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The bryophytes collected in Calabria (S Italy) during the VIII O.P.T.I.M.A. Iter Mediterraneum

Abstract

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The list of bryophytes collected during the VIII Iter Mediterraneum of O.P.T.I.M.A., held in Calabria, is provided. 177 taxa (37 liverworts and 140 mosses), 22 of which new to Calabrian bryoflora, are reported. Among them *Brachythecium mildeanum*, *Racomitrium microcarpon* and *Rhabdoweisia crispata* are new to southern Italy and rare or absent in central Italy. Other findings of phytogeographic interest are those of *Pseudoleskea radicata*, *Syntrichia calcicola*, *S. norvegica* and *Racomitrium elongatum*, being new species to southern part of Italian peninsula. The latter is a rare moss in Italy. Moreover, since the presence of *Racomitrium microcarpon* in Italy was previously based on data before 1950 it is here confirmed. Likewise, 3 taxa (*Ptycodium plicatum*, *Sphagnum palustre* and *Thuidium delicatulum*) had not been found in southern Italy and 13 in Calabria since before 1950. In addition, new localities are recorded for other 20 rare taxa in southern Italy or throughout the entire peninsula.

Key words: bryoflora, Calabria, Italy.

Introduction

As underlined by several authors, the region of Calabria in southern Italy is little known from the bryological point of view. Recently, for the purpose of improving knowledge of its bryoflora several bryologists carried out floristic research in this area (Aleffi & Puntillo 1998; Aleffi & al. 1998; Aleffi & Puntillo 2000; Aleffi & al. 2001; Puntillo 2004a; 2004b).

With the same aim, during the VIII *Iter Mediterraneum* of O.P.T.I.M.A. (Organisation for the Phyto-Taxonomic Investigation of the Mediterranean Area) - held from the 10 to the 21 June in 1997 in Calabria - bryophytes have been gathered. The *Iter* was mainly concerned with the principal Calabrian mountain systems (Aspromonte, Serre Catanzaresi, Sila, Pollino) and territory along the Tyrrhenian and Ionian coasts.

During the course of examination of the samples the finding of some interesting taxa has been the subject of previous reports (Campisi & al. 2000; Campisi & al. 2003). In this paper the complete list of records made during the *Iter* with notes concerning their phyto-geographic interest is given.

For the mosses the nomenclature follows Hill & al. (2006), and Ros & al. (2007) for the liverworts and the hornworts; Düll (1983, 1984-85, 1992) was referred to for the chorotypes. Data on Italian distribution of taxa are drawn from Aleffi & al. (2008).

Appendix 1 lists the 37 collecting sites in order of the provinces (political units) where they belong.

Voucher specimens are kept in the *Herbarium Mediterraneum Panormitanum* (PAL).

List of the findings

Hepaticae

Anastrophyllum minutum (Schreb.) R. M. Schust. – 1, 18. On soil in slopes, in beech wood and ilex wood, 700-1400 m a.s.l. – bor-mont.

New to Calabria, rare in central and southern Italy.

Blasia pusilla L. – 1, 2. On wet soil, 1300 m a.s.l. – bor-mont.

Rare in southern Italy.

Calypogeia arguta Nees & Mont. – 18. On bark of *Quercus ilex* L., 700 m a.s.l. – oc-med.

Calypogeia fissa (L.) Raddi – 2, 6. On rock and on soil, near water courses, about 600 m a.s.l. – suboc-med.

Cephalozia bicuspidata (L.) Dumort. – 2. On soil, 1500 m a.s.l. – temp.

Cephaloziella baumgartneri Schiffn.– 3, 15. On soil and on cliff, 50-1400 m a.s.l. – oc-med.

Cephaloziella turneri (Hook.) Müll.Frib.– 4, 15. On soil in slopes, along the sides of a track in a ilex wood and of a road, 50-800 m a.s.l. – oc-med (-mont).

Fairly rare in Italy.

Chiloscyphus polyanthos (L.) Corda – 5, 24. On soil along the edges of a stream and in sphagnum bog, 1050-1500 m a.s.l. – subbor.

Conocephalum conicum (L.) Dumort. – 2, 6, 30. On soil in slopes, near streams, 300-1500 m a.s.l. – subbor-mont.

Corsinia coriandrina (Spreng.) Lindb. – 6. On soil in slopes, near water courses, 600 m a.s.l. – suboc-med.

Diplophyllum albicans (L.) Dumort. – 6, 21. On soil in slopes, near water courses, 600-1000 m a.s.l. – n.suboc.

Rare in southern Italy.

Fossombronia angulosa (Dicks.) Raddi – 6. On soil in slopes, near water courses, 600 m a.s.l. – oc-med.

Frullania dilatata (L.) Dumort.– 1, 2, 16, 25. On bark of *Castanea sativa* Miller, *Olea europaea* L. and *Quercus frainetto* Ten., 60-1400 m a.s.l.– temp.

Frullania tamarisci (L.) Dumort. – 21. On bark, 1000 m a.s.l. – w. temp-mont.

Gongylanthus ericetorum (Raddi) Nees – 15. On cliff, near sea, 50 m a.s.l. – oc-med.

Rare in southern Italy.

Jungermannia atrovirens Dumort. – 17. On soil along the sides of streams, 1000 m a.s.l. – w. temp-mont/dealp.

Jungermannia gracillima Sm. – 2, 6, 22. On wet soil in slopes, 700-1400 m a.s.l. – w. temp.

Jungermannia hyalina Lyell – 3. On soil, near water courses and waterfalls, 1400 m a.s.l. – temp-mont.

- Lophocolea bidentata* (L.) Dumort. – 2, 3. On soil, near a stream and waterfalls 1400-1500 m a.s.l. – w. temp.
- Lophozia ventricosa* (Dicks.) Dumort. – 3. On soil, near water courses and waterfalls 1400 – bor. Rare in southern Italy.
- Marchantia paleacea* Bertol. – 30. On dry stone wall, near a stream in a beech wood, 300 m a.s.l. – med/trop (-mont).
- Marchantia polymorpha* L. ssp. *ruderalis* Bischl. & Boisselier – 31. In a small marsh, ca 1500 m a.s.l.
- Marsupella emarginata* (Ehrh.) Dumort. – 1, 3, 5, 18, 21, 26. On soil in humid slopes, 700-1600 m a.s.l. – temp-mont. Rare in southern Italy.
- Metzgeria furcata* (L.) Dumort. – 6, 21. On soil in slope and on bark of *Fagus sylvatica* L., 600-1000 m a.s.l. – w. temp.
- Pedinophyllum interruptum* (Nees) Kaal. – 5. On soil along the edges of a stream, in beech wood, 1500 m a.s.l. – suboc-dealp.
- Pellia epiphylla* (L.) Corda – 27. On rock in *Quercus cerris* L. and *Pinus laricio* Poiret wood, 1500 m a.s.l. – w. temp.
- Pellia* sp. – 37. On soil along the edge of a stream, 1800 m a.s.l.
- Plagiochila porelloides* (Torrey ex Nees) Lindenb. – 2, 5, 32. On soil in slopes, 1500-2100 m a.s.l. – subbor-mont.
- Porella cordaeana* (Huebener) Moore – 8, 19. On soil in slopes, 1400-1500 m a.s.l. – w. temp-mont.
- Porella platyphylla* (L.) Pfeiff. – 8,27, 31. On soil and on rock 1400-1500 m a.s.l. – w. temp.
- Radula* sp. – 10, 17. On soil in rock crevices and in slopes, 100-1000 m a.s.l.
- Scapania aequiloba* (Schwägr.) Dumort. – 5. On soil in slopes, on the sides of a footpath, 1500 m a.s.l. – bor-mont. New to Calabria and rare in southern Italy.
- Scapania compacta* (A. Roth) Dumort. – 2, 4, 6, 8, 16, 18. On soil in slopes along roads and footpaths, 60-1500 m a.s.l. – suboc-submed.
- Scapania nemorea* (L.) Grolle – 24. In a sphagnum bog, m 1050 a.s.l., w. temp-mont. Rare in southern Italy.
- Scapania subalpina* (Nees ex Lindenb.) Dumort. – 5. On rock, near a water course, 1500 m a.s.l., – subarc-subalp. Rare in central and southern Italy. Not found in Calabria since before 1950.
- Scapania undulata* (L.) Dumort. – 8. On soil in humid slopes, 1400 m a.s.l. – w.temp-mont.
- Targionia hypophylla* L. – 6, 9. On soil in slopes along streams and in ilex wood, 100-600 m a.s.l. – oc-submed.

Musci

- Amblystegium serpens* (Hedw.) Schimp. – 8. On soil, in *Quercus petraea* (Mattuschka) Liebl. and *Fagus sylvatica* wood, m 1420 a.s.l. – temp. Not found in Calabria since before 1950.
- Anacolia webbii* (Mont.) Schimp. – 13. On granitic rock in garigue, 1000 m a.s.l. – oc-med-mont. Rare in Europe. The Calabrian station is the first in peninsular Italy.

- Antitrichia curtispindula* (Hedw.) Brid. – 8. On soil, on a humid slope, m 1400 a.s.l. – suboc.
- Aulacomnium androgynum* (Hedw.) Schwägr. – 26. In a beech wood slope, 1800 m a.s.l. – temp.
Fairly rare in Italy.
- Aulacomnium palustre* (Hedw.) Schwägr. – 24, 33. On soil in ilex wood and in a marsh, m 900-1050 a.s.l. – bor.
Rare in southern Italy.
- Bartramia halleriana* Hedw. – 15. On soil in a sunny slope along a road, ca 50 m a.s.l. – bor-mont.
- Bartramia ithyphylla* Brid. – 2, 14. On soil in slopes and along the edge of a stream, in beech wood, 1400 m a.s.l. – bor-mont.
- Bartramia stricta* Brid. – 3, 9, 18. On rock and on soil in humid slopes, in ilex wood and near a stream, 100-1350m a.s.l. – suboc-med.
- Brachythecium glareosum* (Bruch ex Spruce) Schimp. – 8, 16, 32. On soil in coark oak wood and *Quercus petraea* and *Fagus sylvatica* wood, 60-2100 m a.s.l. – subbor (-mont).
- Brachythecium mildeanum* (Schimp.) Schimp. – 3. On soil in a beech wood slope along the edge of a stream, 1300 m a.s.l. – temp.
New to southern Italy and rare in central Italy
- Brachythecium rivulare* Schimp. – 2, 3, 5, 7, 17, 21, 30. On rock and on soil of humid slopes near streams and waterfalls, 350-1500 m a.s.l. – subbor.
- Brachythecium rutabulum* (Hedw.) Schimp. – 2, 30. On soil and on rock along the edge of streams, 300-1400 m a.s.l. – temp.
- Brachythecium velutinum* (Hedw.) Ignatov & Huttunen var. *velutinum* – 8, 17, 25. On soil in slopes and on trunk base of *Quercus petraea*, 900-1400 m a.s.l. – temp.
- Bryum alpinum* Huds. ex With. – 3. On soil near waterfalls, 1300 m a.s.l. – suboc-submed-mont.
Rare in southern Italy. Not found in Calabria since before 1950
- Bryum dichotomum* Hedw. – 20. On soil in a slope, in deep valley of a stream, 100 m a.s.l. – submed.
- Bryum capillare* Hedw. – 1, 2, 7, 8, 11. On soil in slopes along the edge of a stream and on the sides of a footpath, on bark of *Quercus petraea*, 1400 m a.s.l. – temp.
- Bryum donianum* Grev. – 2. On soil along the edge of a stream, 1400 m a.s.l. – oc-med.
Not found in Calabria since before 1950.
- Bryum schleicheri* DC. – . 33. On soil in ilex wood, ca 900 m a.s.l. – subarc-subalp.
Not found in Calabria since before 1950.
- Calliergonella cuspidata* (Hedw.) Loeske – 31, 33. In a small marsh and on soil in ilex wood ca. 900-1500 m a.s.l. – temp.
- Ceratodon conicus* (Hampe) Lindb. – 33. On soil in ilex wood, ca 900 m a.s.l. – oc-submed.
- Ceratodon purpureus* (Hedw.) Brid. – 2, 12, 20. On rock and on soil in beech wood and in deep valley of a stream 100-1500 m a.s.l. – temp.
- Cirriphyllum crassinervium* (Taylor) Loeske & M.Fleisch. – 18. On rock, in wood, 700 m a.s.l. – suboc (-mont).
New to Calabria.
- Ctenidium molluscum* (Hedw.) Mitt. – 31, 33. On soil in slope, in ilex wood and in beech wood 900-1700 m a.s.l. – temp.

- Dicranella heteromalla* (Hedw.) Schimp. – 15, 24. On soil in a sunny slope along a road and in sphagnum bog, 50-1050 m a.s.l. – temp.
- Dicranella howei* Renauld & Cardot – 4, 10, 22, 23. On soil in slopes and in crevices in the rock face, 100- 900 m a.s.l. – oc-med.
- Dicranella varia* (Hedw.) Schimp. – 10. On soil in a small crevice in the rock face, 100 m a.s.l. – temp.
- Dicranum scoparium* Hedw. – 3, 18, 24, 28, 34. In marsh and on soil near waterfalls, streams and lakes, 700-1260 m a.s.l. – subbor.
- Didymodon insulanus* (De Not.) M.O.Hill – 2, 4. On soil in slopes, 900-1530 m a.s.l. – submed-suboc.
- Didymodon luridus* Hornsch. – 10, 23. On soil, on sand and in rocky cavities, near streams, 100 m a.s.l. – submed.
- Didymodon vinealis* (Brid.) R.H.Zander – 15. On cliff, near sea, ca 50 m a.s.l. – submed.
- Diphyscium foliosum* (Hedw.) D.Mohr. – 2, 17. On soil in slopes, 1000-1400 m a.s.l. – suboc-mont.
Rare in central and southern Italy.
- Encalypta streptocarpa* Hedw. – 31, 33. On rock, in beech wood and in ilex wood, ca 900-1700 m a.s.l. – subbor (-mont).
Not found in Calabria since before 1950.
- Enthostodon obtusus* (Hedw.) Lindb. – 23. On soil along the edges of a stream, 100 m a.s.l. – suboc-submed.
New to Calabria.
- Eucladium verticillatum* (With.) Bruch. & Schimp. – 10, 33, 37. On soil, tufa and cliff, along the edges of water courses 100-1800 m a.s.l. – submed.
- Eurhynchiastrum pulchellum* (Hedw.) Ignatov & Huttunen – 3. On soil near waterfalls, near a stream, 1400 m a.s.l. – subbor-mont.
Not found in Calabria since before 1950.
- Eurhynchium striatum* (Hedw.) Schimp. – 21. On soil in humid slope, ca 1200-1400 m a.s.l. – suboc.
- Fabronia ciliaris* (Brid.) Brid. – 21. On bark, 1200 m a.s.l. – submed.
New to Calabria and rare in southern Italy.
- Fissidens adianthoides* Hedw. – 8. On soil in a humid slope, 1400 m a.s.l. – subbor.
- Fissidens dubius* P.Beauv. – 17, 33. On rock and on soil in slope, 900-1000 m a.s.l. – temp-mont.
- Fissidens serrulatus* Brid. – 21. On soil, ca 1400 m a.s.l. – oc-submed.
- Fissidens taxifolius* Hedw. subsp. *taxifolius* – 1, 21, 24, 30, 37. On soil and on cliff, near water courses and lakes, 300-1800 m a.s.l. – temp.
- Fissidens taxifolius* ssp. *pallidicaulis* (Mitt.) Mönk. – 33. On tufa, ca 900 m a.s.l. – temp.
- Fontinalis antipyretica* Hedw. subsp. *antipyretica* – 5, 27. On rock, in streams. 1400-1500 m a.s.l. – subbor.
- Fontinalis hypnoides* C. Hartm. var. *hypnoides* – 8. On soil near a stream , 1400 m a.s.l. – suboc-submed.
New to Calabria. Very rare in Italy.
- Funaria hygrometrica* Hedw. – 23. On slope along the edges of a stream, 100 m a.s.l. – temp.
- Grimmia decipiens* (Schultz) Lindb. – 4. On rock in ilex wood, 800 m a.s.l. – suboc-mont.
New to Calabria. Rare in central and southern Italy.

- Grimmia hartmanii* Schimp. – 3. On rock in beech wood, near a stream, ca 1300 m a.s.l. – subbor-mont.
Rare in central and southern Italy.
- Grimmia laevigata* (Brid.) Brid. – 13. On granitic rock in garrigue of *Cistus salviifolius* L., 1000 m a.s.l. – submed-suboc-mont.
- Grimmia montana* Bruch & Schimp. – 5. On soil near a stream, 1400 m a.s.l. – suboc-mont.
Rare in Italy
- Grimmia orbicularis* Bruch ex Wilson – 33. On tufa, ca 900 m a.s.l. – submed-(mont).
- Grimmia pulvinata* (Hedw.) Sm. – 13, 17, 28, 33. On granitic rock in garrigue of *Cistus salviifolius*, on soil and on tufa, 900-1050 m a.s.l. – temp.
- Grimmia ramondii* (Lam. & DC.) Margad. – 31. In a small marsh, ca. 1500 m a.s.l. – bor-mont.
- Grimmia trichophylla* Grev. – 10, 15, 17. On soil in rocky crevices and in slopes 50-1000 m a.s.l. – temp (-mont).
- Gymnostomum calcareum* Nees & Hornsch. – 15. On cliff, near sea, ca 50 m a.s.l. – submed-mont.
- Habrodon perpusillus* (De Not.) Lindb. – 4. On bark of *Quercus ilex*, 800 m a.s.l. – med-oc.
- Hedwigia ciliata* (Hedw.) P.Beauv. var. *ciliata* – 27. On rock in a wood of *Quercus cerris* and *Pinus laricio*, 1500 m a.s.l. – subbor (-mont).
- Hedwigia ciliata* var. *leucophea* Bruch & Schimp. – 13, 27. On rock in garrigue of *Cistus salviifolius*, and in wood of *Quercus cerris* and *Pinus laricio* 1000-1500 m a.s.l. – subbor.(-mont).
- Hedwigia stellata* Hedenäs – 4, 18. On rock in ilex wood, 700-800 m a.s.l – suboc-submed.
- Heterocladium heteropterum* (Brid.) Schimp. – 3, 21. On soil on humid slopes and near waterfalls, 1300-1400 m a.s.l. – oc-mont.
Rare in southern Italy.
- Homalothecium lutescens* (Hedw.) H.Rob. var. *lutescens* – On bark, rock and soil, 1260-1700 m a.s.l., – temp.
- Homalothecium sericeum* (Hedw.) Schimp. – 8, 17. On bark and on soil in oak wood, 1000-1400 m a.s.l. - temp.
- Hygroamblystegium tenax* (Hedw.) Jenn. – 31. In a small marsh, ca. 1500 m a.s.l. – temp.
New to Calabria.
- Hypnum cupressiforme* Hedw. var. *cupressiforme* – 2, 3, 5, 6, 7, 8, 17, 18, 21, 25, 27, 33, 34.
On soil, rock and bark in deciduous and evergreen woods, 620-1500 m a.s.l. – temp.
- Hypnum cupressiforme* var. *filiforme* Brid. – 18, 21. On soil and bark, 700-1000 m a.s.l. – temp.
- Hypnum cupressiforme* var. *resupinatum* (Taylor) Schimp. – 16. On trunk base of *Olea europaea* along a road, 60 m a.s.l. – oc.
- Isothecium alopecuroides* (Lam. ex Dubois) Isov. – 21. On bark, 1300 m a.s.l. – temp.
- Kindbergia praelonga* (Hedw.) Ochyra – 1, 7, 15, 31, 32. On soil in slopes and on rock, 50-1700 m a.s.l. – temp.
- Leptodon smithii* (Hedw.) F.Weber & D.Mohr – 4. On bark of *Quercus ilex*, 800 m a.s.l. – oc-med.
- Leucodon sciuroides* (Hedw.) Schwägr var. *sciuroides* – 2, 8. On soil in beech wood and on bark of *Quercus petraea*, 1400 m a.s.l. – temp.
- Mnium marginatum* (Dicks.) P.Beauv. – 24. In a marsh, m 1050 a.s.l. – subbor (-mont).
New to Calabria. Rare in southern Italy.

- Mnium thomsonii* Schimp. – . 17, 21. On soil in humid slopes, 1000-1060 m a.s.l. – subarc-subalp.
New to Calabria. Rare in southern and central Italy.
- Neckera complanata* (Hedw.) Huebener – 17, 21. On bark of *Fagus sylvatica*, 1000-1060 m a.s.l. – temp.
- Neckera pumila* Hedw. – 30. On bark, near a stream, 250 m a.s.l. – n. suboc.
Fairly rare in central and southern Italy.
- Orthotrichum affine* Schrad. ex Brid. – 8, 35. On soil in slopes and on bark of *Quercus petraea*, 1100-1400 m a.s.l. – temp.
- Orthotrichum diaphanum* Schrad. ex Brid. – 18. On rock, in wood, 700 m a.s.l. – temp.
- Orthotrichum lyellii* Hook & Taylor – 27. On bark of *Quercus cerris* and *Pinus laricio*, ca 1500 m a.s.l. – suboc-submed
- Orthotrichum rupestre* Schleich. ex Schwägr. – 7, 18, 29, 35. On rock and soil in slopes 700-1500 m a.s.l. – n. suboc-mont.
- Orthotrichum speciosum* Nees var. *speciosum* – 34. On bark of *Prunus* sp., 1260 m a.s.l. – subkont.
- Orthotrichum striatum* Hedw. – 8, 34. On bark of *Prunus* sp. and of *Quercus petraea*, 1260–1400 m a.s.l. – suboc.
- Oxyrrhynchium hians* (Hedw.) Loeske – 3, 23. On humid soil, 100–1300 m a.s.l. – temp.
- Oxystegus tenuirostris* (Hook & Taylor) A.J.E.Sm. – 33. On tufa, 900 m a.s.l. – suboc-mont.
Fairly rare in Italy
- Palustriella commutata* (Hedw.) Ochyra – 30, 31, 37. On humid soil, on rock and in a small marsh, ca 250–1800 m a.s.l. – temp.
- Philonotis caespitosa* Jur. – 5. On soil near a water course, 1500 m a.s.l. – bor.
- Philonotis fontana* (Hedw.) Brid. – 26. On soil, ca 1600 m. – subbor.
- Philonotis tomentella* Molendo – 37. On humid soil, 1800 m a.s.l. – bor-mont
- Plagiomnium affine* (Blandow ex Kunck) T.J.Kop. – 2. On soil near a stream in beech wood, 1400 m a.s.l. temp.
- Plagiomnium medium* (Bruch & Schimp.) T.J.Kop. – 1, 2, 3. On soil near stream, 1300 m a.s.l. – subarc-alp.
- Plagiomnium rostratum* (Schrad.) T.J.Kop. – 3. On humid soil in slope, 1300 m a.s.l. – temp.
- Plagiomnium undulatum* (Hedw.) T.J.Kop. var. *undulatum* – 6, 17, 21, 30. On humid soil and rock 250–1000m a.s.l. – temp.
- Platyhypnidium riparioides* (Hedw.) Dixon – 3, 30. On humid soil and rocks near waterfalls and watercourse and on wall in beech wood, ca 250–1400 m a.s.l. – temp.
- Pleuroidium acuminatum* Lindb. – 4. On soil in ilex wood, 900 m a.s.l. – suboc.
- Pleurochaete squarrosa* (Brid.) Lindb. – 15, 33, 36. On cliff near sea, on soil and on rock in ilex wood ca 50–900 m a.s.l. – submed.
- Pogonatum aloides* (Hedw.) P.Beauv. – 2. On soil in beech wood, 530 m a.s.l. – temp.
- Pogonatum nanum* (Hedw.) P.Beauv. – 4. On soil in ilex wood, 950 m a.s.l. – suboc-submed.
- Pohlia annotina* (Hedw.) Lindb. – 4. On soil in ilex wood, 950 m a.s.l. – temp.
New to Calabria. Rare in central and southern Italy.
- Pohlia cruda* (Hedw.) Lindb. – 5. On humid soil, 1500 m a.s.l. – temp-mont.

Pohlia elongata Hedw. – 4, 14. On soil, 900 m a.s.l. – bor-mont.

Rare in southern Italy.

Pohlia wahlenbergii (F.Weber & D.Mohr.) Jenn. var. *wahlenbergii* – 31. In a small marsh, ca. 1500 m a.s.l. – subbor.

Not found in Calabria since before 1950.

Pohlia sp. – 34. On soil, 1200 m a.s.l.

Polytrichastrum longisetum (Sw. ex Brid.) G.L.Sm. – 26. On soil in beech wood, 1600 m a.s.l. – bor.

New to Calabria and rare in southern Italy.

Polytrichum commune Hedw. – 33. On soil in ilex wood, 900 m a.s.l. – subbor.

Polytrichum juniperinum Hedw. – 32. On rock, 2170 m a.s.l. – temp.

Polytrichum piliferum. Hedw. – 1, 2. On soil in beech wood, ca 1500 m a.s.l. – temp.

Pseudocrossidium hornschuchianum (Schultz) R.H.Zander – 20, 28, 29. On soil, ca 100–1500m a.s.l. – submed-suboc.

Pseudoleskea incurvata (Hedw.) Loeske – 1, 2, 31, 32. On soil, on cliff and on bark in beech wood, 1500–2000m a.s.l. – bor-mont.

Pseudoleskea radicata (Mitt.) Macoun & Kindb. – 31. On soil, 1500 m a.s.l. – subarc-alp.
New to southern part of Italian peninsula

Pseudoscleropodium purum (Hedw.) M.Fleisch. – 4. On soil in ilex wood, m 800 a.s.l. – temp.

Pterigynandrum filiforme Hedw. var. *filiforme* – 1, 8. On soil in beech wood and on bark of *Quercus petraea*, 1400–1500 m a.s.l. – bor-mont.

Pterogonium gracile (Hedw.) Sm. – 1. On rock in beech wood, 1500 m a.s.l. – suboc-submed-mont.

Ptycodium plicatum (Schleich. ex F.Weber & D.Mohr) Schimp. – 3, 21. On soil and on bark in beech wood, ca 1100–1350 m a.s.l. – subarc-subalp.

New to Calabria. Rare in southern Italy, where it had not been found since before 1950.

Racomitrium aciculare (Hedw.) Brid. – 3. On humid soil and rock in beech wood, 1300–1400 m a.s.l. – suboc-mont.

Rare in central and southern Italy.

Racomitrium canescens (Hedw.) Brid. – 12. On rock and on slope in beech wood, ca 1000 m a.s.l. – bor.

Racomitrium elongatum Ehrh ex Frisvoll – 34. On soil, 1260 m a.s.l. – bor.

New to southern part of Italian peninsula. Rare in Italy.

Racomitrium heterostichum (Hedw.) Brid. – 1. On rock in beech wood, 1600 m a.s.l. – temp-mont.

Rare in central and southern Italy.

Racomitrium microcarpon (Hedw.) Brid. – 17. On slope, 1000 m a.s.l. – bor-mont.

New to southern Italy. In central Italy only known from Sardinia. The record confirms the presence of these species in the Italian bryoflora, being previously based on data before 1950.

Rhabdoweisia crispata (Dicks.) Lindb. – 17, 21. On soil in humid slope, ca 620–1300 m a.s.l. – suboc-mont /dealp.

Known only from few localities of northern Italy.

- Rhynchostegium murale* (Hedw.) Schimp. – 16. On soil in slope in coark oak wood, 60 m a.s.l. – temp.
Not found in Calabria since before 1950.
- Rhizomnium punctatum* (Hedw.) T.J.Kop. – 2, 5, 8, 12, 21. On humid soil and on bark of *Fagus sylvatica*, 1000–1500 m a.s.l. – n.suboc.
- Schistidium confertum* (Funck) Bruch & schimp. – 33. On rock in ilex wood, ca 900 m a.s.l. – subbor-mont.
Little known in Italy.
- Schistidium crassipilum* H.H.Blom. – 33. On rock in ilex wood, ca 900 m a.s.l. – temp.
- Scleropodium touretii* (Brid.) L.F.Koch. – 2, 5. On soil, 1500 m a.s.l. – oc-submed.
- Scorpiurium circinatum* (Bruch) M.Fleisch. & Loeske – 15. On cliff, near sea, ca 50 m a.s.l. – oc-med.
- Sphagnum palustre* L. – 24. In a marsh, 1050 m a.s.l. – subbor.
It had not been found in southern Italy since before 1950.
- Syntrichia calcicola* J.J.Amann – 32. On rock in a clearing, 2000 m a.s.l. – submed-mont.
New to southern part of Italian peninsula. Rare in central Italy.
- Syntrichia montana* Nees var. *montana* – 4. On bark of *Quercus ilex*, 800 m a.s.l. – submed-mont.
- Syntrichia norvegica* F.Weber – 31. On rock, 2000 m a.s.l. – subarc-subalp.
New to southern part of Italian peninsula.
- Syntrichia princeps* (De Not.) Mitt. – 29, 31. On grasssland soil and on rock, 1500–2000 m a.s.l. – oc-submed.
Not found in Calabria since before 1950.
- Syntrichia ruralis* (Hedw.) F.Weber & D.Mohr var. *ruralis* – 27, 34. On soil in a wood of *Quercus cerris* and *Pinus laricio* and on bark of *Quercus petraea*, ca 1260–1500 m a.s.l. – temp.
- Thamnobryum alopecurum* (Hedw.) Gangulee – 1, 6, 21. On soil in humid slope in beech wood, ca 620-1300 m a.s.l. – suboc-submed.
- Thuidium delicatulum* (Hedw.) Schimp. – 24. In a marsh, m 1050 a.s.l. – submed-suboc (-mont).
Not found in southern Italy since before 1950.
- Timmiella barbuloides* (Brid.) Mönk. – 5. On soil in slope, 1500 m a.s.l. – med.
- Tortella flavovirens* (Bruch) Broth. var. *flavovirens* – 6, 20. On soil in humid slope, 100-620 m a.s.l. – suboc-submed.
- Tortella inclinata* (R. Hedw.) Limpr. var. *inclinata* – 36. On soil – temp.
New to Calabria.
- Tortella nitida* (Lindb.) Broth. – 15, 33. On cliff and on tufa near sea, ca 50-900 m a.s.l. – oc-med.
New to Calabria.
- Tortella tortuosa* (Hedw.) Limpr. var. *tortuosa* – 3, 31. On rock in beech wood, ca 1300-1800 m a.s.l. – bor-mont.
- Tortula canescens* Mont. – 4, 16. On soil in slope and on trunk base of *Olea europaea*, ca 50-800 m a.s.l. – suboc-submed.

Tortula marginata (Bruch & Schimp.) Spruce – 32. On rock in a clearing, 2000 m a.s.l. – oc-med.

Not found in Calabria since before 1950.

Trichostomum brachydontium Bruch – 15. On cliff near sea, ca 50 m a.s.l. – submed-mont.

Trichostomum crispulum Bruch - 33. On tufa, 900 m a.s.l. – temp.

Weissia sp. – 33. On tufa, 900 m a.s.l.

Discussion

During the VIII *Iter* 552 specimens were collected, almost all composed of more than one taxon. Altogether 177 taxa (37 liverworts and 140 mosses) have been found. As was anticipated by Campisi & al. (2000) many of these taxa are of phytogeographic interest in that they are new for the Calabrian bryoflora and also rare in southern Italy or throughout the entire peninsula. They mainly include montane taxa above all belonging to boreal-montane chorotypes.

In particular, among the liverworts *Scapania aequiloba* and *Anastrophyllum minutum* are new to Calabria, the first of which previously unknown in southern part of Italian peninsula and the other rare in this territory.

With regard to the mosses, on the whole 22 are new to Calabrian bryoflora, many of which are of phytogeographic interest.

Brachythecium mildeanum and *Racomitrium microcarpon* were unknown in southern Italy, while *Rhabdoweisia crispata* was unknown both in central and southern Italy. *Pseudoleskea radicata*, *Syntrichia calcicola*, *S. norvegica* and *Racomitrium elongatum* are new to southern part of Italian peninsula. The latter is a very rare taxon throughout in Italy.

Moreover, *Anacolia webbii*, rare species in Europe included in the “Red data book of European bryophytes” (ECCB 1995), has been found for the first time in peninsular Italy. This finding has previously been reported by Campisi & al. (2003).

Also interesting is the record of *Racomitrium microcarpon* because it confirms the presence of this species in the Italian bryoflora, being previously based on data before 1950 (Aleffi & al. 2008). Furthermore, 3 taxa (*Ptycodium plicatum*, *Sphagnum palustre* and *Thuidium delicatulum*) had not been found in southern Italy and 13 in Calabria since before 1950.

Lastly, new localities are recorded for other 20 rare taxa (such as *Diplophyllum albicans*, *Scapania subalpina*, *Fabronia ciliaris*, *Grimmia decipiens*, *Pohlia annotina*) in southern Italy or throughout the entire peninsula.

In the light of the data reported here, it is clear that the collections made during the VIII *Iter* not only contributes to the knowledge of bryoflora in the Calabrian region, but also fills wide gaps in knowledge about the distribution of numerous taxa.

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Appendix 1. Collecting localities per province

REGGIO CALABRIA PROVINCE

1: Gambarie; 2: Monte Basilico; 3: Listi stream; 4: Monte Cerasia; 5: Tre Limiti; 6: Ponte Moio; 7: Maesano waterfall; 8: Canovai; 9: Fiumara Amendolea; 10: Fiumara La Verde; 11: Pizzo Schiavone; 12: Serro Sgarrone; 13: Portella Bova; 14: Serro Schiavo; 15: Bagnara; 16: Campo Calabro; 17: Ferdinanda; 18: Marmarico waterfall; 19: Montalto.

CROTONE PROVINCE

20: Neto stream.

CATANZARO PROVINCE

21: Monte Pecoraro; 22: Allaro stream; 23: Angitola lake.

COSENZA PROVINCE

24: Trifoglietti lake; 25: Monte Basilicò; 26: Fontana del Colonnello; 27: Camigliatello; 28: Cecita lake; 29: Macchialonga; 30: Argentino stream; 31: Monte Pollino; 32: Serra del Prete; 33: Colloreto; 34: Timpa di Cassano; 35: Colle Dragone; 36: Raganelle Canyon; 37: Piani di Pollino.