

## New species and interesting records of lichenicolous fungi

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**Abstract:** Records of twenty-two rarely collected or otherwise interesting species of lichenicolous fungi are presented. Three species are described as new: *Adelococcus immersus* (in thallus of *Dermatocarpon hiennense*) from Turkey, *Arthonia ceracea* (on *Peltigera polydactylon*) from British Columbia, and *Feltgeniomyces physciae* (on *Physcia* spec.) from Australia. *Dactylospora porphyrea*, *Roselliniella atlantica*, and *Stigmidium glebarum* are additions to the known mycoflora of North America, *Didymellopsis perigena* and *Refractohilum peltigerae* are reported for Asia for the first time. *Buellia uberior* and *Syzygospora physciacearum* are reported as new to Arizona as is *Lichenosticta alcicornaria* for British Columbia, *Stigmidium fuscatae* for California, and *Abrothallus usneae*, *Arthonia clemens*, *A. glaucomaria*, *Biatoropsis usnearum*, and *Vouauxiella lichenicola* for Turkey.

**Zusammenfassung:** Funddaten von 22 selten dokumentierten oder anderweitig bemerkenswerten Arten lichenicoler Pilze werden vorgelegt. Drei Arten werden neu beschrieben: *Adelococcus immersus* (im Thallus von *Dermatocarpon hiennense*) aus der Türkei, *Arthonia ceracea* (auf *Peltigera polydactylon*) aus Britisch Kolumbien und *Feltgeniomyces physciae* (auf *Physcia* spec.) aus Australien. Die Funde von *Dactylospora porphyrea*, *Roselliniella atlantica* und *Stigmidium glebarum* sind Erstnachweise für Nordamerika, die von *Didymellopsis perigena* und *Refractohilum peltigerae* Erstnachweise für Asien. *Buellia uberior* und *Syzygospora physciacearum* sind neu für Arizona, *Lichenosticta alcicornaria* für Britisch Kolumbien, *Stigmidium fuscatae* für Kalifornien, und *Abrothallus usneae*, *Arthonia clemens*, *A. glaucomaria*, *Biatoropsis usnearum* und *Vouauxiella lichenicola* für die Türkei.

Lichenicolous fungi have received increasing attention within the last decades, and the number of known species is growing considerably. However, the distribution of these fungi is still rather poorly known. During recent field work in North America and Turkey the second author collected several samples of lichenicolous fungi which were studied by the first author. A few additional specimens which had been sent to us from other parts of the world by colleagues and proved to be noteworthy records are added. Three taxa turned out to be new to science, the remaining collections represent interesting records or extensions of the known distribution range. Unless otherwise stated the samples are deposited in LI (Biologiezentrum des Oberösterr. Landesmuseums, Linz).

***Abrothallus usneae* RABENH.**

Turkey, Anatolia, prov. Trabzon, 15 km SE of Uzungöl, ca. 1680 m s. m., S-exp. slope with *Picea orientalis* (L.) LINK, 40°34'33''N, 40°23'58''E, 25. 7. 1997, O. BREUSS no. 13.407 (with *Biatoropsis usnearum* RÄSÄNEN).

*Abrothallus usnearum* grows on basidiomata of *Biatoropsis usnearum* (DIEDERICH & CHRISTIANSEN 1994). First record from Turkey.

***Adelococcus immersus* ETAYO & BREUSS, spec. nova**

Perithecia in thallo *Dermatocarpi* innata non erumpentia. Excipulum paraplectenchymaticum, incoloratum. Filamentia interascalialia dissolventia. Asci clavati, unitunicati, octospori. Paries ascorum tenuis, ad apicem non vel leviter incrassatus. Ascospores late ellipsoideae, primum hyalinae et unicellulares, mature brunneae uniseptataeque, 13-18 (-20) x 7-8(-9,5) µm.

**Typus:** Turkey, Anatolia, prov. Trabzon, small gorge at the road 6 km SE of Maçka, ca. 850 m s. m., 40°43'37''N, 39°31'27''E, 1. 8. 1997, O. BREUSS no. 13724 (LI - holotype).

Perithecia completely immersed in the thallus of *Dermatocarpon biennense* ZSCH., ovoid, 290-320 x 210-220 µm. Excipulum paraplectenchymatous, composed of 7-10 rows of cells, 30-40 µm thick, colourless except for the ostiole, which is brown and plane; the innermost excipulum cells containing lipid droplets. Periphyses also with oil-contents, densely covering the ostiolar channel. Interascal filaments early gelatinizing, absent in mature ascomata, I-, KI+ blue. Asci clavate, 8-spored, 45-65 x 16-22 µm, unitunicate, apically not or slightly thickened. Ascospores ellipsoid, uniseptate, dark brown, darker at apices and septum, thin-walled, smooth, without halo, filled with small oil guttules, 13-18(-20) x 7-8(-9.5) µm. Conidiomata unknown. (Fig. 1).

The new species differs from other *Adelococcus* species primarily by its constantly 1-septate, smooth or very weakly ornamented spores and colourless perithecial walls. Its perithecia are completely immersed within the thallus of the host and appear like those of the latter as small black dots on the upper surface. Diagnostic for *Adelococcus* are the unitunicate, thin-walled asci, whereas the asci of the otherwise very similar genus *Endococcus* are fissitunicate with distinct apical thickenings (HAWKSWORTH 1979a).

*Adelococcus* is a small genus. The two previously known species are parasymbionts on calcicolous crustose lichens (MATZER & HAFELLNER 1990). *Adelococcus immersus* is remarkable in growing in a foliose lichen. It is so far known only from the type collection.

There are only very few pyrenocarpous fungi known to grow parasitically on *Dermatocarpon* species. Another species with uniseptate spores is *Stigmatidium stygnospilum* (MINKS) R. SANT. (= *Pharcidia arnoldiana* ZOPF) which is easily distinguished by its smaller, black, semi-immersed perithecia (50-100 µm diam.), different asci, and hyaline narrower spores (16-18 x 4.5-5.5 µm) with unequal cells (KEISSLER 1930).

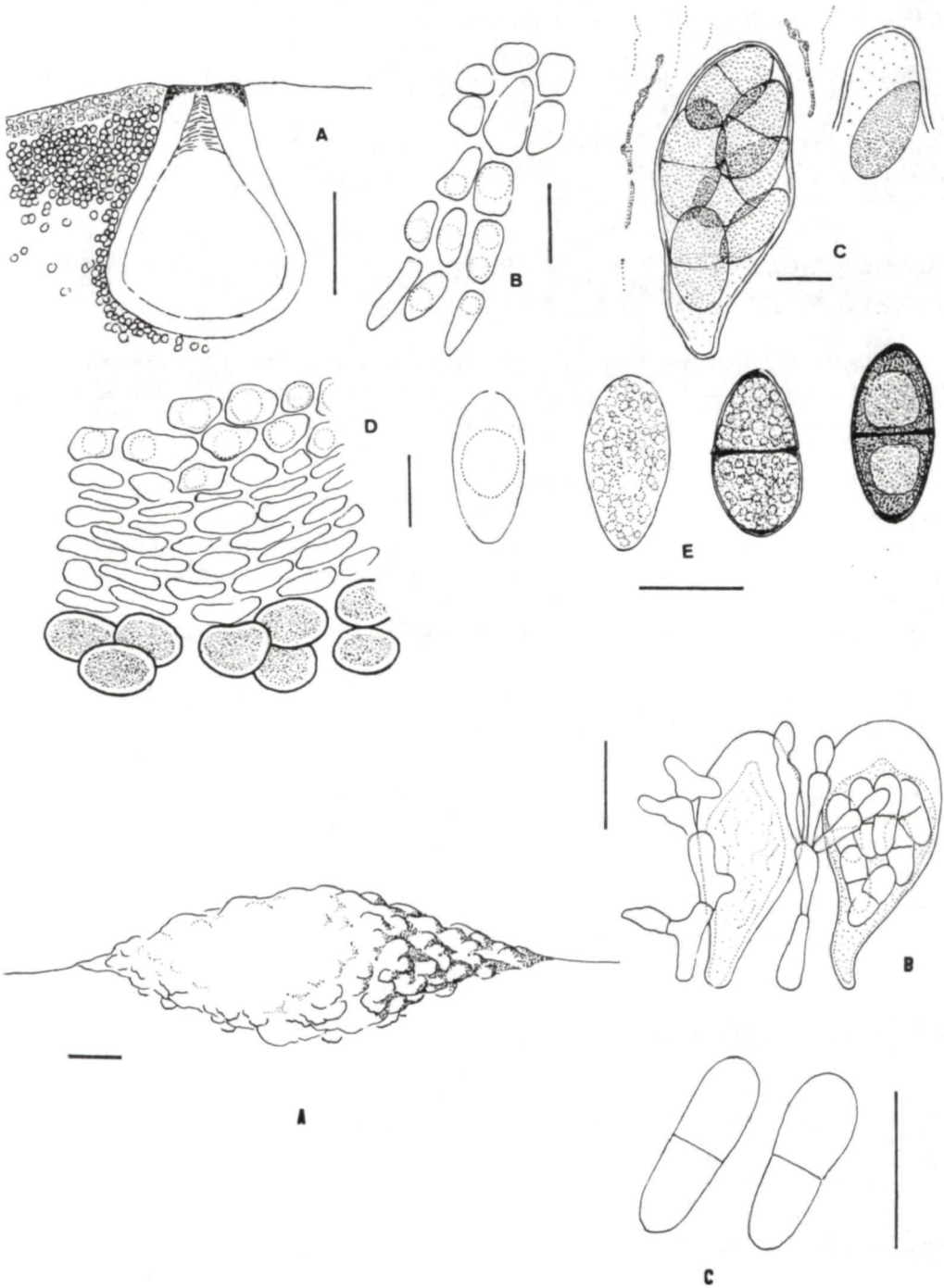


Fig. 1. *Adelococcus immersus* (holotype). A cross-section through an ascoma, B paraphyses, C asci (right: detail of ascus tip) and disintegrating paraphyses, D ascoma wall (upper cells containing oil droplets) and algal cells below, E ascospore development (right: mature spore). - Bars: A 100  $\mu$ m, B-D 10  $\mu$ m. Fig. 2. *Arthonia ceracea* (holotype). A ascoma (habitus, with verrucose surface), B asci and paraphyses, C ascospores. - Bars: A 0.2 mm, B-C 10  $\mu$ m.



***Arthonia ceracea* ETAYO & BREUSS, spec. nova**

Ascomata lichenicola, fusca, rutundata, plana vel leviter convexae, ceracea, 1,5-2,5 mm in diametro. Hymenium K-, KI+ caeruleum. Epithecium aurantiacum, K-. Hypothecium hyalinum ad brunneolum. Excipulum nullum, asci clavati, octospori, KI+ caerulei, 23-31 x 11-16  $\mu\text{m}$ ; ascosporae hyalinae, uniseptatae, 11-14 x 3,5-4  $\mu\text{m}$ . (Fig. 2.)

**Typus:** Canada, British Columbia, Wells Gray Provincial Park, Trophy Mountain Recreation Area, 51°46'N, 119°54'W, 1800-1900 m s. m., 24. 8. 1994, O. BREUSS no. 10.658 (LI - holotype, UPS - isotype).

Ascomata lichenicolous on thallus of *Peltigera polydactylon* (NECKER) HOFFM., brown, roundish, plane or slightly convex, waxy, with irregular to verrucose surfaces, 1.5-2.5 mm in diameter, margins not clearly delimited. Hymenium c. 35  $\mu\text{m}$  high, hyaline, K-, KI+ blue. Epithecium orangish, K-. Hypothecium hyaline to pale brownish, K-. Exciple absent. Paraphyses hyaline, septate, normally constricted at the septa thus appearing  $\pm$  moniliform, with some cells irregular in shape, embedded in a gelatinized matrix, easily seen in K. Asci 8-spored, clavate, KI+ blue in outer layer and surrounding ocular chamber, 23-31 x 11-16  $\mu\text{m}$ . Ascospores hyaline, 1-septate, not or only slightly constricted at septum, straight, smooth, narrowly ellipsoidal to oblong, 11-14 x 3.5-4  $\mu\text{m}$ , without episore.

The new species is so far only known from the type locality where it was found growing on *Peltigera polydactylon*. Macroscopically, it is easily recognized by its conspicuous, large, brown, waxy ascomata on the host thallus. At least three other species of the genus *Arthonia* are known to grow on *Peltigera* species: *A. peltigerina* (ALMQU.) OLIVIER and *A. fuscopurpurea* (TUL.) R. SANT. have smaller ascomata, always less than 0.5 mm in diameter, and the latter species furthermore differs in its green-brownish epithecium. *Arthonia peltigerae* TH. FR. has black ascomata and larger spores (14-20 x 6-7  $\mu\text{m}$ ). *Skytella mulleri* (WILLEY) D. HAWKSW. & R. SANT. is similar in its waxy ascomata but clearly distinct in size and colour of the ascomata, ascus type and in having simple spores.

***Arthonia clemens* (TUL.) TH. FR.**

Turkey, Anatolia, prov. Trabzon, ca. 30 km SE of Uzungöl, Balikli Göl, 2550 m s. m., siliceous rocks, 40°32'01''N, 40°23'22''E, on apothecia of *Rhizoplaca chrysoleuca* (SM.) ZOPF, 25. 7. 1997, O. BREUSS no. 13.457.

First record from Turkey.

***Arthonia glaucomaria* NYL.**

Turkey, Anatolia, prov. Trabzon, ca. 30 km SE of Uzungöl, Balikli Göl, 2550 m s. m., siliceous rocks, 40°32'01''N, 40°23'22''E, on apothecia of *Lecanora rupicola* (L.) ZAHLBR., 25. 7. 1997, O. BREUSS no. 13.458.

New to Turkey.

***Biatoropsis usnearum* RÄSÄNEN**

USA, Arizona, Gila Co., Tonto National Forest, N of Payson, Houston Mesa Rd., Whispering Pines, slope of hill, on *Usnea* spec., 11. 7. 1997, O. BREUSS no. 13.142; Arizona, Gila Co., Washington Park, trail 290 (Col. Devin trail), on *Usnea* spec., 11. 7. 1997, O. BREUSS no. 13.181. - Turkey, Anatolia, prov. Trabzon, 15 km SE of Uzungöl, ca. 1680 m s. m., S-exp. slope with *Picea orientalis*, 40°34'33''N, 40°23'58''E, 25. 7. 1997, O. BREUSS no. 13.407.

A cosmopolitan species. DIEDERICH & CHRISTIANSEN (1994) cite only a few North American localities, but the species can be expected to be widely distributed and common there. New to Turkey.

***Buellia uberior* ANZI**

USA, Arizona, Coconino Co./Gila Co., N-facing edge of Mogollon Rim above Pine Canyon, 12. 7. 1997, T. H. NASH & O. BREUSS no. 13269.

Rather widespread in alpine and subalpine regions in Europe. North American records have been reported from Colorado (SCHEIDEGGER 1987).

***Buelliella trypethelii* (TUCK.) FINK ex HAF.**

This characteristic species is only known from Florida where it grows on *Trypethelium* spec. (HAFELLNER 1979). We add an additional locality: USA, Florida, Levy Co., Black Point Swamp, along Co. Rd. 326, 1.5 mi W of Co. Rd. 347, 29°13'N, 83°02'W, hardwood swamp with scattered *Taxodium* and *Sabal*, 31. 12. 1995, O. BREUSS no. 12136, 12.170.

***Chionosphaera* cf. *apobasidialis* COX**

Argentina, prov. Tucumán, Dept. Mamailla/Monteros, ca. 7 km S El Mollar along the road from Tañi del Valle to Famailla, (on *Lecanora* spec.) on bark of fresh stems of pasture fence, ca. 1600 m s. m., 14. 2. 1993, W. TILL no. 10242 with *Lichenodiplis lecanorae* (VOUAUX) DYKO & D. HAWKSW.

Basidiomata resembling those of *Chionosphaera apobasidialis* have been found in Mallorca and the Canary Islands (ETAYO 1996) on various lichen genera (*Parmelina*, *Teloschistes*, *Lecidella*). In North and Central America the species was known to be corticolous. The cited sample from Argentina represents the first American record growing on a lichen (*Lecanora*) and is very similar to the specimen on *Lecidella* from the Canary Islands. A very similar taxon, *C. coppinsii* ROBERTS, growing on *Melanelia* and *Lecidella* species, has been recently described (ROBERTS 1997).

***Dactylospora porphyrea* HAF. & KALB**

Canada, British Columbia, Vancouver Island, Bamfield Marine Station, 28. 8. 1994, O. BREUSS no. 10929.

(1-)3-septate slightly ornamented spores, hymenium height of 40-50 µm and reddish brown pigmentation of exciple and epithecium are the diagnostic features of this

species, known so far from the American tropics where it was found growing on several lichen genera (HAFELLNER 1986). The Canadian sample cited above is on a member of the *Graphis lactea* group and is the first North American record.

***Didymellopsis perigena* (NYL.) GRUBE & HAF.**

N-Pakistan, Khaibar, upper Hunza, 36°35'N, 74°43'E, alt. 2940 m s. m., upper montane *Seriphidium maritimum* steppe on N-facing slope, on *Endocarpon* spec., 20. 8. 1990, G. & S. MIEHE no. 2670.

First Asian record. The species was previously known only from Algeria (GRUBE & HAFELLNER 1990).

***Feltgeniomyces physciae* ETAYO & BREUSS, spec. nova**

Conidiomata lichenicola in thallo et apothecia *Physciae*; sporodochia convexa, nigra, 70-150 µm diametro; cellulae conidiogenae enteroblasticae, 4-6 x 4-5 µm, conidia ellipsoidea, atrofusca, 1(-2)-septata, pariete crasso, 6,5-8 x 3,5-4 µm.

**Typus:** Australia, Victoria, Malmsbury Park 95 km NW of Melbourne, ca. 180 m s. m., on epiphytic *Physcia* spec., 19. 1. 1981, P. TURCSAK (LI - holotype, CBG, hb. ETAYO - isotypes).

Colonies forming patches on the thallus and apothecia of *Physcia* spec. Mycelium immersed, hyaline to light brown in the base of sporodochia. Conidiophores semi-macronematous, aggregated into tufted, convex, black sporodochia of 70-150 µm in diameter, consisting of irregularly branched conidial chains. Conidiogenous cells enteroblastic, terminal, determinate, ampulliform to widely cylindrical, with a thick collarette, dark brown, ca. 4-6 x 4-5 µm. Conidia solitary, 1(2)-septate, slightly to markedly constricted at septa, not truncate at base, thick-walled, smooth, 6.5-8 x 3.5-4 µm. (Fig. 3).

Sporodochia and the presence of enteroblastic conidiogenous cells are diagnostic for *Feltgeniomyces* DIEDERICH. The sporodochia of the new species are growing on the thallus, apothecial margins and discs of *Physcia* spec. without damaging the host. Awaiting the forthcoming thorough revision of Australian *Physciaceae* in Flora of Australia Vol. 56 the host is determined just to genus level. Two other species of *Feltgeniomyces* are known, one of which also has 2-celled conidia: *F. uniseptatus* (APTROOT & al. 1997). This species differs from *F. physciae* in its larger sporodochia (200-500 µm), larger conidia (10-13 x 7-8.5 µm) and different host species.

*Feltgeniomyces physciae* is so far known only from the type collection.

***Lichenodiplis lecanorae* (VOUAUX) DIKO & D. HAWKSW.**

Argentina, prov. Tucumán, Dept. Mاماilla/Monteros, ca. 7 km S El Mollar along the road from Tafi del Valle to Fاماilla, on *Lecanora* spec. on bark of fresh stems of pasture fence, ca. 1600 m s. m., 14. 2. 1993, W. TILL no. 10242.

The species was already reported from Argentina (SANTESSON, pers. comm. in TRIEBEL & al. 1991) without exact indication of locality. Our sample is on a member of the *Lecanora subfusca* group.



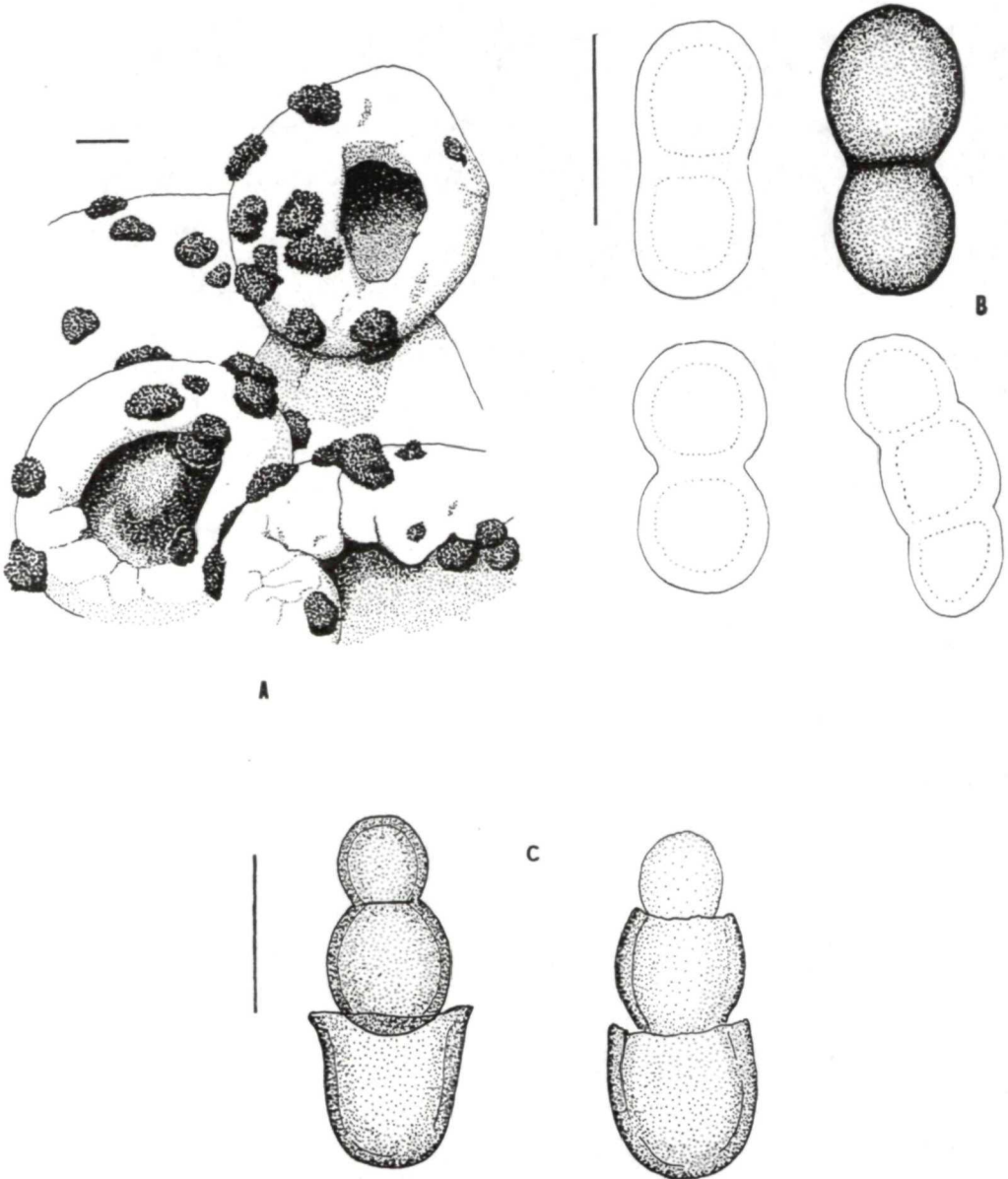


Fig. 3. *Feltgeniomyces physciae* (holotype). A sporodochia on *Physcia* spec., B conidia, C conidiogenous cells with conidia. - Bars: A 0.1 mm, B-C 5  $\mu$ m.

***Lichenosticta alcicornaria* (LINDSAY) D. HAWKSW.**

Canada, British Columbia, Wells Gray Provincial Park, Clearwater River valley, Ray Farm, 52°05'N, 120°08'W, ca. 700 m s. m., on *Cladonia* spec., 25. 8. 1994, O. BREUSS.

According to the literature, the species is rather widespread in Europe. In North America previously known from Newfoundland (HAWKSWORTH 1981). New to British Columbia.

***Refractohilum peltigerae* (KESSLER) D. HAWKSW.**

Turkey, Anatolia, prov. Trabzon, 15 km SE of Uzungöl, ca. 1680 m s. m., S slope with *Picea orientalis*, 40°34'33''N, 40°23'58''E, on *Peltigera polydactylon*, 25. 7. 1997, O. BREUSS no. 13400.

This hyphomycete forms very distinctive bullate galls on the host thallus with conidiophores projecting from their surfaces. The present material differs somewhat from other collections in producing paler galls and narrower conidia (15-19 x 4-5 µm).

Known distribution: Europe and Canada (HAWKSWORTH 1979b, CLAUZADE & al. 1989). The Turkish collection seems to be the first record for Asia.

***Rimularia insularis* (NYL.) RAMBOLD & HERTEL**

Turkey, Anatolia, prov. Trabzon, ca. 30 km SE of Uzungöl, Balikli Göl, 2550 m s. m., siliceous rocks, 40°32'01''N, 40°23'22''E, on thallus of *Lecanora rupicola*, 25. 7. 1997, O. BREUSS no. 13.458 (with *Arthonia glaucomaria*).

The species seems to be new to Turkey.

***Roselliniella atlantica* MATZER & HAF.**

USA, Florida, Marion Co., Ocala National Forest, along Co. Rd. 316 ca. 0.5 mi E of Oklawaha River bridge at Eureka, 0.2 mi W of Forest Service Rd. 67, 29°22'N, 81°43'W, Oak-*Ericaceae* scrub, on *Parmotrema praesorediosum* (NYL.) HALE, 29. 12. 1995, O. BREUSS no. 11979.

The species was known from western and northern Europe (MATZER & HAFELLNER 1990, CALATAYUD & al. 1995) and the Canary Islands (ETAYO 1996). First record from North America.

***Roselliniella nephromatis* (CROUAN) MATZER & HAF.**

Canada, British Columbia, Wells Gray Provincial Park, Clearwater Lake, lake trail to boat launch, 52°07'N, 120°10'W, ca. 675 m s. m., on *Nephroma parile* (ACH.) ACH., 25. 8. 1994, O. BREUSS no. 10756.

This species was known from the British Isles, France (MATZER & HAFELLNER 1990), Macaronesia (ETAYO 1996), and Vancouver Island (GOWARD & al. 1996). Second record for North America.



*Stigmatidium fuscatae* (ARN.) R. SANT.

USA, California, San Luis Obispo Co., Los Padres National Forest, Big Rocks, USFS Rd 30S02 ca. 2 mi N of State Hwy 166, 26 mi E of US Hwy 101, 35°07'40.8''N/120°06'59.3''W, on *Acarospora schleicheri* (ACH.) A. MASSAL., 5. 7. 1997, C. C. BRATT, O. BREUSS (no. 12958) & S. TUCKER.

According to TRIEBEL & al. (1991) this parasite seems to be frequent in arid regions of southwestern North America (Arizona and Mexico). It occurs on brown and yellow *Acarospora* species. New to California.

*Stigmatidium glebarum* (ARN.) HAF.

Canada, British Columbia, Fraser Plateau, Cariboo Hwy, Marble Canyon Provincial Park, 50°50'N, 121°40'W, ca. 600 m s. m., on *Toninia sedifolia* (SCOP.) TIMDAL, 23. 8. 1994, O. BREUSS no. 10639.

The species is not included in ESSLINGER & EGAN (1995) and seems to be new to North America.

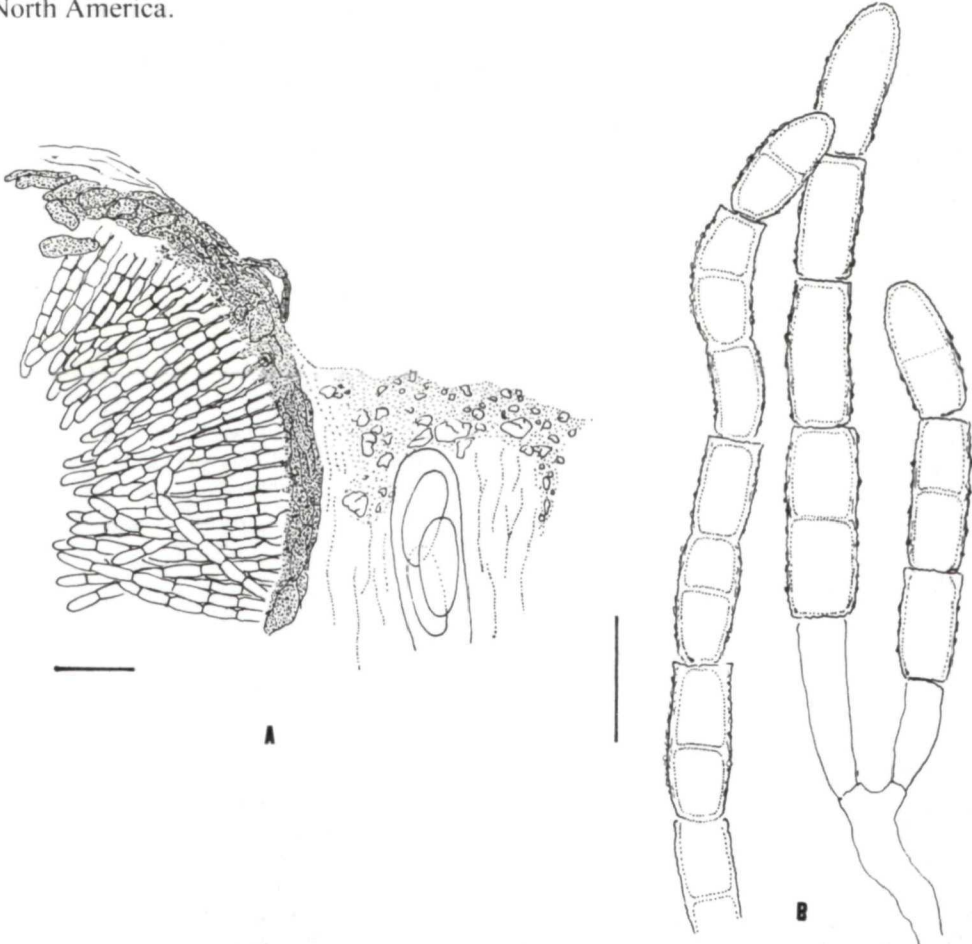


Fig. 4. *Vouauxiella lichenicola* (BREUSS 12.541). A cross-section through a conidioma growing in the hymenium of *Lecanora varia* s. l., B chains of conidia. - Bars: A 10 µm, B 5 µm.

***Syzygospora physciacearum* DIEDERICH**

USA, Arizona, Gila Co., Washington Park, trail 290 (Col. Devin trail), on *Physconia* spec., 11. 7. 1997, T. H. NASH & O. BREUSS no. 13182.

As the genus *Physconia* is poorly studied in North America, the host is determined just to genus level. *Syzygospora physciacearum* was described by DIEDERICH (1996). It is widely distributed (Europe, Africa, the Americas, and SE Asia) and occurs on species of *Physciaceae*. New to Arizona.

***Vouauxiella lichenicola* (LINDSAY) PETRAK & SYDOW**

USA, Washington, Olympic Peninsula, Clallam Co., Sequim Bay State Park, along Hwy 101 ca. 2.5 mi W of Blyn, 0-10 m s. m., on *Lecanora varia* s. l. on branches, 3. 8. 1996, O. BREUSS no. 12541. - Turkey, Anatolia, prov. Trabzon, S of Uzungöl, road to Soganli pass, ca. 1750 m s. m., 40°35'51''N, 40°18'29''E, on *Lecanora chlarotera* NYL., 26. 7. 1997, O. BREUSS no. 13500.

The American sample of *Vouauxiella lichenicola* occurs on the thallus and, especially, the discs of a corticolous yellowish species of the *Lecanora varia* complex. Although infection is rather heavy (6-8 conidiomata per apothecium), the asci of the host go on producing healthy spores (Fig. 4). The species was already known from North America, but our sample differs from the normal description of *V. lichenicola* in the bluish colour (N+ reddish) of practically all parts of the conidiomata and by its thinner 0-1-septate conidia (6-9 x 2-2.5 µm). - The species was not reported from Asia by HAWKSWORTH (1981). New to Turkey.

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