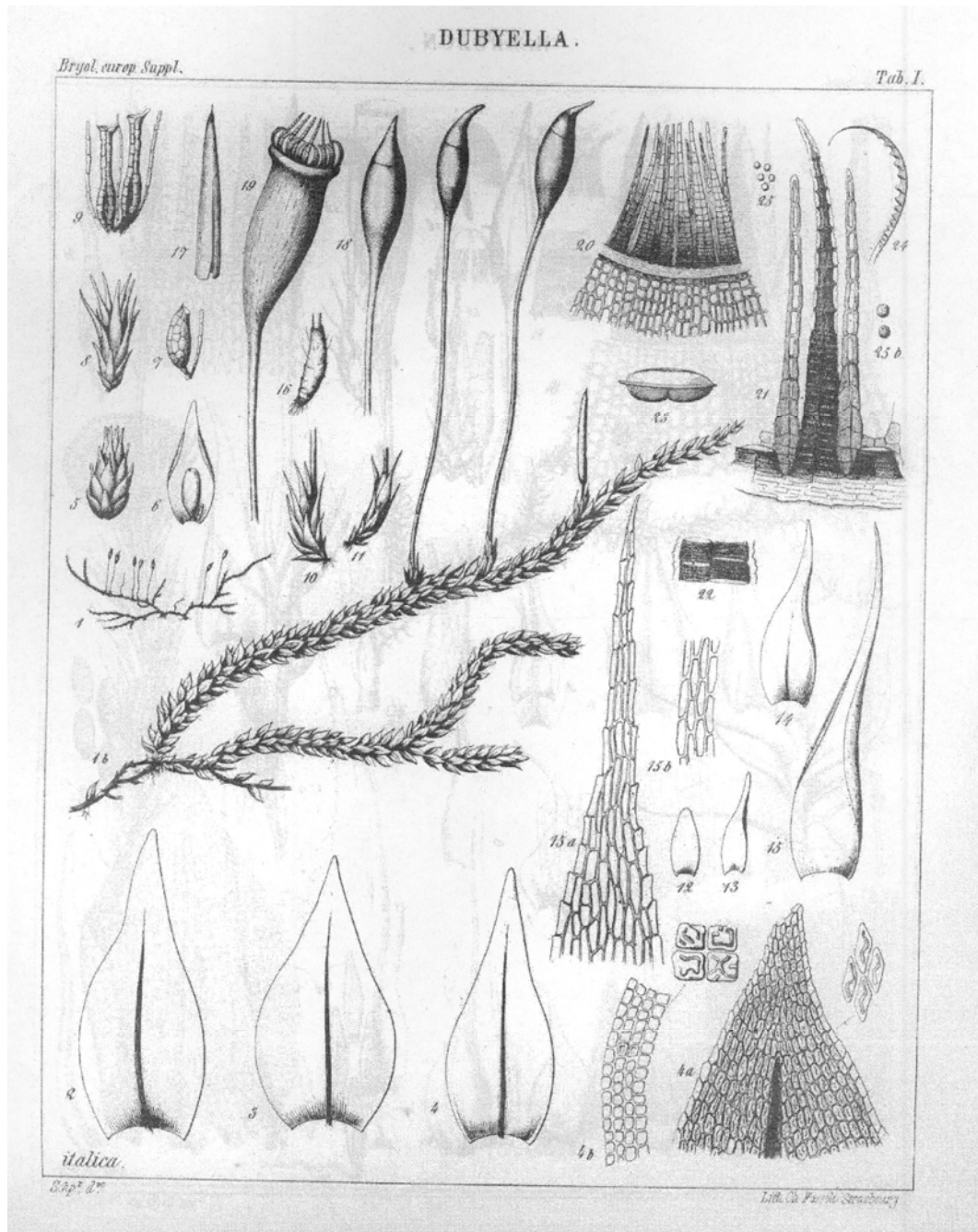


Fig. 3: *Helicodontium italicum* (from *Bryologica Europaea*)



Fig. 4-7: *Helicodontium capillare* from Dominican Republic.

- La Polla, uppermost part of Fiume Serra (the valley stretching north from Seravezza), 500-550m, Lüth 2004, 2013 (figs. 5-6).
- Rio Gallena 200m, Schumacker 1988, Rio Gallena fra Seravezza e Ruosina, Cortini Pedrotii 1988

Cephaloziella massalongi

Seravezza, min. del Bottino 300m with *Scopelophila ligulata*, Schumacker et al. 1988.

Seravezza, Rio Gallena 200m, Schumacker 1988. Second record in Italy except for the type.

Gymnocolea inflata

Seravezza v. Serra sopra Riomagno 300m, Schumacker et al. 1988.

Scopelophila ligulata

This species was not known from the region before 1988.

Seravezza: sopra Rio Magno, Schumacker et al, 1988.

Min. del Bottino, Schumacker et al. 1988.

Rio Gallena fra Seravezza e Ruosina, Cortini Pedrotii 1988.

Highest part of Rio Valle Serra, Polla 500 m, Lüth 2004, 2013.

The latter locality was probably not known before and is probably new, since the species is accompanied by large masses of *Mielichhoferia*, which was only indicated before from



Figs. 4-5: Heavy metal rocks at La Polla, with *Scopelophila ligulata* (dark green) and *Mielichhoferia mielichhoferi* (light green).

“Seravezza”, or the indication Seravezza by Cortini Pedrotti 1988 concerns this locality, although it is in some distance to the village.

This species has an almost worldwide distribution but is found in Europe only in the Alps and neighbouring mountains such as the Pyrenees in Spain, Switzerland, Austria and Italy.

Mielichhoferia mielichhoferi

Seravezza, Cortini Pedrotti 1988. Here found by Michael Lüth in 2013 at the end of Valle Serra in La Pola at 500 m alt., together with *Gymnocolea inflata* and *Marsupella sprucei* (Frahm)

Atlantic species

All atlantic elements comprise liverworts:

Dumortiera hirsuta. Occasionally along small streams, which seems to be a method to avoid frost damages, since the species is growing in frost free climates on soil in humid conditions.

Lejeunea lamacerina. Not rare on rocks in streams.

Lophocolea fragrans. Only one record from Rimone near Seravezza.

Plagiochila exigua. Known from about a dozen localities.

Plagiochila bifaria. relatively common, known from about 50 collections.

Saccogyna viticulosa. Known from about a dozen collections.

Harpalejeunea ovata. Known from about two dozen collections.

Marchesinia mackayi. Known from less than a dozen records.

Subatlantic elements

Calypogeia arguta

Cladipodiella francisci

Isopaches bicrenatus

Scapania compacta

Ptychomitrium polyphyllum

Mediterranean elements

Cololejeunea rossettiana

Corsinia coriandrina

Fossombronia angulosa

Gongylanthus ericetoum

Lunularia cruciata

Mannia androgyna

Marchantia paleacea

Phaeoceros bulbiculosus

Porella obtusata

Riccia michelii

Riccia nigrella

Southbya nigrella

Southbya tophacea

Targionia hyophylla

As in other cases it is questionable whether the records of Atlantic or Macaronesian elements are a result of relics or dispersal. Cortini Pedrotti et al (1992), favour the explanation of recent dispersal.

Relics from the Tertiary can generally not be excluded since there is a true relic in the southern Alps in northern Italy: *Radula visianica*. This is a species which has been collected only twice in the Padova region, occurs nowhere else in the world and has a tropical relationship within the genus. However, as stated by the authors, *Harpalejeunea ovata* and *Plagiochila exigua* produce no sporophytes in Europe, which support the relic hypothesis.

Remarkable is, that only a small selection of species is found in the Apuanian Alps, that these species occur very scattered and not in all potential habitats, like the same species in NW Spain, in contrast to Macaronesia.

Literature

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