Miscellaneous Records of Lichenicolous Fungi from the Italian Alps

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Wolfgang von Brackel

Abstract: Brackel, W. v. 2013. Miscellaneous records of lichenicolous fungi from the Italian Alps. – Herzogia **26**: 141–157.

A commented list of 69 lichenicolous fungi from the central and eastern part of the Italian Alps is presented; 14 of them are recorded as new to Italy. The new species *Pronectria pedemontana*, growing on *Collema auriforme*, is described.

Zusammenfassung: Brackel, W. v. 2013. Einige Nachweise von flechtenbewohnenden Pilzen aus den italienischen Alpen. – Herzogia **26**: 141–157.

Eine kommentierte Liste von 69 flechtenbewohnenden Pilzen aus dem mittleren und östlichen Teil der italienischen Alpen wird vorgestellt, von denen 14 erstmals für Italien erwähnt werden. Die neue, auf *Collema auriforme* wachsende Art *Pronectria pedemontana* wird beschrieben.

Key words: Ascomycetes, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia.

Introduction

In the second half of the 19th century lichenicolous fungi of the Italian Alps were explored with great emphasis by M. Anzi, F. Baglietto, A. Carestia, A. Massalongo and others. F. Arnold and E. Kernstock contributed studies from Southern Tyrol, now part of Italy. It was not until the end of the 20th century that the research started again, for instance with studies of J. Hafellner and M. Tretiach. This paper is part of a series of contributions to the flora of lichenicolous fungi in Italy.

Material and Methods

The specimens were studied macroscopically with a Zeiss stereo microscope at magnifications up to ×40 and microscopically with an Olympus BX 51 microscope. Measurements were taken on thin hand-cut sections mounted in water. Statistical measurements are indicated as (minimum–) $\overline{X}-\sigma_x-\overline{X}+\sigma_x$ (–maximum) followed by the number of measurements; the length/breadth ratio of ascospores and conidia is indicated as l/b and given in the same way. For identification and staining, the standard reagents 10% KOH, Steiner's solution, lactic acid, Lugol's solution, and cotton blue were used. If not otherwise indicated the specimens are deposited in the private herbarium of the author at the Institut für Vegetationskunde und Landschaftsökologie (hb ivl), the type specimen of the new taxon in M. All specimens were investigated microscopically, but from very common species (e.g. *Lichenoconium erodens*) not all specimens were kept in the herbarium. All political entities down from the regions are consequently written in the Italian notation.

Results

The bold numbers A001–A038 indicate the localities described below. All specimens leg. W. & G. v. Brackel, det. W. v. Brackel. Species marked with an "L" are lichenized (parasitic lichens).

Abrothallus caerulescens C.Kotte

A003: on *Xanthoparmelia conspersa* (hb ivl 6303).

A widely distributed species on *Xanthoparmelia conspersa* and close relatives. In Italy it was known from Sicilia (Kernstock 1890, Brackel 2008b), but it is to be expected in all parts of the Alps and the Apennine Mountains with siliceous bedrock.

Abrothallus cladoniae R.Sant. & D.Hawksw.

A001: on *Cetraria islandica* (hb ivl 6197).

Small greenish pruinose stalked ascomata, ascospores 7–10 × 3 µm, easily breaking in two single spores already in the asci, growing on the thallus of *Cetraria islandica*. The specimen fits well the features of the protologue (Hawksworth 1990). *Abrothallus cladoniae* is known to occur on different species of *Cladonia*, including the subgen. *Cladina*. As the host was weakened by a coinfection with *Lichenoconium usneae*, this may be a secondary infection and *Cetraria islandica* is an optional host; several species of *Cladonia*, e.g. *C. rangiferina*, were growing mixed with *Cetraria islandica* at the location but were not searched especially for *A. cladoniae*, as the fungus was identified only in the laboratory.

The species is known from Europe and North America. New to Italy.

Abrothallus parmeliarum (Sommerf.) Arnold

A031: on *Parmelia sulcata* (hb ivl 6347).

A worldwide distributed commensalist on *Parmelia* s. str. In Italy it is known from Friuli-Venezia Giulia, Lombardia, Piemonte, Puglia, Sicilia, Trentino-Alto Adige, and Veneto (Massalongo 1852, Anzi 1860, Baglietto & Carestia 1865–1867, Jatta 1875, Hafellner 1998, BSM 2006–2012, Brackel 2008b).

Abrothallus peyritschii (Stein) C.Kotte

A017: on *Vulpicida pinastri* (hb ivl 6326).

The species, always growing on *Vulpicida* spp., is widely distributed over the northern hemisphere, but not common. In Italy it was known from Trentino-Alto Adige (Kotte 1909, Keissler 1930, BSM 2006–2012).

Abrothallus prodiens (Harm.) Diederich & Hafellner

A017: on *Hypogymnia physodes* (hb ivl 6324).

The species is widely distributed over the northern hemisphere, growing on *Hypogymnia* and the related genus *Menegazzia*. Our specimen fits well the features of the protologue except for a greenish pruina we could observe on younger ascomata. New to Italy.

Abrothallus usneae Rabenh.

A014: on *Usnea rigida* agg. (hb ivl 6320).

In our specimen we found only pycnidia of the *Vouauxiomyces* type, c. 50 µm diam., with truncate, irregular ellipsoid, hyaline conidia, 7–8 × 4–4.5 µm. This is in accordance with the features mentioned by Etayo & Sancho (2008). *Abrothallus usneae* is new to Italy.

Actinocladium rhodosporum Ehrenb.

A007: on *Flavoparmelia caperata*, *Lepraria rigidula* (hb ivl 6310).

This hyphomycete is a widespread saprophyte on bark and lignum (Ellis 1971, Yurchenko 2001), but facultatively assumes a lichenicolous habit on different foliose and crustose lichens.

Arthonia phaeophysciae Grube & Matzer

A021: on *Phaeophyscia orbicularis* (hb ivl 6334).

A widespread parasite on several species of *Phaeophyscia*, known from Europe and South America. New to Italy.

Arthonia subvarians Nyl.

A001: on *Lecanora polytropa* (hb ivl 6196).

Ascomata arthonioid, slightly convex, c. 60–70 µm high, 120–150 µm diam., covered with a hyaline gelatinous sheet. Hymenium hyaline, I+ deep wine-red, KI+ blue. Hypothecium brownish with a reddish tinge, K+ pale olive brown. Epithecium greyish brown, K–. Paraphyses septate, branched, c. 2 µm wide, apically swollen and pigmented. Asci apically conspiciously thickened, with a small internal beak, KI–, (4–)8-spored, saccate, 20–30 × 11–15 µm. Ascospores 1-septate, ellipsoid to slightly soleiform, smooth, indistinctly halonate, (8.5–)9.6–11(–12) × 4–4.5(–5) µm, l/b = (1.9–)2.2–2.7(–3) (n = 40).

Twelve taxa of *Arthonia* are known to grow on *Lecanora*. Among them, five taxa with 1-septate ascospores and 8-spored asci are growing on the apothecial discs of saxicolous *Lecanora* species: *A. apotheciorum* (A.Massal.) Almq., *A. galactinaria* Leight., *A. lecanorina* (Almq.) R.Sant., *A. sherparum* Grube & Matzer, and *A. subvarians* Nyl. *Arthonia apotheciorum* and *A. galactinaria* are distinguished by the dark brown epithecium and the bigger asci, *A. sherparum* by the dark brown hypothecium and *A. lecanorina* by the broader asci (18–22 µm vs. 11–15 µm). Our specimen fits the short description of *A. subvarians* of Nylander (1868) except for the smaller ascospores (Nylander: 11–15 × 4.5–5.5 µm), but this may be due to the state of development. Characteristic is the I+ wine-red hymenium.

A rarely recorded parasite in the hymenia of *Lecanora* species. It was known in Italy from Toscana and Trentino-Alto Adige (as *Arthonia clemens* on *Lecanora muralis*, Nimis et al. 1990, BSM 2006–2012), but these finds should be reinvestigated as the hosts (*L. muralis*, *L. varia*) leave doubts about the identity.

Arthrorhaphis aeruginosa R.Sant. & Tønsberg

A011: on *Cladonia digitata* (hb ivl 6315); on *C. pyxidata* subsp. *pyxidata* (hb ivl 6332); **A032**: on *Cladonia* sp. (hb ivl 6350, in the specimen of *Phaeopyxis punctum*).

A widespread parasite, growing mainly on the squamules of several *Cladonia* species excl. *Cladina*. In Italy it was known until now only from Lombardia (Brackel 2010d), but it is to be expected from all parts of the Alps and other regions with a mountainous climate.

[L]***Aspicilia parasitica*** de Lesd.

A006: on *Aspicilia caesiocinerea* agg. (hb ivl 6307, in the specimen of *Lichenostigma elongatum*).

This lichenicolous lichen is known from several regions throughout Italy, but according to Nimis & Martellos (2008) not yet from Lombardia.

Athelia arachnoidea (Berk.) Jülich

A007: on *Flavoparmelia caperata*, in the sclerotic state (hb ivl 6308, in the specimen of *Chalara* aff. *inflatipes*).

According to Arvidsson (1976) the parasites on lichens and algae with sclerotia belong to *A. arachnoidea*, whilst the saprophytic group of *A. epiphylla* does not develop sclerotia.

In Italy this agressive parasite was known from Basilicata, Lombardia, Puglia, and Sicilia (Brackel 2008b, 2010d, 2011a).

Biatoropsis usnearum Räsänen

A036: on *Usnea dasypoga* (hb ivl 6356).

A cosmopolitan parasite on *Usnea* spp. and close relatives. In Italy the species is known from Trentino-Alto Adige (Diederich & Christiansen 1994, BSM 2006–2012).

Calongeomyces gibelluloides (D.Hawksw. & Etayo) D.Hawksw. & Etayo

A007: on *Flavoparmelia caperata* (hb ivl 6308, in the specimen of *Chalara inflatipes*); Lombardia, Prov. di Brescia, Parco Naturale dell'Adamello, Val Malga SE Sónico, on dead wood, on *Cladonia pyxidata* and on *Tremella cladoniae*, 1170 m, 46°07'59"N/10°22'59"E, 08.09.2009 (hb ivl 6361).

This rarely reported species was known only from Spain and Germany (Hawksworth & Etayo 2010, Brackel 2010b). In our specimen 6361 it grew on the squamules of *C. coniocraea* as well as on the basidiomata of *Tremella cladoniae* (the latter reported for Lombardia in Brackel 2010d). New to Italy.

Chalara aff. ***inflatipes*** (Pr.) Sacc.

A007: on *Flavoparmelia caperata* and adjacent areas of the bark of *Castanea sativa* (hb ivl 6308).

The genus *Chalara* comprises dematiaceous and hyaline hyphomycetes living on wood, bark and plant debris; three known species are lichenicolous fungi (*C. lichenicola*, *C. lobariae*, *C. pseudocyphellariae*). In our specimen we found 3–10-septate phialophores, phialides 80–125 µm long, venter 8–14 µm wide, collarette 5–7 µm wide, ratio of length of collarette to venter c. 2 : 1, conidia 3-septate, 24–30 × 4–4.5 µm. In its features the specimen is very near to *C. angustata* T.Kowalski & Halmschlager, but in this species the ratio of length of collarette to venter is 1.4 : 1 and the conidia are broader [4.8–6(–7) µm] (Nag Raj & Kendrick 1975, Kowalski & Halmschlager 1996, McKenzie et al. 2002).

C. inflatipes was described growing on *Alnus* and known only from Germany. In our specimen we found colonies growing on the bark of *Castanea sativa* as well as in a lichenicolous habit on the more or less healthy looking thallus of *Flavoparmelia caperata*. The host was coinfected with *Athelia arachnoidea*, *Calongeomyces gibelluloides* and *Lichenoconium usneae*.

Cercidospora epipolytropa (Mudd) Arnold

A010: on *Lecanora polytropa*, apothecia (hb ivl 6314).

A cosmopolitan species, rather common on siliceous substrates on *Lecanora polytropa* agg. and related species. In Italy it was known from Friuli-Venezia Giulia, Sicilia, Toscana, and Trentino-Alto Adige (Hafellner 1987, Tretiach & Hafellner 2000, Brackel 2008a, b, Calatayud et al. in press).

Cercidospora melanophthalmae Nav-Ros., Calat. & Hafellner

A006: on *Rhizoplaca melanophthalma* (hb ivl 6306).

Ascomata perithecioid, immersed in the host thallus, wall hyaline in the lower part, bluish-green in the upper part, 90–160 µm diam., asci c. 50–65 × 10–12.5 µm, 6–8-spored, ascospores hyaline, 1-septate, spindle-like, slightly heteropolar, 17–22 × 4.5–5.5 µm, l/b = c. 4.

The species, confined to the host *Rhizoplaca melanophthalma*, is known from a multitude of locations spread over the northern hemisphere (Calatayud et al. in press). New to Italy.

Cladosporium licheniphilum Heuchert & U.Braun

A001: on *Pseudevernia furfuracea* (hb ivl 6199, in the specimen of *Lichenostigma maureri*); **A007**: on *Flavoparmelia caperata*; **A019**: on *Peltigera degenii* (hb ivl 6330, in the specimen of *Periconia digitata*).

An rather common hyphomycete on several foliose, fruticose and crustose lichens. In Italy it was known from Basilicata, Lombardia, Puglia, Toscana and Sicilia (Brackel 2008b, c, 2010d, 2011a).

Clypeococcum hypocenomycis D.Hawksw.

A033: on *Hypocenomyce scalaris* (hb ivl 6351); **A036**: on *H. scalaris* (hb ivl 6354).

The species is widely distributed in the northern hemisphere and common at least in Central Europe, growing on *Hypocenomyce* spp. In Italy it was known from Emilia Romagna (Tretiach et al. 2008).

Comatricha laxa Rostaf.

A036: on *Cladonia rangiferina* (hb ivl 6357).

Like other myxomycetes growing on lichens (e.g. *Licea parasitica*), this species seems not to be parasitic on the lichen but using it as a substratum for the fructification.

Cornutispora intermedia Punith. & D.Hawksw.

Lombardia, Prov. di Bescia, Parco dell'Adamello, Valle dell'Avio S Temù, on *Alnus incana*, on *Physcia* sp., 1200 m, 46°13'46"N/10°28'38"E, 7.9.2009, W. v. B. (hb ivl 5224).

This species is recorded from only a few locations in Europe, North and South America. It seems to be not host specific and was found on crustose as well as on foliose lichens. New to Italy.

Cornutispora lichenicola D.Hawksw. & B.Sutton

A032: on *Cladonia polydactyla* (hb ivl 6349).

A cosmopolitan species on a multitude of lichen genera. In Italy it is known from Lombardia, Emilia Romagna, Sicilia, and Trentino-Alto Adige (Hawksworth 1981, Tretiach et al. 2008, Brackel 2008b, 2010d).

Diederichia pseudeverniae (Etayo & Diederich) D.Hawksw.

A011: on *Pseudevernia furfuracea* (hb ivl 6316); **A013**: on *P. furfuracea* (hb ivl 6318).

A very rarely reported parasite on *Pseudevernia furfuracea* with some scattered occurances in Europe. In addition to the description of Etayo & Diederich (1996) we found a few (two among 50) conidia with a median septum in the specimen 6316. New to Italy.

Dinemasporium strigosum (Pers. ex Fr.) Sacc.

A001: on *Pseudevernia furfuracea* (hb ivl 6199, in the specimen of *Lichenostigma maureri*).

Dinemasporium strigosum is a common saprophyte on grasses, but facultatively assumes a lichenicolous habit; the species is mainly found on *Peltigera* spp., but also on *Parmelia sulcata* or *Xanthoria parietina* (Brackel 2010b). It was reported from Italy growing on the grass *Andropogon ischaemum* (e.g. Passerini 1867), but not as lichenicolous. *Pseudevernia furfuracea* is a new host.

Ellisembia lichenicola Heuchert & U.Braun

A008: on *Lecanora chlarotera* (hb ivl 6311).

A rare but probably overlooked hyphomycete on foliose and crustose lichens. In Italy it was known from Puglia (Brackel 2011a).

Epicladonia sandstedei (Zopf) D.Hawksw.

A036: on *Cladonia rangiferina* (hb ivl 5952).

This gall-inducing and widely distributed parasite lives on a multitude of *Cladonia* species. New to Italy.

Libertiella malmedyensis Speg. & Roum.

A035: on *Peltigera didactyla* (hb ivl 6353).

This coelomycete has a wide distribution in Europe, North and South America, growing on *Peltigera* spp., especially on *P. didactyla*. New to Italy.

Licea parasitica (Zukal) Martin

A002: on *Parmeliopsis ambigua* (hb ivl 6200).

A myxomycete, commonly growing on corticolous lichens.

Lichenoconium erodens M.S.Christ. & D.Hawksw.

A002: on *Pseudevernia furfuracea*, *Vulpicida pinastri*; **A003**: on *Xanthoparmelia conspersa*, apothecia (hb ivl 6304, in the specimen of *Phacopsis fusca*); **A004**: on *Flavoparmelia caperata*; **A007**: on *F. caperata*; **A008**: on *Punctelia jeckeri*; **A013**: on *Hypogymnia physodes*, *P. furfuracea* (hb ivl 6318, in the specimen of *Diederichia pseudeverniae*); **A019**: on *Parmelia sulcata*, *Ramalina farinacea*; **A024**: on *Parmotrema reticulatum*; **A025**: on *F. caperata*; **A031**: on *R. farinacea*; **A034**: on *Bryoria nadvornikiana*, *Parmeliopsis ambigua*.

This cosmopolitan species is a pathogenic parasite on foliose, fruticose and crustose lichens. In Italy it was known from Basilicata, Emilia Romagna, Lombardia, Puglia, Toscana, and Sicilia (Brackel 2008a, b, c, 2011a, Tretiach et al. 2008).

Lichenoconium pyxidatae (Oudem.) Petr. & Syd.

A011: on *Cladonia digitata* (hb ivl 6315, in the specimen of *Arthrorhaphis aeruginosa*); **A036**: on *Cladonia gracilis*, podetia (hb ivl 5951).

In our specimens we found conidiomata of 60–100 µm diam. with brown walls and pale to medium brown, truncate conidia, 2.5–3.5 × 2–3 µm. According to Lawrey et al. (2011) four species of *Lichenoconium* are known on *Cladonia*. *L. erodens* is distinguished by smaller conidiomata [(20–)30–50 (–60) µm] and a high pathogenity, *Lichenoconium usneae* and *L. aeruginosum* by bigger conidia [(2.9–) 3.2–3.8(–4.2) × (2.4–)2.9–3.4(–3.7) respectively (3.4–)3.8–4.6(–5.4) × (3–)3.4–3.8(–4.3) µm], the latter also by the bluish grey pigmentation of the upper part of the pycnidial wall.

Lichenoconium pyxidatae is a common and widespread parasite on several species of *Cladonia* incl. subgen. *Cladina*. In Italy it was known from Lombardia and Puglia (Brackel 2010d, 2011a).

Lichenoconium usneae (Anzi) D.Hawksw.

A001: on *Cetraria islandica* (hb ivl 6197, in the specimen of *Abrothallus cladoniae*); **A007**: on *Flavoparmelia caperata* (hb ivl 6308, in the specimen of *Chalara inflatipes*).

A cosmopolitan and common species on a multitude of foliose and fruticose lichens. In Italy it is known from Abruzzo, Basilicata, Lombardia, Puglia, Sicilia, and Trentino-Alto Adige (Anzi 1868, Hawksworth 1977, 1981, Nimis & Tretiach 1999, Brackel 2008a, 2011a).

Lichenopeltella peltigericola (D.Hawksw.) R.Sant.

A019: on *Peltigera degenii* (hb ivl 6330, in the specimen of *Periconia digitata*).

This widely distributed species is growing on the lower surface of several species of *Peltigera*; in our specimen we found it in a rich population. In Italy it was known from Lombardia (Brackel 2010d).

Lichenopeltella ramalinae Etayo & Diederich

A017: on *Ramalina farinacea* (hb ivl 6323).

A widespread but rather rare fungus on species of *Ramalina*. In Italy it was known from Sicilia (Brackel 2008b).

Lichenopeltella uncialicola Brackel

A036: on *Cladonia rangiferina* (hb ivl 5950).

This is the second find after the type specimen from Iceland (Brackel 2010a); *Cladonia rangiferina* is a new host. *Lichenopeltella rangiferinae* Brackel differs in bigger ascospores with three pairs of setulae, whilst these are lacking in *L. uncialicola* (Brackel 2011b). The description of the species has to be extended: asci 4(–8)-spored, ascospores sometimes slightly wider, up to 4.5 µm. New to Italy.

Lichenostigma cosmopolites Hafellner & Calatayud

A003: on *Xanthoparmelia conspersa* (hb ivl 6302); **A038**, on *X. conspersa* (hb ivl 6362).

A cosmopolitan species, common on *Xanthoparmelia* spp. on siliceous rocks. In Italy it is known from Lombardia, Sardegna, Sicilia, and Trentino-Alto Adige (Lettau 1958 as *Echinothecium reticulatum* on *Xanthoparmelia stenophylla*, Nimis & Poelt 1987 as *Echinothecium reticulatum* on *Parmelia conspersa*, Hafellner & Calatayud 1999, Calatayud et al. 2002, Brackel 2008a, b, 2010d).

Lichenostigma elongatum Nav.-Ros. & Hafellner

A005: on *Aspicilia caesiocinerea* agg. (hb ivl 6305); **A006**: on *A. caesiocinerea* agg. (hb ivl 6307).

A cosmopolitan species, growing on different species of *Aspicilia*, on calcareous as well as on siliceous rocks. In Italy it was known from Abruzzo, Emilia-Romagna, Liguria, Sicilia, and Trentino-Alto Adige (Nimis & Tretiach 1999, Brackel 2008a, b).

Lichenostigma maureri Hafellner

A001: on *Pseudevernia furfuracea* (hb ivl 6199); **A002**: on *Vulpicida pinastri* (hb ivl 6301).

A widespread and common parasymbiont on diverse foliose and fruticose epiphytic lichens. In Italy it is known from Basilicata, Lombardia and Trentino-Alto Adige (Hafellner 1982, Thor 1985, Brackel 2011a).

Lichenostigma rugosum G.Thor

A034: on *Diploschistes scruposus* (hb ivl 6352).

A cosmopolitan and rather common parasymbiont on *Diploschistes* spp. In Italy it was known from Liguria and Sicilia (Thor 1985, Nimis et al. 1994, Brackel 2008b).

Marchandiobasidium aurantiacum Diederich & Schultheis

A029: on *Physcia adscendens*, *P. tenella* (hb ivl 6341).

This virulent parasite, growing on different species of *Physcia*, *Physconia* and *Xanthoria*, is widespread in Europe and regionally common, especially in air polluted areas. In Italy it was known from Sicilia and Toscana (Brackel 2008b, 2008c).

Marchandiomyces corallinus (Roberge) Diederich & D.Hawksw.

A037: on *Xanthoria fallax* (hb ivl 5136).

This widely distributed parasite is growing on many different lichens. In Italy it was known from Basilicata and Puglia (Brackel 2011a).

Merismatium nigritellum (Nyl.) Vouaux agg.

A026: on *Lempholemma polyanthes* (hb ivl 6337).

In *Merismatium nigritellum* most probably several taxa are included. Our specimen on *Lempholemma polyanthes* with globose ascomata of 100–125 µm diam. and (sub-)muriform, pale brown ascospores of 16–20 × 6–7 µm may represent a distinct taxon.

Muellerella lichenicola (Sommerf.: Fr.) D.Hawksw.

A029: on *Caloplaca cerina* (hb ivl 6340).

A cosmopolitan and common species on many host genera, mainly on epipetric and more rarely on epiphytic lichens. In Italy it was known from Basilicata, Puglia, Sardegna, Sicilia, and Trentino-Alto Adige (Nimis & Poelt 1987, Triebel 1989, Nimis et al. 1994, Brackel 2008a, b, 2011a).

Niesslia cladoniicola D.Hawksw. & W.Gams

A030: on *Cladonia rangiferina* (hb ivl 6344); **A036**: on *C. rangiferina* (hb ivl 5950, in the specimen of *Lichenopeltella uncialicola*).

This widely distributed but not common saprophyte, living on decaying parts of several *Cladonia* species, was known in Italy only from Sardegna (Nimis & Poelt 1987).

Periconia digitata (Cooke) Sacc.

A019: on *Peltigera degenii* (hb ivl 6330).

This hyphomycete is a saprophyte on stems and leaves of vascular plants, but occasionally assumes a lichenicolous habit (Etayo & Berger 2009). In our specimen 6330 it grew in a necrotic zone of the host thallus together with *Phoma peltigerae* and *Cladosporium licheniphilum*.

Phacopsis fusca (Triebel & Rambold) Diederich

A003: on *Xanthoparmelia conspersa* (hb ivl 6304).

A cosmopolitan species, growing on *Xanthoparmelia* spp. and related genera of the Parmeliaceae. In Italy it was known from Sardegna, Sicilia, and Trentino-Alto Adige (Triebel et al. 1995, Brackel 2008a, b).

Phaeopyxis punctum (A.Massal.) Rambold, Triebel & Coppins

A032: on *Cladonia polydactyla*, *Cladonia* sp. (hb ivl 6350).

A cosmopolitan species, growing on *Cladonia* spp. (incl. subgen *Cladina*). In Italy it was known from Lombardia and Veneto (Jatta 1909–11, as *Lecidea punctum*, Rambold & Triebel 1990, Nimis 1993, Brackel 2010d).

Phaeospora peltigericola D.Hawksw.

A030: on *Peltigera leucophlebia* (hb ivl 6345).

A rarely reported species (Europe, both Americas, Asia), growing on *Peltigera* spp. In Italy it was known only from the type location in Trentino-Alto Adige (Rehm 1904, Hawksworth 1980).

Phaeosporobolus alpinus R.Sant., Alstrup & D.Hawksw.

A019: on *Ochrolechia alboflavescens* (hb ivl 6328).

This cosmopolitan and common species grows on several species of *Pertusaria*, *Ochrolechia*, and *Varicellaria*. In Italy it was known from Basilicata, Puglia, Sardegna and Sicilia (Brackel 2008b, 2011a).

Phaeosporobolus usneae R.Sant. & D.Hawksw.

A001: on *Pseudevernia furfuracea* (hb ivl 6198); **A011**: on *P. furfuracea*, *Hypogymnia physodes*, *Usnea dasypoga* (hb ivl 6316, in the specimen of *Diederichia pseudeverniae*); **A013**: on *Bryoria nadvornikiana* (hb ivl 6319); **A015**: on *P. furfuracea*; **A017**: on *Bryoria fuscescens*; **A032**: on *P. furfuracea*; **A034**: on *P. furfuracea*, *U. dasypoga*; **A036**: on *P. furfuracea*, *U. dasypoga* (hb ivl 6356, in the specimen of *Biatoropsis usnearum*).

The possible anamorph of *Lichenostigma maureri* was found in mixed populations with this species (specimen 6198). In Italy it was known from Basilicata, Piemonte, Puglia and Trentino-Alto Adige (Hawksworth & Hafellner 1986, BSM 2006–2012, Brackel 2011a, Berger & Brackel 2011).

Phoma peltigerae (P.Karsten) D.Hawksw.

A019: on *Peltigera degenii* (hb ivl 6330, in the specimen of *Periconia digitata*); **A030**: on *Peltigera* sp. (hb ivl 6346).

In our specimen 6330 we measured conidia of 4–5 × 2–2.5 µm, in 6346 4–5 × 1.5–2 µm. *Phoma peltigerae* is widely distributed in Europe and North America, growing on *Peltigera* spp. In Italy it was known from Lombardia (Brackel 2010d).

Pronectria robergei (Mont. & Desm.) Lowen s. l.

A030: on *Solorina spongiosa*, *S. saccata* (hb ivl 6343).

A widely distributed species growing on *Peltigera* spp. and *Solorina* spp. A discrimination of *P. solorinae* Lowen & R.Sant. (ined.), based on the features of narrower ascospores (less than 5 µm) and pale buff exposed portions of the peridium is problematic, as shown by Zhurbenko (2009). In our specimen the ascomata grew in the hymenium of *S. spongiosa* and on the thallus of *S. saccata*; the ascospores measured c. 13–15 × 5 µm. In Italy *P. robergei* was known until now only from Piemonte (BSM 2006–2012).

Pronectria pedemontana Brackel **sp. nov.** [MycoBank 803500] (Figs 1, 2)

Fungus lichenicola in thallo lichenis *Collema auriforme* crescens. Ascomata immersa vel erumpia, hyalina vel lurida, 130–200 µm diam. et 150–180 µm alta. Asci clavati, 6–8-spori, 50–60 × 8–12 µm. Ascosporae ellipsoideae vel tenuiter ovoidae, 1-septatae, guttulatae, verruculosae, (13.5–)14–16.5 (–19) × (4–)4.9–6,4(–7) µm.

Typus: Germany, Oberbayern, Kreis Garmisch-Partenkirchen, Garmisch-Breitenau, Herrgottsschrofen, limestone rocks, on *Collema auriforme*, 780 m, MTB 8532/1, 24.8.2009, W. v. Brackel (M – holotypus, hb ivl 4967 – isotypus).

Ascomata first completely immersed in the host thallus, swelling the thallus on the upper and lower side, later erumpent (to more than half), scattered, obpyriform, 130–200 µm wide and 150–200 µm high, pale yellowish or whitish in exposed parts, brownish when covered by remnants of the host thallus, papilla truncate, c. 80 µm wide, without hairs; concolorous ostiole lined with periphyses c. 1 µm thick; ascomatal wall hyaline to very pale yellowish, 15–30 µm thick, formed by 4–7 rows of cells;

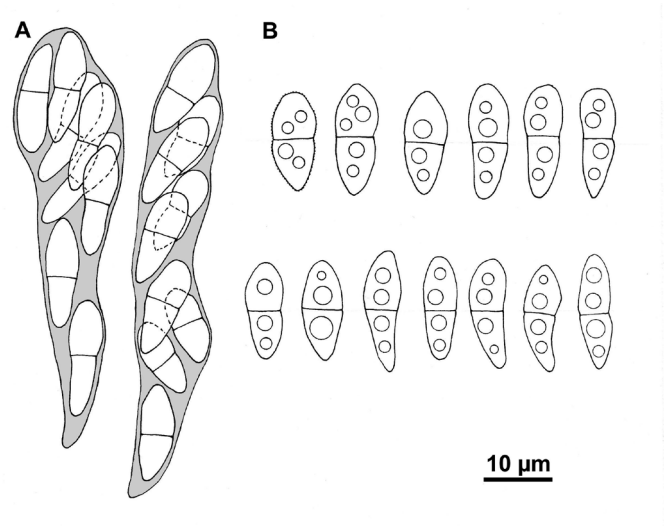

Fig. 1: *Pronectria pedemontana* (holotypus). **A** – asci with ascospores; **B** – ascospores (the ornamentation is indicated only in the first ascospore).

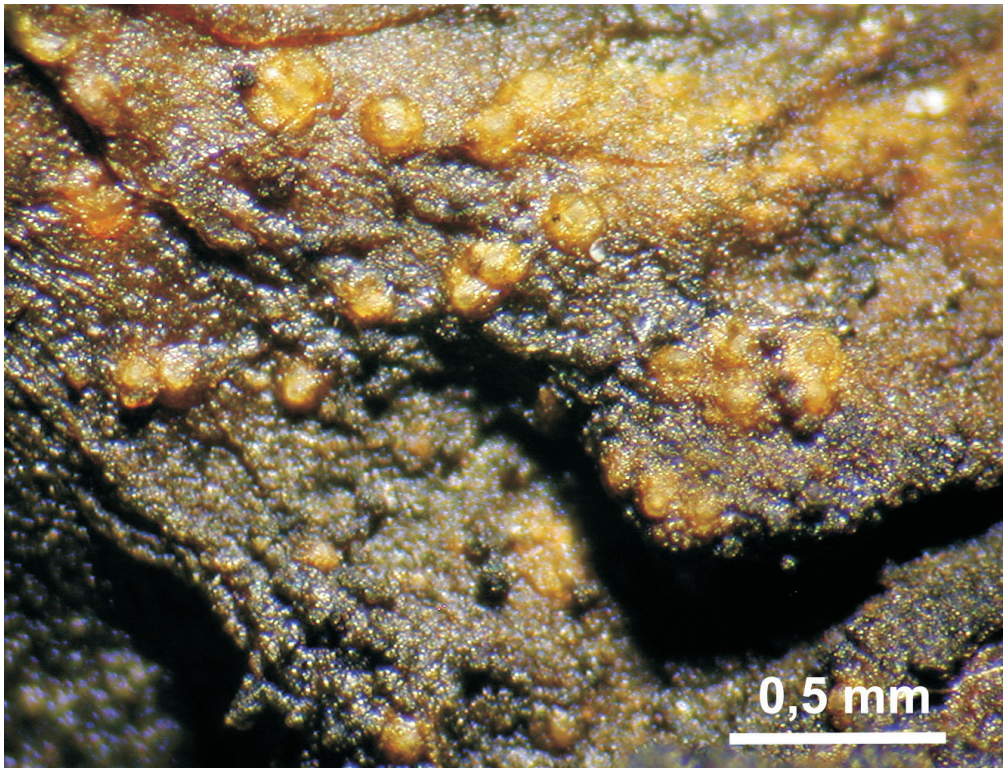

Fig. 2: *Pronectria pedemontana* (holotypus): part of the infected thallus of *Collema auriforme* with ascomata of *Pronectria pedemontana*.

these in cross section 5–10 × 3–4 µm, applanate, thick-walled with narrow lumina on the outer, thin-walled on the inner side of the wall, in surface view of textura angularis with cells of 5–10 µm across, K–, I–, lactic acid –; centrum with few orange oil drops.

Paraphyses gelatinizing, absent at maturity.

Asci clavate, 6–8-spored, apically rounded, wall not thickened, only ascoplasm I+ dextroid, c. 50–60 × 8–12 µm.

Ascospores irregular distichous in the asci, ellipsoid to narrowly ovoid, straight or slightly curved, hyaline, 1-septate, with cells frequently different in size and shape, the upper one being broader and rounded or rarely attenuated, the lower one narrower and mostly attenuated, constricted at the septum, slightly verruculose at high magnification, with two big or several smaller guttules in each cell, (13.5–)14–16.5(–19) × (4–)4.9–6.4(–7) µm, l/b = (1.9–)2.3–3.2(–3.5) (n = 40).

Etymology: The epithet "pedemontana" means "at the foot of the mountains"; all three known locations of the new species are situated at the edge of the Alps, the type locality at the northern side, the other two localities on the southern side.

Distribution and host: The new species is known from the type locality in Germany, Bavaria and from two localities in Italy, Lombardia and Friuli-Venezia Giulia. It lives on the thallus of *Collema auriforme*, causing a slight bleaching of the thallus. The type specimen was already recorded as *Pronectria* sp. in Brackel & Etayo (2010).

Additional specimens examined: Germany: Bayern, Oberbayern, Kreis Garmisch-Partenkirchen, Garmisch-Breitenau, Herrgottsschrofen, limestone rocks, on *Collema auriforme*, 780 m, MTB 8532/1, 24 April 2009, W. v. Brackel (hb Etayo – topotypus). – Italy: Lombardia, Prov. di Como, Gottro NE Portezza near Lago di Lugano, end of the Valle Sanagra, mixed forest with limestone rocks, on *C. auriforme*, 1200 m, 46°03'59,6"N/09°11'12,8"E, 01.11.2007, W. v. Brackel (hb ivl 6312); Friuli-Venezia Giulia, Prov. di Udine, Nimis, entrance to Abisso Vigant, on damp limestone rocks and on *Acer pseudoplatanus*, on *C. auriforme*, 550 m, 46°14'41,8"N/13°17'22,3"E, 31.5.2012, W. v. Brackel (hb ivl 6338).

Compared specimens: *Pronectria collematis*: Germany, Oberbayern, Kreis Garmisch-Partenkirchen, Garmisch-Breitenau, Herrgottsschrofen, limestone rocks, on *Collema undulatum*, alt. 780 m, MTB 8532/1, 47°28'54"N/11°02'53"E, 24.07.2009, W. v. Brackel 4966 (hb ivl – isotypus). *Pronectria terrestris*: Italy, Lombardia, Provincia di Brescia, Parco Naturale dell'Adamello, Valle dell'Avio S Temù, open soil with rubble, on unidentified crusts, c. 1300 m, 46°13'13"N/10°28'42"E, 07.09.2009, W. v. Brackel (hb ivl 4972).

Observations: On the hosts *Collema* spp. and *Leptogium* spp. nine species of Bionectriaceae and Nectriaceae are known. Two *Xenonectriella* species, *X. lutescens* (Arnold) Weese and *X. leptaleoides* (Etayo) Etayo, are easily separated from the new species by the K+ violet reaction of ascomatal wall. *Nectria brutia* Diederich & Puntillo and *Nectriopsis collematis* Diederich have superficial ascomata (Diederich & Puntillo 1995, Aptroot et al. 1997). *Pronectria pilosa* Etayo & Lòpez-Silanes and *P. leptogii* Etayo are distinguished by smaller ascospores [10–13.5(–15) × 3–3.5 µm, respectively 11–15.5 (–17) × 2.5–3(–4) µm] (López de Silanes et al. 2009, Etayo 2000). *Pronectria tenacis* (Vouaux) Lowen is distinguished by the pale orange ascospores and the red-orange ostiolar region of the ascomata, *P. collematis* Etayo & Brackel by the longer and narrower ascospores [(16–)18–21.5(–23) × (3.5–)3.7–4.3(–4.5) µm], and *P. diplococca* Kocourk. et al. by the easily disintegrating ascospores (Lowen 1990, Brackel & Etayo 2010, Khodosovtsev et al. 2012). The recently published key of *Pronectria* (Khodosovtsev et al. 2012) leads to *P. terrestris* Lowen & Diederich; this species shows similar features but has smooth ascospores, a reddish tinge of the ascomata and a completely different habitat, living immersed on the terricolous *Thrombium epigaeum* or terrestrial algae (Lowen & Diederich 1990, Brackel 2010d).

Pyrenochaeta xanthoriae Diederich

A028: on *Xanthoria parietina* (hb ivl 6339).

A widespread but rather rare parasite on *Xanthoria* spp., until now only known from Europe. In Italy it was known from Basilicata, Puglia, and Sicilia (Brackel 2008b, 2011a).

Scutula tuberculosa (Th.Fr.) Rehm

A016: on *Solorina saccata* (hb ivl 6321).

According to Wedin et al. (2007) this is the only species of *Scutula* growing on *Solorina* and includes *S. krempelhuberi* and *S. solorinaria*. New to Italy, but known from all neighbouring alpine countries.

Sphaerellothecium cladoniae (Alstrup & Zhurb.) Hafellner

A010: on *Cladonia pyxidata* agg. (hb ivl 6313); **A020**: on *C. pyxidata* subsp. *pyxidata* (hb ivl 6331); Friuli-Venezia Giulia, Sella Nevea, Altopiano del Montasio, on calcareous soil, on *C. symphycarpia* and *C. pyxidata* sub*sp. pocillum*, 2200 m, 14.07.2009, leg. A. Zehm, det. W. v. B. (hb ivl 5242).

A widely distributed species on *Cladonia* spp. except for subgen. *Cladina*. In Italy it was known until now only from Friuli-Venezia Giulia (Hafellner et al. 2005).

Stigmidium microspilum (Körb.) D.Hawksw.

A024: on *Graphis scripta* (hb ivl 6335); **A025**: on *G. scripta*.

This species, always growing on *Graphis scripta* s. l., is widespread through Europe. In Italy it is known from Friuli-Venezia Giulia (Tretiach 1993). It seems to avoid the Mediterranean region. Though *Graphis scripta* is not rare in the mountainous regions of the peninsula and the big islands, and we searched many specimens of the host for *Stigmidium microspilum*, which is easy to see due to the greyish flecks it causes on the host thallus, but we could not find it outside the Alps.

Stigmidium mycobilimbiae Cl.Roux, Triebel & Etayo

A020: on *Mycobilimbia hypnorum* (hb ivl 6333).

This species is widespread but not common in Europe and North America, growing on different species of *Bilimbia* and *Mycobilimbia*. In Italy it was known from Veneto (Roux & Triebel 1994, BSM 2006–2012) from one single find of Arnold in 1874 from the Val Fonda south of Schluderbach.

Stigmidium peltideae (Vain.) R.Sant.

A018: on *Peltigera* cf. *praetextata* (hb ivl 6327).

Stigmidium peltideae is almost worldwide distributed and grows on several species of *Peltigera*. In Italy it was known from Trentino-Alto Adige (Roux & Triebel 1994, BSM 2006–2012).

Stigmidium solorinarium (Vain.) D.Hawksw.

A016: on *Solorina saccata* (hb ivl 6322); **A030**: on *S. saccata* (hb ivl 6342).

A widespread species (Europe, North America, New Zealand) on *Solorina saccata* and *S. bispora*. New to Italy.

Stigmidium xanthoparmeliarum Hafellner

A038: on *Xanthoparmelia conspersa* (hb ivl 6363).

Stigmidium xanthoparmeliarum is confined to the pale brown coloured species of *Xanthoparmelia*. In Italy it is known until now only from Trentino-Alto Adige (Hafellner 1994, BSM 2006–2012).

Syzygospora physciacearum Diederich

A029: on *Physcia tenella* (hb ivl 6341, in the specimen of *Marchandiobasidium aurantiacum*).

A widely distributed, mild papathogen or commensalist on members of the Physciaceae. In Italy it was known from Basilicata and Puglia (Brackel 2011a).

Taeniolella cladinicola Alstrup

A036: on *Cladonia rangiferina* (hb ivl 6355).

This hyphomycete, confined to hosts of subgen *Cladina*, has a few occurrances scattered over Europe. As in a specimen from Bavaria (Germany), the conidia are a little rough, contrary to the protologue. New to Italy.

Taeniolella phaeophysciae D.Hawskw.

A021: on *Phaeophyscia orbicularis*, *Physcia ciliata* (hb ivl 6334, in the specimen of *Arthonia phaeophysciae*); **A037**: on *P. orbicularis* (hb ivl 5137).

A widespread species, reported from several European countries and North America, growing on *Phaeophyscia* spp. and *Physconia* spp. In Italy it was known from Basilicata, Lombardia, and Puglia (Brackel 2010d, 2011a).

Thelocarpon epibolum var. ***epithallinum*** (Leight. ex Nyl.) G.Salisb.

A016: on *Solorina saccata* (hb ivl 6321, in the specimen of *Scutula tuberculosa*); **A030**: on *Peltigera leucophlebia* (hb ivl 6345, in the specimen of *Phaeospora peltigericola*).

In Italy *Thelocarpon epibolum* s. l. is known from Trentino-Alto Adige, Friuli-Venezia Giulia, and Veneto (Nimis 1993, Nimis & Martellos 2008), but the variety is not indicated in these reports.

Tremella hypogymniae Diederich & M.S.Christ.

A017: on *Hypogymnia physodes* (hb ivl 6325).

The species is widely distributed over the northern hemisphere, growing on *Hypogymnia physodes*. In Italy it was known from Lombardia (Brackel 2010d).

Unguiculariopsis lettaui (Grummann) Coppins

A031: on *Evernia prunastri* (hb ivl 6348).

The species is widely spread over Europe, the Atlantic Islands and North America, always growing on *Evernia prunastri*. In Italy it is known from Basilicata, Toscana, and Trentino-Alto Adige (Diederich & Etayo 2000, BSM 2006–2012, Brackel 2011a).

Unguiculariopsis thallophila (P.Karst.) W.Y.Zhuang

A019: on *Lecanora carpinea* (hb ivl 6329).

The species is widespread in Europe and North America, growing on different epiphytic species of *Lecanora*. In Italy it was known from Basilicata and Sicilia (BSM 2006–2012, Brackel 2008b, 2011a).

Vouauxiomyces truncatus (de Lesd.) Dyko & D.Hawksw.

A007: on *Flavoparmelia caperata* (hb ivl 6309).

In contrast to the description in Hawksworth & Dyko (1979), where the species is treated as a parasymbiont, we could find sometimes slight discolorations of the host thallus in the infected areas. In Italy it was known from the Toscana (Brackel 2008c).

Xanthoriicola physciae (Kalchbr.) D.Hawksw.

A008: on *Xanthoria parietina* (hb ivl 6205, in the specimen of *Melanelixia subargentifera*).

A common and widespread parasite on *Xanthoria parietina* and *X. polycarpa*, frequent especially in areas with a high input of nutrients, favouring the host. In Italy it is known from Basilicata, Lombardia, Puglia, Sicilia, and Toscana (Santesson 1994, Nimis & Tretiach 1999, Nimis et al. 1994, BSM 2006–2012, Brackel 2008c, 2011a).

Localities with lists of lichens checked for lichenicolous fungi (all Italy).

A001 Lombardia, Prov. di Sondrio, between S. Giuseppe and Carotte in the Valmalenco, open soil with gneiss grus and spruces, 1650 m, 46°19'04,7"N/09°48'43,2"E, 29.10.2007. – *Cetraria islandica*, *Cladonia rangiferina*, *Lecanora polytropa*, *Pseudevernia furfuracea* (with apothecia!).

A002 Lombardia, Prov. di Sondrio, W of Chiareggio, on *Larix europaea*, 1635 m, 46°18'45,5"N/09°46'18,9"E, 29.10.2007. – *Bryoria fuscescens*, *Hypogymnia physodes*, *Parmelia sulcata*, *Parmeliopsis ambigua*, *Pseudevernia furfuracea*, *Vulpicida pinastri*.

A003 Lombardia, Prov. di Como, above Dosso del Livo, NW Gravedóna, small wall of schist, 715 m, 46°09'50,6"N/09°16'09,2"E, 30. 10.2007. – *Xanthoparmelia conspersa*.

A004 Lombardia, Prov. di Como, above Dosso del Livo, NW Gravedóna, forest of *Castanea sativa*, 715 m, 46°09'57,4"N/09°15'36,1"E, 30. 10.2007. – *Flavoparmelia caperata*.

A005 Lombardia, Prov. di Como, Monte Cortafon W Gravedóna, meadow of *Nardus stricta* with gneiss outcrops, 1388 m, 46°08'48,6"N/09°14'30,4"E, 31.10.2007. – *Acarospora fuscata*, *Aspicilia caesiocinerea* agg., *Candelariella vitellina*, *Dimelaena oreina*, *Rhizocarpon geographicum*, *Umbilicaria cylindrica*.

A006 Lombardia, Prov. di Como, Monte Cortafon W Gravedóna, meadow of *Nardus stricta* with gneiss outcrops, 1388 m, 46°08'54,6"N/09°13'54,3"E, 31.10.2007. – *Acarospora fuscata*, *Aspicilia caesiocinerea* agg. *Candelariella vitellina*, *Lecanora polytropa*, *Rhizocarpon geographicum*, *Rhizoplaca melanophthalma*, *Umbilicaria cylindrica*.

A007 Lombardia, Prov. di Como, Monte Cortafon W Gravedóna, forest of *Castanea sativa*, 980 m, 46°08'29,2"N/09°15'07,4"E, 31.10.2007. – *Candelariella reflexa*, *Flavoparmelia caperata*, *Lepraria incana* agg., *L. rigidula*.

A008 Lombardia, Prov. di Como, Gottro NE Portezza near Lago di Lugano, on *Juglans regia* at the roadside, 565 m, 46°02'43,2"N/09°10'39,1"E, 01.11.2007. – *Candelaria concolor*, *Lecanora chlarotera*, *Melanelixia subargentifera* (hb ivl 6205), *Parmelina tiliacea*, *Physcia ciliata*, *Punctelia jeckeri*, *Xanthoria fallax*, *X. parietina*.

A009 Lombardia, Prov. di Como, Gottro NE Portezza near Lago di Lugano, end of the Valle Sanagra, mixed forest with limstone rocks, 1200 m, 46°03'59,6"N/09°11'12,8"E, 01.11.2007. – *Anema nummularium* (hb ivl 6206), *Collema auriforme*, *Gyalecta jenensis*, *Normandina pulchella*, *Opegrapha dolomitica*.

A010 Lombardia, Prov. di Sondrio, Passo dello Spluga, gneiss rocks and outcrops, 1915 m, 46°28'30,0"N/09°21'07,2"E, 02.11.2007. – *Acarospora fuscata*, *Candelariella vitellina*, *Cladonia pyxidata*, *C. symphycarpia*, *Lecanora polytropa*, *Lecidea* spp., *Lecidella carpathica*, *Lecidoma demissum*, *Rhizocarpon geographicum*.

A011 Trentino-Alto Adige, Prov. di Trento, W Passo Pordoi, forest of *Picea abies* and *Larix europaea*, 1970 m, 46°29'04,2"N/11°47'22,4"E, 28.5.2012. – *Cladonia digitata*, *Hypogymnia physodes*, *Pseudevernia furfuracea* (with apothecia!), *Usnea dasypoga*.

A012 Veneto, Prov. di Belluno, SE Passo di Fedaia, Riserva Naturale Serrai di Sottoguda, limestone rocks, 1350 m, 46°25'31,2"N/11°55'10,1"E, 28.5.2012. – *Agonimia tristicula*, *Bilimbia sabuletorum*, *Fulgensia bracteata*, *Gyalecta jenensis*, *Lecanora muralis*, *Lecidella stigmatea*, *Peltigera praetextata*, *Protoblastenia rupestris*, *Solorina saccata*, *Toninia sedifolia*, *Verrucaria muralis*, *V. nigrescens*.

A013 Veneto, Prov. di Belluno, Cortina d'Ampezzo, Campeggio Cortina, on *Larix europaea*, 1130 m, 46°31'12,8"N/12°08'07,5"E, 28.5.2012. – *Bryoria fuscescens*, *B. nadvornikiana*, *Hypocenomyce scalaris*, *Hypogymnia farinacea*, *H. physodes*, *H. tubulosa*, *Melanohalea exasperatula*, *Parmelia sulcata*, *Parmeliopsis ambigua*, *Pseudevernia furfuracea*, *Tuckermannopsis chlorophylla*, *Usnea* spp.

A014 Veneto, Prov. di Belluno, Val da Rin W Auronzo, on *Abies alba*, 1000 m, 46°33'23,4"N/12°23'18,9"E, 29.5.2012. – *Usnea rigida* agg.

A015 Veneto, Prov. di Belluno, Val da Rin W Auronzo, on *Larix decidua*, 1060 m, 46°32'51,4"N/12°22'51,6"E, 29.5.2012. – *Pseudevernia furfuracea*.

A016 Veneto, Prov. di Belluno, Val da Rin W Auronzo, 995 m, edge of path through forest, 46°33'14,4"N/12°23'09,8"E, 29.5.2012. – *Solorina saccata*.

A017 Veneto, Prov. di Belluno, NE S. Stefano di Cadore, Valle Visdende near Albergo Gasperina, spruce forest, 1265 m, 46°36'29,2"N/12°37'51,4"E, 29.5.2012. – *Bryoria* spp., *Evernia prunastri*, *Flavoparmelia caperata*, *Hypogymnia physodes*, *Lobaria pulmonaria*, *Melanohalea elegantula*, *Menegazzia terebrata*, *Parmelia saxatilis*, *P. sulcata*, *Platismatia glauca*, *Pseudevernia furfuracea*, *Ramalina farinacea*, *Usnea* spp., *Vulpicida pinastri*. – Note: *Buxbaumia viridis* on the stump of a spruce tree at 46°36'27,3"N/12°37'54,2"E.

A018 Veneto, Prov. di Belluno, NE S. Stefano di Cadore, Valle Visdende E Costa d'Autola, spruce forest, 1385 m, 46°37'34,2"N/12°40'08,9"E, 30.5.2012. – *Hypogymnia physodes*, *Peltigera* cf. *praetextata*, *Ramalina farinacea*, *Usnea dasypoga*.

A019 Veneto, Prov. di Belluno, NE S. Stefano di Cadore, Valle Visdende E Costa d'Autola, on *Salix caprea* and on soil, 1420 m, 46°37'47,5"N/12°40'12,1"E, 30.5.2012. – *Buellia griseovirens*, *Cetrelia olivetorum* agg., *Evernia prunastri*, *Hypogymnia physodes*, *H. tubulosa*, *Lecidella elaeochroma*, *Melanelixia subaurifera*, *Melanohalea elegantula*, *Ochrolechia alboflavescens*, *Parmelia sulcata*, *Peltigera degenii*, *P. praetextata*, *Ramalina farinacea*, *Solorina saccata*, *Usnea* spp., *Vulpicida pinastri*.

A020 Veneto, Prov. di Belluno, Valle della Piave N Cima Sappada, limestone rocks, 1400 m, 46°35'04,2"N/12°43'37,1"E, 30.5.2012. – *Bacidia bagliettoana*, *Cladonia furcata*, *C. pyxidata* subsp. *pocillum*, *C. pyxidata* subsp. *pyxidata*, *Cetraria islandica*, *Diploschistes muscorum*, *Micarea peliocarpa* (hb ivl 6332, in the specimen of *Arthrorhaphis aeruginosa*), *Mycobilimbia hypnorum*, *Peltigera rufescens*, *Solorina saccata*, *S. spongiosa*.

A021 Friuli-Venezia Giulia, Prov. di Udine, valley of the Tagliamento SW Osoppo near Gemona, 190 m, 46°15'07,2"N/13°03'23,4"E, 30.5.2012. – *Candelaria concolor*, *Phaeophyscia orbicularis*, *Physcia ciliata*.

A022 Friuli-Venezia Giulia, Prov. di Udine, valley of the Tagliamento SW Osoppo near Gemona, Colle S. Rocco, oak forest on limestone crest, 235 m, 46°15'16,4"N/13°04'12,0"E, 30.5.2012. – *Candelaria concolor*, *Physcia tenella*, *Xanthoria parietina*.

A023 Friuli-Venezia Giulia, Prov. di Udine, valley of the Tagliamento S Peonis, limestone rocks near the road, 185 m, 46°14'45,5"N/13°02'10,9"E, 30.5.2012. – *Caloplaca cirrochroa*, *Placidium rufescens*, *Collema auriculatum*, *Endocarpon pusillum* agg., *Leptogium lichenoides*, *Petractis clausa*, *Placynthium nigrum*, *Romjularia lurida*, *Verrucaria nigrescens*.

A024 Friuli-Venezia Giulia, Prov. di Udine, Valle Vedronza W Vedronza N Tarcento, on *Fraxinus excelsior*, 350 m, 46°16'07,6"N/13°13'50,0"E, 31.5.2012. – *Arthonia radiata*, *Graphis scripta*, *Normandina pulchella*, *Parmelia sulcata*, *Parmotrema reticulatum* (hb ivl 6207).

A025 Friuli-Venezia Giulia, Prov. di Udine, Valle Vedronza W Vedronza N Tarcento, on *Acer pseudoplatanus* and *Fraxinus excelsior*, 350 m, 46°15'55,4"N/13°14'10,5"E, 31.5.2012. – *Arthonia radiata*, *Flavoparmelia caperata*, *Graphis scripta*, *Hypotrachyna laevigata* (hb ivl 6208), *Normandina pulchella*, *Parmelia sulcata*, *Peltigera praetextata*, *Pertusaria amara*, *Phlyctis argena*.

A026 Friuli-Venezia Giulia, Prov. di Udine, Nimis, entrance to Abisso Vigant, on damp limestone rocks and on *Acer pseudoplatanus*, 550 m, 46°14'41,8"N/13°17'22,3"E, 31.5.2012. – *Cladonia coniocraea*, *C. fimbriata*, *Collema auriforme*, *Flavoparmelia caperata*, *Hypotrachyna laevigata*, *Lempholemma polyanthes*, *Lepraria incana* agg., *Normandina pulchella*.

A027 Veneto, Venezia, Isola di San Michele, on soil, 2 m, 45°26'49,8"N/12°20'52,8"E, 4.6.2012. – *Collema tenax*.

A028 Veneto, Cavallino-Treporti near Jesolo, Campeggio Marina di Venezia, on *Fraxinus excelsior*, 5 m, 45°26'03,4"N/12°26'15,7"E, 5.6.2012. – *Xanthoria parietina*.

A029 Veneto, Prov. di Belluno, Passo Cimabanche, pine forest on limestone gravel, on *Pinus sylvestris*, 1530 m, 46°37'11,5"N/12°10'53,8"E, 6.6.2012. – *Anaptychia crinalis* (hb ivl 6210), *Candelariella reflexa*, *C. xanthostigma*, *Caloplaca cerina*, *Lecanora carpinea*, *Lecidella elaeochroma*, *Melanohalea exasperatula*, *Physcia adscendens*, *P. tenella*.

A030 Trentino-Alto Adige, Prov. di Bolzano, Toblacher See, southern lakeside, on soil, 1265 m, 46°41'58,9"N/12°12'55,5"E, 6.6.2012. – *Bilimbia sabuletorum*, *Cladonia rangiferina*, *Solorina saccata*, *S. spongiosa*.

A031 Trentino-Alto Adige, Prov. di Bolzano, Toblacher See, southern lakeside, on *Salix*, 1265 m, 46°41'51,1"N/12°13'06,7"E, 6.6.2012. – *Evernia prunastri*, *Parmelia sulcata*, *Ramalina farinacea*.

A032 Trentino-Alto Adige, Prov. di Bolzano, Wielental, near the pyramids, spruce-pine-forest, on *Picea abies*, tree stumps and forest floor, 1560 m, 46°48'18,7"N/12°01'06,4"E, 7.6.2012. – *Bryoria nadvornikiana*, *Cetraria islandica*, *Cladonia digitata*, *C. polydactyla*, *C. rangiferina*, *Hypogymnia physodes*, *Parmeliopsis ambigua*, *Pseudevernia furfuracea*, *Ramalina farinacea*, *Usnea dasypoga*.

A033 Trentino-Alto Adige, Prov. di Bolzano, Wielental above Oberwielenbach near Bruneck, valley above the village, on *Larix decidua*, 1530 m, 46°49'14,9"N/12°00'54,1"E, 7.6.2012. – *Bryoria fuscescens*, *Hypocenomyce scalaris*, *Hypogymnia physodes*, *Usnea* sp., *Vulpicida pinastri*.

A034 Trentino-Alto Adige, Prov. di Bolzano, Wielental above Oberwielenbach near Bruneck, valley above the village, on granite rocks (a), on *Larix decidua* (b) and *Picea abies* (c), 1615 m, 49'34,8"N/12°01'27,8"E, 7.6.2012. – a: *Diploschistes scruposus*, b: *Bryoria nadvornikiana*, *Hypogymnia physodes*, *Letharia vulpina* (hb ivl 6211), *Parmeliopsis ambigua*, *Pseudevernia furfuracea*, c: *B. nadvornikiana*, *Usnea dasypoga*.

A035 Trentino-Alto Adige, Prov. di Bolzano, Wielental above Oberwielenbach near Bruneck, valley above the village, edge of a path, 1650 m, 46°49'45,3"N/12°01'42,0"E, 7.6.2012. – *Peltigera didactyla*.

A036 Trentino-Alto Adige, Prov. di Bolzano, Wielental above Oberwielenbach near Bruneck, valley above the village, bolder scree with forest of *Larix europaea*, *Picea abies*, and *Pinus cembra*, 1745 m, 46°50'12,0"N/12°02'23,8"E, 7.6.2012. – *Alectoria nigricans*, *Cladonia arbuscula*, *C. gracilis*, *C. portentosa*, *C. rangiferina* (hb ivl 6010), *C. stellaris* (hb ivl 6009), *C. uncialis*, *Flavocetraria cucullata*, *Hypocenomyce scalaris*, *Parmelia sulcata*, *Pseudevernia furfuracea*, *Usnea dasypoga*,

A037 Trentino-Alto Adige, Prov. di Bolzano, Ultental, St. Pankraz, on *Acer pseudoplatanus*, 750 m, 46°35'08,3"N/11°05'16,0"E, 03.11.2009. – *Phaeophyscia orbicularis*, *Xanthoria fallax*.

A038 Trentino-Alto Adige, Prov. di Bolzano, Mals, Tartscher Bühel, on rocks of mica schist, c. 1020 m, 46°40'42"N/10°33'29"E, 03.08.2002. – *Agonimia tristicula*, *Xanthoparmelia conspersa*.

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