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Phoma ficuzzae sp. nov. and some other lichenicolous fungi from Sicily, Italy

Phoma ficuzzae sp. nov. und einige andere flechtenbewohnende Pilze aus Sizilien, Italien

Wolfgang VON BRACKEL

Key words: *Phoma ficuzzae*, lichenicolous fungi, Sicily, Italy.

Schlagwörter: *Phoma ficuzzae*, lichenicole Pilze, Sizilien, Italien.

Summary: During an excursion through Sicily in summer 2006 several sites of lichenological interest were investigated such as the lava boulder screes of Mount Etna as well as limestone rocks and relictic forests in the Madonie mountains. The new species *Phoma ficuzzae*, lichenicolous on *Ramalina fraxinea*, is described, and a list of 33 collected taxa is provided. New to Sicily are: *Arthonia intexta, Arthonia molendoi, Cercidospora epipolytropa, Intralichen baccisporus, Leptosphaeria ramalinae, Lichenochora obscuroides, Lichenoconium erodens, Lichenoconium lecanorae, Lichenoconium usneae, Lichenostigma cosmopolites, Muellerella ventosicola, Nectriopsis parmeliae, Phacopsis fusca, Polycoccum kerneri, Pronectria leptaleae, Pseudocercospora lichenum, Stigmidium congestum, Stigmidium neofusceliae, Stigmidium squamariae, Taeniolella beschiana, Telogalla olivieri, Tremella ramalinae, Vouauxiomyces ramalinae, Zwackhiomyces coepulonus.*

Zusammenfassung: Während einer Exkursion durch Sizilien im Sommer 2006 wurden mehrere lichenologisch interessante Orte besucht, darunter sowohl die Lavafelder des Ätna wie auch Kalkfelsen und reliktische Wälder in den Bergen der Madonie. Die neue Art *Phoma ficuzzae* wird beschrieben und eine Liste von 33 gesammelten Arten wird vorgestellt. Neu für Sizilien sind: *Arthonia intexta, Arthonia molendoi, Cercidospora epipolytropa, Intralichen baccisporus, Leptosphaeria ramalinae, Lichenochora obscuroides, Lichenoconium erodens, Lichenoconium lecanorae, Lichenoconium usneae, Lichenostigma cosmopolites, Muellerella ventosicola, Nectriopsis parmeliae, Phacopsis fusca, Polycoccum kerneri, Pronectria leptaleae, Pseudocercospora lichenum, Stigmidium congestum, Stigmidium neofusceliae, Stigmidium squamariae, Taeniolella beschiana, Telogalla olivieri, Tremella ramalinae, Vouauxiomyces ramalinae, Zwackhiomyces coepulonus.*

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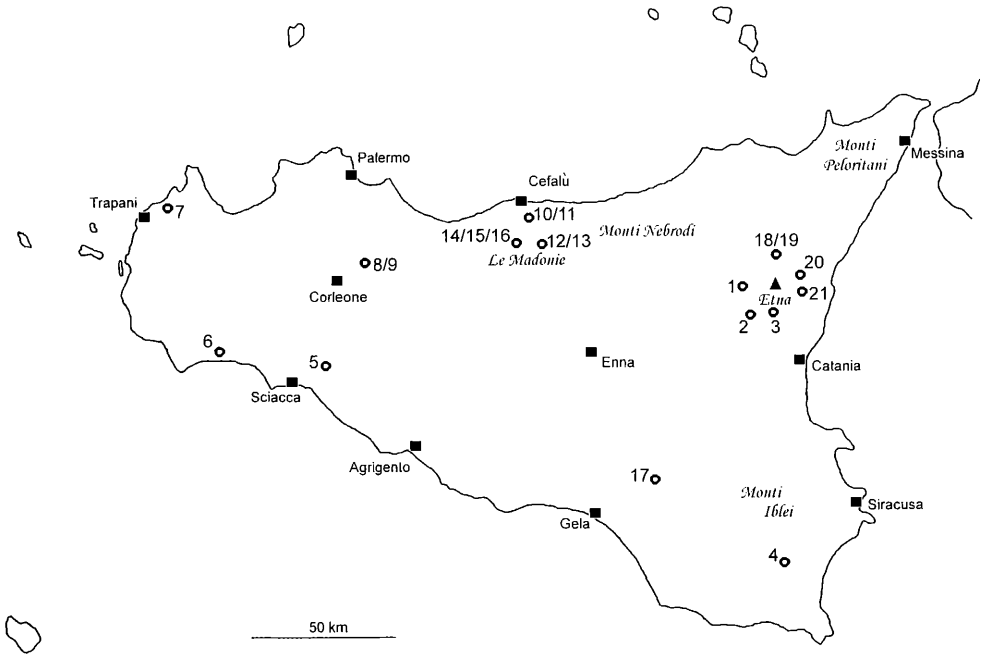

Fig. 1: Collection sites 1 – 21.

Introduction

Sicily is the largest island of the Mediterranean Sea and with the Etna has its highest peak of about 3350 m. Located between the western and the eastern part of the Mediterranean Sea on one hand and between the Italian mainland and Africa on the other hand it connects several floristic-geographical elements. In lower altitudes especially on the southern coast xeric Mediterranean vegetation is dominant, whereas in the mountains of the northern part beech and oak forests similar to those in Central Europe can be found. Due to the strategic importance of the island in ancient times (it was conquered by Greeks, Carthagians, Romans, Goths, Byzantians, Arabs, Normans, Germans, French, Spanish, Italians, and in the end, tourists) most of the forests were exploited for building ships or were changed to farmland to feed the armies or the population of the homeland of the occupiers. A lot of the natural and semi-natural woody vegetation of the island was devastated by grazing and other forms of extensive agricultural use. In more recent times increasing populations along the coast

have also impacted local flora. Despite all of this, Sicily has kept an overwhelming beauty of the landscape and an impressive cultural richness.

During a trip around the island in August 2006 we visited several sites of special lichenological interest. The most important were the slopes on Mount Etna, with the large fields of lava boulders of different age, the limestone rocks of the Madonie mountains and the relict forests between Cefalù, Enna and Corleone. One of the richest visited sites is the "Bosco della Ficuzza", a grazed coppice forest of mainly oaks and ashes near Corleone in the windward of a high crest that causes exceptional humidity.

The lichenological exploration of the island reaches back to the 19th century, but records of lichenicolous fungi are rare. Some information could be found in the papers of NIMIS et al. (1994) on the Marettimo island, VAN DEN BOOM (1992), GRILLO and GRILLO et al. (1989, 1993, 1995, 1996, and 2004) as well as in different monographs on lichenicolous fungi. As the literature is extremely scattered, we can not be not sure, if all our statements "new for Sicily" are correct. Some of the species may also be new for Italy, but we hesitate to indicate them as "new to Italy" as long as we don't have a sufficient overview on the literature.

Material and Methods

The specimens were studied macroscopically with a Zeiss stereo microscope at magnifications up to x40 and microscopically with an Olympus BX 51 microscope fitted with Normarski differential interference contrast optics. Measurements were taken on thin hand-cut sections mounted in water using an Olympus C 5060 digital camera and Quickphoto Camera 2.1 software. Conidial measurements of *Phoma* are indicated as (minimum–) $\bar{X}-\sigma_X$ – $\bar{X}+\sigma_X$ (–maximum) followed by the number of measurements; the length/breadth ratio of conidia is indicated as l/b and given in the same way. The specimens are deposited in the private herbarium of the author at the Institut für Vegetationskunde und Landschaftsökologie (hb IVL), the isotype of *Phoma ficuzzae* in M.

Results

The underlined numbers 1 – 21 indicate the localities described below. All specimens have been collected by W. & G. v. BRACKEL and identified by the author.

Arthonia galactinaria LEIGHT.
12: on *Lecanora dispersa* agg. (hb IVL 3944).

Arthonia galactinaria is widespread and quite common in Europe, and is also known from North America, northern Africa, and New Zealand. It seems to

be restricted to *Lecanora dispersa* agg., whereas the very similar *Arthonia lecanorina* (ALMQ.) R. SANT. is growing on *Lecanora albella* (SANTESSON et al. 2004). Collections of *Arthonia clemens* (THUL.) TH. FR. (which is resticted to the genus *Rhizoplaca*, see GRUBE & MATZER 1997) on *Lecanora dispersa* agg. are reported from several locations in Italy (according to NIMIS 1993) and also from Sicily (VAN DEN BOOM 1992). They may belong to *Arthonia galactinaria* or even to *Arthonia apotheciorum* (MASSAL.) ALMQ., growing on *Lecanora albescens*.

Arthonia intexta ALMQ.
3: on *Lecidella carpathica* (hb IVL 3977).

This cosmopolitan species was reported in Italy from Friúli-Venezia Giulia (HERTEL 1969), Trentino-Alto Adige (KEISSLER 1930, POELT 1957, HERTEL 1969) and Sardinia (NIMIS & POELT 1987), but not from Sicily. *Arthonia intexta* is growing inside the apothecia of saxicolous species of *Lecidella*.

Arthonia molendoi (HEUFL. ex FRAUENFELD) R. SANT.
10b: on the thallus and apothecia of *Xanthoria parietina* (hb IVL 3938).

Arthonia molendoi is widely distributed in Europe and North America, and there are also reports from Asia, Oceania and the Antarctic. This seems to be the first report for Sicily.

Arthonia varians (DAVIES) NYL.
3: on *Lecanora rupicola* (hb IVL 3974).

Arthonia varians is known from several European countries as well as from North America and from Turkey. According to NIMIS (1993) the species is widely distributed in Italy and it is known also from Sicily (GRILLO & CANIGLIA 1989). The species is growing in the apothecia of the *Lecanora rupicola* group.

Carbonea supersparsa (NYL.) HERTEL
20: on *Lecanora polytropa* (hb IVL 3952).

The species is widely distributed in Europe and also known from North America and the Canary Islands. In Italy it is known from Trentino-Alto Adige, Toscana, Lazio and Sardinia (NIMIS 1993), as well as from Sicily (GRILLO & CANIGLIA 1989).

Cercidospora epipolytropa (MUDD.) ARNOLD
20: on *Lecanora polytropa* (hb IVL 3954).

Cercidospora epipolytropa is widely distributed in the northern hemisphere, in Italy it is known from Toscana (HAFELLNER 1987). New for Sicily.

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„Dendrophoma lecanorae" VOUAUX
19: on *Lecanora conizaeoides*, thallus (hb IVL 3950).

Conidiomata about 120 µm, semi-immersed, conidiogenous cells in chains, conidia arising laterally, circa 4 x 2 µm, with one or two guttules, truncate at the base. Following the argumentation of HAWSKWORTH (1981) on *Lichenosticta alcicornaria* also this species cannot stay in the genus *Dendrophoma*. For a new combination further studies are necessary.

Intralichen baccisporus D. HAWKSW. & M. S. COLE
5: on *Caloplaca dolomiticola* (hb IVL 3980).

Intralichen baccisporus was described in 2002 from a collection in North America (HAWSKWORTH & COLE 2002). SÉRUSIAUX et al. (2003) lists it for Belgium, Germany, Luxembourg and the Netherlands. A lot of the older reports on *Caloplaca* spp. reported under *Intralichen* (*Bispora*) *christiansenii* may also belong to this species. New for Sicily, probably also for Italy.

Leptosphaeria ramalinae (DESM.) SACC.
7: on *Ramalina fastigiata* (hb IVL 3984, in the specimen of *Phoma ficuzzae).*

This rare species was known only from a few collections in France, Luxembourg, Denmark, Spain, Mallorca and the Canary Islands. New for Sicily, probably also for Italy.

Lichenochora obscuroides (LINDS.) TRIEBEL & RAMBOLD
8: on *Physcia tenella* (hb IVL 3931).

Lichenochora obscuroides is widespread in Europe from Scandinavia to the Mediterranean and also known from a few records in North America. It seems to be quite common on species of *Phaeophyscia* and, rarer on *Physcia*. New for Sicily, probably also for Italy.

Lichenoconium erodens M. S. CHRIST. & D. HAWKSW.
18: on *Pleurosticta acetabulum* (hb IVL 3949).

A widespread and common fungus on a wide range of lichens. We don't know about any reports from Italy.

Lichenoconium lecanorae (JAAP) D. HAWKSW.
3: on *Xanthoparmelia pulla* (hb IVL 3964); 18: on *Melanohalea exasperata* (hb IVL 3947).

A widespread and common fungus, growing on members of the Lecanoraceae and Parmeliaceae. Previously known Italian records are from Trentino-Alto Adige (HAWKSWORTH 1981) and from Sardinia (NIMIS & POELT 1987).

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Lichenoconium usneae (ANZI) D. HAWKSW.
18: on *Melanohalea exasperata,* apothecia (hb IVL 3948).

A widespread and common fungus, with preference growing on apothecia of members of the Parmeliaceae, Physciaceae and Ramalinaceae (HAWKSWORTH 1977). The type is from Lombardia (ANZI 1868) and the species was also collected by Arnold in Italy (Südtirol) in 1896 (HAWKSWORTH 1977).

Lichenodiplis lecanorae (VOUAUX) DYKO & D. HAWKSW.
8: on *Caloplaca flavorubescens* var. *quercina* (hb IVL 3932).

A cosmopolitan species on a wide range of mostly crustose or placodioid lichens. In Italy it is known from the island of Marettimo near the west coast of Sicily (NIMIS et al. 1994).

Lichenostigma cosmopolites HAFELLNER & CALATAYUD
1a: (hb IVL 3956); 2: (hb IVL 3958); 3: (hb IVL 3961); 21: (hb IVL 3951); all on *Xanthoparmelia conspersa.*

According to HAFELLNER & CALATAYUD (1999) *Lichenostigma cosmopolites* is widespread in extratropical regions of both hemispheres. In Italy it was known from Trentino-Alto Adige, Elba (HAFELLNER & CALATAYUD 1999) and Sardinia (NIMIS & POELT 1987). It seems to be confined to the genus *Xanthoparmelia*. New for Sicily.

Lichenostigma elongatum NAV.-ROS. & HAFELLNER
1a: on *Aspicilia cinerea* (hb IVL 4137 in the specimen of *Acarospora hospitans*); 16b: on *Aspicilia calcarea* agg. (hb IVL 3943).

According to NAVARRO-ROSINÉS & HAFELLNER (1996) *Lichenostigma elongatum* has a central European-Mediterranean distribution and is also found in Africa, Asia, Australia, and North America. Some later records, e.g. from Russia, the Canary Islands, and New Zealand, show the worldwide distribution of the species. In Italy it was known from Trentino-Alto Adige, Emilia-Romagna, Friuli-Venezia Giulia, and Liguria; in Sicily it was reported from the Madonie mountains (NAVARRO-ROSINÉS & HAFELLNER 1996). It is confined to the genera *Aspicilia* and *Lobothallia.*

Muellerella lichenicola (SOMMERF.) D. HAWKSW.
4: on *Caloplaca aurantia* (hb IVL 3978); 5: on *C. aurantia* (hb IVL 3982); 8: on *Physcia aipolia* (hb IVL 3839); 17: on *Caloplaca saxicola* (hb IVL 3946).

This worldwide distributed species was known in Italy from Sardinia (NIMIS & POELT 1987) and from the island of Marettimo (NIMIS et al. 1994). It grows on a wide range of host lichens, but preferably on members of the Physciaceae and Teloschistaceae (TRIEBEL 1989).

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Muellerella erratica (A. MASSAL.) HAFELLNER & V. JOHN
1a: on *Caloplaca erythrocarpa* (hb IVL 3957); 2: on *Lecanora rupicola* (hb IVL 3959); 3: on *Tephromela atra* (hb IVL 3975); 5: on *Aspicilia contorta* (hb IVL 3981); 12: on *Caloplaca erythrocarpa* (hb IVL 3945); 20: on *Lecanora polytropa* (hb IVL 3955).

This is the most common member of the genus with a worldwide distribution on a wide range of host lichens. In Italy it was known from Lombardia, Trento-Alto Adige, Friuli-Venezia Giulia, Liguria (ANZI 1860, TRIEBEL 1989) and Sardinia (NIMIS & POELT 1987) as well as from the island of Marettimo (NIMIS et al. 1994) (most records under the name *Muellerella pygmaea* var. *athallina* (MÜLL. ARG.) TRIEBEL).

Muellerella pygmaea (KÖRB.) D. HAWKSW. s.str.
3: on *Lecidea obluridata* (hb IVL 3963); 16b: on *Aspicilia calcarea* agg. (hb IVL 3842); 20: on *Lecidea grisella*; 20: on *Acarospora smaragdula* (hb IVL 3953).

A worldwide distributed species with a wide range of host lichens, most common on saxicolous, mainly crustose lichens in higher altitudes of the northern hemisphere (HAFELLNER & MAYERHOFER 2007). In Italy it is known from Lombardia, Trento-Alto Adige (ANZI 1860, TRIEBEL 1989), Friuli-Venezia Giulia (TRETIACH & HAFELLNER 2000), Sardinia (NIMIS & POELT 1987); in Sicily it has been reported near Cefalù and Milo (VAN DEN BOOM 1992) and on the island of Marettimo (NIMIS et al. 1994).

Muellerella ventosicola (MUDD) D. HAWKSW.
3: on *Rhizocarpon geographicum* (hb IVL 3965).

Rarer than the two other species of the *Muellerella pygmaea* complex, this species shows a preference for hosts of the genus *Rhizocarpon*, without being resticted to them. In Italy it was known from Trento-Alto Adige (TRIEBEL 1989).

Nectriopsis parmeliae (BERK. & M.A. CURTIS) M.S. COLE & D. HAWKSW.
18: on *Parmelia saxatilis* (hb IVL 4234).

A very rare species, previously known from the British Isles, Germany, USA, and Brazil. New for Sicily, probably also for Italy.

Phacopsis fusca (TRIEBEL & RAMBOLD) DIEDERICH
3: on *Xanthoparmelia conspersa* (hb IVL 3976).

Phacopsis fusca shows a worldwide distribution and is growing on members of the Parmeliaceae (mostly on *Xanthoparmelia).* In Italy it was known from Trentino-Alto Adige and from Sardinia (TRIEBEL et al. 1995). New for Sicily.

Phoma ficuzzae BRACKEL sp. nov.

Pycnidia lichenicola, immersa, subglobosa, 105–135 µm in diametro. Cellulae conidiogenae breviter ampulliformes vel subglobosae, (5·7–)6·0–7·6(–8·0) x

(3·9–)4·3–5·3(–5·6) µm. Conidia ellipsoidea, (5·5–)5·9–6·8(–7·6) x (3·1–)3·5–3·9(–4·2) µm.

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Typus: Italy, Sicily, Prov. Palermo, Bosco della Ficuzza, road from Ficuzza to S, 910 m alt., 37°52'00,6''N, 13°23'17,3''E, in grazed coppice forest mainly of oaks and ashes, on the bark of *Pyrus amygdaliformis*, on *Ramalina fraxinea*, 9.VIII.2006, W. & G. v. BRACKEL (hb IVL 3983 – holotypus; M-0044890 – isotypus).

Conidiomata pycnidial, immersed in the host thallus and margin of the apothecia, black in macroscopical view, in section brown in lower parts and dark brown around the ostiole, subspherical, ostiolate, 105–135 µm diam.; pycnidial wall 7–10 µm thick, pseudoparenchymatous, composed of 2–4(–5) layers of polyhedral and to the inside more subglobose cells, outer cells brown, about 8–10 x 3–4·5 µm, inner ones hyaline, about 4–5 µm diam. Conidiogenous cells lining the inner wall of the pycnidial cavity, short ampulliform to subglobose, hyaline, smooth-walled, (5·7–)6·0–7·6(–8·0) x (3·9–)4·3–5·3(–5·6) µm (n=10); conidiogenesis enteroblastic. Conidia abundantly produced, arising singly, ellipsoid, rounded at both ends, hyaline, simple, smooth-walled, with a guttule near each apex, (5·5–)5·9–6·8(–7·6) x (3·1–)3·5–3·9(–4·2) µm (n=40), l/b = (1·4–)1·6–1·9(–2·1) (n=40).

Distribution and hosts: The species is known only from two localities in Italy, Sicily, where it grows on the thallus of *Ramalina fraxinea* and *R. fastigiata*. *Phoma ficuzzae* causes severe damage to the host. The infected parts of the thallus are bleached and usually surrounded by a blackish line. In a later stage they become eroded.

Observations: *Phoma ficuzzae* is similar to *P. epiphyscia* VOUAUX in the size of the conidiomata and the length of the conidia, but in *P. ficuzzae* these are broader and the lenght: breadth ratio is 1·6–1·9 instead of 2–2·3 in *P. epiphyscia* (VOUAUX 1914, ALSTRUP & HAWKSWORTH 1990). In the compared specimen of *P. epiphyscia* we found conidia of 5·6–7·2 x 2·8–3·3 µm. *P. epiphyscia* is reported only for the hosts *Phaeophyscia* and *Xanthoria*. Other species of *Phoma* reported from *Ramalina* have much narrower conidia: in *Phoma cytospora* (VOUAUX) D. HAWKSW. the conidia are up to 2 µm broad, and in *Phoma lichenis* PASS. circa 1 µm broad (VOUAUX 1914, ETAYO 1996). In the most recent literature on *Phoma* (HAWKSWORTH & COLE 2004, DIEDERICH et al. 2007) no species fitting to our material could be found.

Additional specimen: Italy, Sicily, Prov. Trapani, Érice, small park beneath the castle, ca. 750 m alt., 38°02'24,2''N, 12°35'15,1''E, on twigs of *Fraxinus ornus*, on *Ramalina fastigiata*, 8.VIII.2006, W. & G. v. BRACKEL (hb IVL 3984).

Compared specimen: *Phoma epiphyscia* VOUAUX: Germany, Bavaria, München, Lochhausen, Moor am Küchenmeisterbach, 506 m alt., 48°24'08,0''N, 11°50'47,6''E, on dead twigs of *Sambucus nigra*, on *Xanthoria parietina*, 17.VII.2006, W. v. BRACKEL (hb IVL 3833).

Etymology: The species is named after the type locality "Bosco della Ficuzza" near the village Ficuzza.

Remarks: In the same locality we found another *Phoma* on *Ramalina fastigiata*, that also does not fit to any of the decribed species, with conidia (3·7–)3·9–4·3(–4·4) x (2·0–)2·1–2·3(–2·4) µm (n=20), l/b = (1·6–)1·7–2·0(–2·2) (n=20) (hb IVL 130).

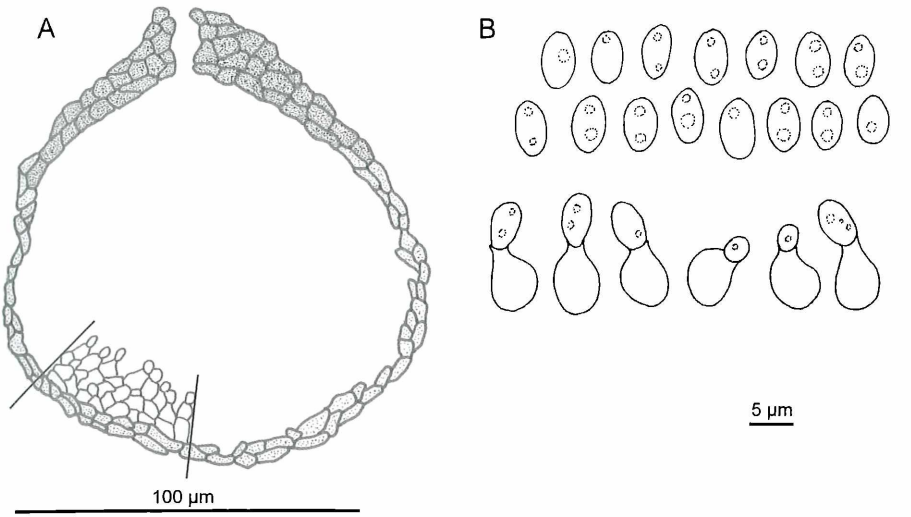

Fig. 2: *Phoma ficuzzae* (holotypus): **A** section through a conidioma (detail with inner part of wall and conidiogenous cells). **B** Conidia and conidiogenous cells.

Polycoccum kerneri J. STEINER

3: on *Lecidea fuscoatra* (hb IVL 3966).

This obviously rare species so far is known from the British Isles and France, Greece, the Czech Republic, the Canary Islands, and the USA. In Europe it seems to be confined to *Lecidea fuscoatra* s. l., whilst in America it was found on *Lecidea tessellata*. New for Sicily, probably also for Italy.

Pronectria leptaleae (STEINER) LOWEN

8: on *Physcia aipolia* (hb IVL 3930).

We follow the argumentation of DIEDERICH (2003) not to include this species in the genus *Xenonectriella*. *Pronectria leptaleae* was described from the Belgrade forest, which lies in the European part of Turkey near Istanbul (not in Serbia!). It is known from a few other European countries (Austria, British Isles,

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France, Germany, Luxembourg, Spain, and Sweden) as well as from North America. We do not know about records of this obviously rare species from Italy.

Pseudocercospora lichenum (KEISSL.) D. HAWKSW.
16a: on *Physconia distorta* (hb IVL 4229).

This hyphomycete seems to be a very rare species. Except of the type location in Austria (KEISSLER 1913) we found only reports from Germany (POELT 1972) and Mallorca (ETAYO 1996). Known hosts are *Haematomma cismonicum*, *Lobaria pulmonaria* and *Ramalina* sp.

Stigmidium congestum (KÖRB.) TRIEBEL
8: on *Lecanora chlarotera* (hb IVL 3928).

This is a common and widespread fungus growing on the apothecia of the *Lecanora chlarotera* group, known from many European countries, the Canary Islands, North America, Asia, and New Zealand. In Italy it was reported from Lombardia (ROUX & TRIEBEL 1994, TRIEBEL 2007), Molise (TRIEBEL 2007), Sardinia (NIMIS & POELT 1987), Campania (JATTA 1875), and Puglia (JATTA 1875). New for Sicily.

Stigmidium neofusceliae CALATAYUD & TRIEBEL
3: on *Xanthoparmelia pulla* (hb IVL 3967).

Stigmidium neofusceliae was known from three localities near Valencia/Spain on *Xanthoparmelia pulla* and *X. verruculifera* (CALATAYUD & TRIEBEL 1999) and from two localities in the Czech Republic on *X. verruculifera* (KOCOURKOVÁ 2000). In our specimen we could not observe the I+ violet reaction of the hymenial gel, only the brown parts of the vegetative hyphae and of the ascomatal wall turned from brown to dirty dark violet after treatment with iodine. New for Sicily, probably also for Italy.

Stigmidium squamariae (DE LESD.) CL. ROUX & TRIEBEL
4: on *Lecanora pruinosa* (hb IVL 4226).

This widespread but rarely recorded fungus growing on the apothecia of *Lecanora muralis* agg., *Lecanora polytropa*, *Lecanora valesiaca*, and *Rhizoplaca peltata* is known from some European countries (Austria, Czech Republic, Germany, Spain) as well as from the Canary Islands, North and Central America, and Asia. In Italy it was known from Lombardia (ROUX & TRIEBEL 1994). New for Sicily.

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Taeniolella beschiana DIEDERICH
8: on *Cladonia foliacea* (hb IVL 4227).

Taeniolella beschiana is living on the squamules of several *Cladonia* species and so far known from mostly northern regions of Europe, North America, and Asia (Alaska, British Isles, Denmark, Estonia, Lithuania, Poland, Russia, Svalbard, Sweden), and from Central/Western Europe (Czech Republic, Germany, Luxembourg). This is the first record for the Mediterranean region.

Telogalla olivieri (VOUAUX) NIK. HOFFM. & HAFELLNER
8: on *Xanthoria parietina* (hb IVL 3933); 10a: on *X. parietina* (hb IVL 3937).

Thelogalla olivieri is inducing galls of almost the same colour as the host lichen (*Xanthoria* spp.). It is known only from Europe including the Mediterranean region. New for Sicily.

Tremella ramalinae DIEDERICH
8: on *Ramalina fastigiata* (hb IVL 3936); 9: on *R. fraxinea* (hb IVL 3935); 13: on *R. fraxinea* (hb IVL 3940); 14: on *R. fraxinea* (hb IVL 3939).

Tremella ramalinae is a rare species with a few known records from Europe (Estonia, France, Germany, Lithuania, Poland, Spain, Sweden) and America (USA, Mexico). New for Sicily, probably also for Italy.

Vouauxiomyces ramalinae (NORDIN) D. HAWKSW.
9: on *Ramalina fastigiata* (hb IVL 3934).

Vouauxiomyces ramalinae is the anamorph of *Abrothallus suecicus*. It is widespread through Europe from Norway to Spain. New for Sicily, probably also for Italy.

Zwackhiomyces coepulonus (NORM.) GRUBE & SANT.
8: on *Caloplaca flavorubescens* var. *quercina*. (hb IVL 3838).

A widespread fungus on hosts of the genera *Caloplaca* and *Xanthoria*, known from several European countries as well as from the Canary Islands, North America, and Asia. In Italy it was known from Trento-Alto Adige (GRUBE & HAFELLNER 1990). New for Sicily.

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

1a) Prov. Catania, Passo Pisciaro on the W slope of the Etna, on lava boulders near the roadside, 563 m, 37°53'16''N, 15°02'53''E, 1.VIII.2006. – *Acarospora hospitans* on *Aspicilia cinerea*, *Caloplaca arenaria*, *C. grimmiae* on *Candelariella vitellina*, *Caloplaca subpallida*, *Xanthoparmelia conspersa*, *X. pulla* var. *pulla*, *Xanthoria parietina*.

1b) same location, on *Platanus orientalis*. – *Physcia biziana*.

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2) Prov. Catania, Mt. Arso on the S slope of the Etna, on lava boulders, 1300 m, 37°40'36''N, 14°56'47''E. 1.VIII.2006. – *Acarospora smaragdula, Aspicilia caesiocinerea, A. contorta, Candelariella vitellina, Lecanora rupicola* var. *rupicola, Lecidea fuscoatra, Lecidella carpathica, Rhizocarpon geographicum, Stereocaulon vesuvianum, Xanthoparmelia conspersa, X. pulla* var. *pulla.*

3) Prov. Catania, Villino Platania on the S slope of the Etna, on lava boulders, 1117 m, 37°39'30''N, 14°59'21''E, 2.VIII.2006. – *Acarospora hospitans* on *Aspicilia cinerea, Acarospora smaragdula, Aspicilia caesiocinerea, A. cinerea, Caloplaca subpallida, Candelariella vitellina, Lecanora bolcana, L. rupicola* var. *rupicola, Lecidea grisella, L. obluridata, Lecidella carpathica, Rhizocarpon geographicum, R. lecanorinum, R.* aff. *badioatrum, R.* cf. *richardii, R.* spec., *Stereocaulon vesuvianum, Tephromela atra, Xanthoparmelia conspersa, X. pulla, X. verruculifera.*

4) Prov. Siracusa, between Rosolini and Palazzolo Acreide near Castelluccio, on dry walls of limestone in a grove of olive and almond trees, 360 m, 36° 56'59''N, 14°56'41''E, 5.VIII.2006. – *Aspicilia calcarea, A. contorta, Caloplaca aurantia, C. lactea, C. variabilis, Lecanora pruinosa, Rinodina immersa.*

5) Prov. Agrigento, near Rocca Ficuzza between Caltabellotta and Sciacca, on sunny limestone rocks, 650 m, 37°34'28''N, 13°10'54''E, 7.VIII.2006. – *Aspicilia calcarea, A. contorta, Caloplaca aurantia, C. dolomiticola, C. flavescens, C. inconnexa on Verrucaria nigrescens, Lecania inundata, Lecanora pruinosa, Rinodina bischoffii, Verrucaria caerulea.*

6) Prov. Trapani, Selinunte, Zona Archeologica, Tempio G, on fallen pillar of the ancient temple, 7 VIII.2006. – *Cladonia foliacea, Collema tenax, Verrucaria calciseda.*

7) Prov. Trapani, Érice, small park beneath the castle, on *Fraxinus ornus*, 38° 02'24''N, 12°35'15''E, 8.VIII.2006. – *Ramalina fastigiata.*

8) Prov. Palermo, Bosco della Ficuzza, road from Ficuzza to S, in grazed coppice forest of *Fraxinus* and *Quercus*, on *Fraxinus excelsior*, 730 m, 37°52'40''N, 13°22'53''E, 9.VIII.2006. – *Anaptychia ciliaris, Caloplaca flavorubescens* var. *quercina, Collema nigrescens, Lecanora chlarotera, Lecidella elaeochroma, Phaeophyscia orbicularis, Physcia adscendens, P. aipolia, P. tenella, Physconia distorta, P. venusta, Ramalina fastigiata, R. fraxinea, Xanthoria parietina.*

9) Prov. Palermo, Bosco della Ficuzza, road from Ficuzza to S, in grazed coppice forest of *Fraxinus* and *Quercus*, on *Pyrus amygdaliformis*, 910 m, 37°52' 00''N, 13°23'17''E, 9.VIII.2006. – *Anaptychia ciliaris, Physconia distorta, Ramalina farinacea, R. fastigiata, R. fraxinea, Xanthoria parietina.*

10a) Prov. Palermo, between Pollina and Castelbuono near Casa Vallente on the roadside, on *Olea europaea*, 240 m, 37°57'40''N, 14°06'07''E, 10.VIII.2006. – *Caloplaca cerina, Physcia ascendens, P. tenella, Xanthoria calcicola, X. parietina.*

10b) same location, on *Fraxinus excelsior*. – *Physcia tenella, Xanthoria parietina.*

11) Prov. Palermo, Castelbuono, row of trees at the entrance of the cemetery, on *Cupressus sempervirens*, 350 m, 37°56'20''N, 14°065'38''E, 10.VIII.2006. – *Phaeophyscia orbicularis, Physconia grisea.*

12) Prov. Palermo, Parco delle Madonie, Vallone Madonna degli Angeli, S slope, on sunny limestone rocks and on soil, 1420 m, 37°50'36''N, 14°01'17''E, 11.VIII.2006. – *Acarospora cervina, Aspicilia calcarea* agg., *A. contorta, Caloplaca erythrocarpa, C. inconnexa, C.* spec., *Collema tenax, Lecanora dispersa* agg., *Verrucaria nigrescens, V* spec.

13) Prov. Palermo, Parco delle Madonie, Vallone Madonna degli Angeli, N slope, in low beech-forest, on *Fagus sylvatica*, 1650 m, 37°50'38''N, 14°01' 48''E, 11.VIII.2006. – *Anaptychia ciliaris, Caloplaca cerina, Lecanora carpinea, L.* aff. *allophana, Lecidella elaeochroma, Melanohalea exasperata, Physcia aipolia, P. tenella, Ramalina fraxinea.*

14) Prov. Palermo, Parco delle Madonie, Piano Battaglia, road from Rifugio Marini to Petralia, in thin oak-forest, on *Quercus pubescens*, 1390 m, 37°51' 43''N, 14°04'27''E, 11.VIII.2006. – *Anaptychia ciliaris, Lecidella elaeochroma, Parmelina quercina, Physcia aipolia, P. tenella, Physconia distorta, P. venusta, Pleurosticta acetabulum, Ramalina fraxinea, Xanthoria parietina.*

15) Prov. Palermo, Parco delle Madonie, Piano Battaglia, between Rifugio Marini and Pizzo Carbonara, in low beech-forest, on *Fagus sylvatica*, 1730 m, 37°53'03''N, 14°02'29''E, 12.VIII.2006. – *Ramalina fraxinea.*

16a) Prov. Palermo, Parco delle Madonie, Piano Battaglia, beneath Pizzo Carbonara, on *Fagus sylvatica*, 1950 m, 37°53'26''N, 14°01'54''E, 12.VIII.2006. – *Physcia aipolia, Physconia distorta.*

16b) same location, on limestone rocks. – *Acarospora cervina, Aspicilia calcarea* agg., *Caloplaca inconnexa, C. variabilis* agg., *Lecidella stigmatea.*

17) Prov. Catania, Caltagirone, bridge in the town between Chiesa San Francesco d'Assisi and Santa Maria del Monte, on mortared wall, 550 m, 37°14' 10''N, 14°30'47''E, 13.VIII.2006. – *Caloplaca saxicola.*

18) Prov. Catania, N slope of the Etna, above Linguaglossa, in oak-forest, on *Quercus pubescens*, 1150 m, 37°48'35''N, 15°05'22''E, 16.VIII.2006. – *Anaptychia ciliaris, Candelariella reflexa, Catillaria nigroclavata, Hypogymnia physodes, Lecidella elaeochroma, Melanohalea exasperata, Ochrolechia* cf. *szatalaensis, Pannaria mediterranea, Parmelia saxatilis, P. sulcata, Parmelina quercina, P. tiliacea, Physcia aipolia, P. leptalea, P. tenella, Physconia distorta, P. venusta, Pleurosticta acetabulum, Ramalina fastigiata.*

19) Prov. Catania, N slope of the Etna, above Linguaglossa, on the roadside above the restaurant, on *Pinus nigra*, 16.VIII.2006. – *Hypocenomyce scalaris, Hypogymnia farinacea, Lecanora conizaeoides.*

20) Prov. Catania, NW slope of the Etna, above Puntalazzo, in young lava field above the road, on lava, 1635 m, 37°46'55''N, 15°03'37''E, 16.VIII.2006. – *Acarospora smaragdula* ssp. *smaragdula, Lecanora polytropa, Lecidea grisella, L. lapicida* var. *pantherina, Lepraria incana* agg., *Rhizocarpon distinctum, R. geographicum, R. lecanorinum, Rinodina confragosa, Stereocaulon vesuvianum.*

21) Prov. Catania, NW slope of the Etna, north of Milo, between the road and the oak-forest, on older lava, 905 m, 37°44'18''N, 15°06'20''E, 16.VIII.2006. – *Acarospora smaragdula, Amandinea punctata, Candelariella vitellina, Lecidea fuscoatra, Xanthoparmelia conspersa, X. pulla.*

Further literature reports of lichenicolous fungi from Sicily:

Arthonia apotheciorum (A. MASSAL.) ALMQ., [sub *Arthonia clemens* (THUL). TH. FR.] on *Lecanora albescens*, Marettimo (NIMIS et al. 1994).

Carbonea vitellinaria (NYL.) HERTEL, on *Candelariella vitellina*, Etna sud orientale (GRILLO & CANIGLIA 1989); Prov. Catania: N of Milo (VAN DEN BOOM 1992).

Cecidonia umbonella (NYL.) TRIEBEL & RAMBOLD, on *Lecidea lactea* var. *spilotea*, Etna sud orientale (GRILLO & CANIGLIA 1989).

Dactylospora parasitica (FLOERKE ex SPRENG.) ZOPF, Bosco di Bauli/Iblean plateau (GRILLO & CANIGLIA 2004).

Dactylospora rimulicola (MÜLL. ARG.) HAFELLNER, on *Pertusaria ocellata*, Prov. Siracusa, N of Buccheri (ALSTRUP 2004).

Endococcus propinquus (KÖRB.) D. HAWKSW., on *Lecanora polytropa*, Prov. Catania: N of Milo (VAN DEN BOOM 1992).

Intralichen christiansenii (D. HAWKSW.) D. HAWKSW. & M. COLE, [sub *Bispora christiansenii* D. HAWKSW.] on *Caloplaca variabilis*, SW Cefalù (VAN DEN BOOM 1992).

Libertiella fennica ALSTRUP, on *Peltigera hymenina*, Prov. Messina, N of S. Fratello (ALSTRUP 2004).

Lichenostigma rugosum THOR, on *Diploschistes muscorum*, Marettimo (NIMIS et al. 1994).

Opegrapha parasitica (A.MASSAL.) H.OLIVIER, on *Aspicilia calcarea*, Marettimo (NIMIS et al. 1994).

Opegrapha pertusariicola COPPINS & P. JAMES, on *Pertusaria leucostoma*, Polizzi Generosa (GRILLO & CRISTAUDO 1995).

Opegrapha physciaria (NYL.) D. HAWKSW. & COPPINS, on *Xanthoria parietina*, Marettimo (NIMIS et al. 1994); pine-wood of Vittoria/Iblean plateau (GRILLO & CANIGLIA 2004).

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Opegrapha rupestris PERS., several locations in the Iblean plateau (ALBO 1926, GRILLO 1996, GRILLO & CANIGLIA 2004); SW of S. Vito lo Capo (sub *Opegrapha saxatilis* DC., VAN DEN BOOM 1992).

Sagediopsis campsteriana (LINDS.) D. HAWKSW. & R. SANT., [sub *Metasphaeria tartarina* (NYL.) KEISSL.] on *Lecanora chlarotera*, Linguaglossa, Polizzi Generosa (GRILLO & CRISTAUDO 1995).

Sphinctrina leucopoda NYL., Borgo A. Rizzi/Iblean plateau (GRILLO & CANIGLIA 2004).

Sphinctrina turbinata (PERS. ex FR.) DE NOT., on *Pertusaria pertusa*, Bosco di San Pietro nel Caltagironese (GRILLO & ROMANO 1989); Capizzi/Monti Nebrodi (GRILLO 1993); on *Pertusaria pertusa*, Marettimo (NIMIS et al. 1994); on *Pertusaria*, Ucria (GRILLO & CRISTAUDO 1995).

Toninia episema (NYL.) TIMDAL, on *Aspicilia calcarea*, SW of S. Vito lo Capo (VAN DEN BOOM 1992); on *Aspicilia calcarea*, Marettimo (NIMIS et al. 1994).

Toninia subfuscae (ARNOLD) TIMDAL, on *Lecanora pruinosa*, SW of S. Vito lo Capo (VAN DEN BOOM 1992).

Vouauxiella lichenicola (LINDSAY) PETR. & SYD., on *Lecanora horiza*, Marettimo (NIMIS et al. 1994).

Xanthoriicola physciae (KALKBR.) D. HAWKSW., on *Xanthoria steineri*, Marettimo (NIMIS et al. 1994).

Zwackhiomyces calcariae (FLAGEY) HAFELLNER & NIK. HOFFM., [sub *Pharcidia calcariae* (Flagey) Vouaux] on *Aspicilia calcarea*, Marettimo (NIMIS et al. 1994).

Zwackhiomyces lecanorae (STEIN) NIK. HOFFM. & HAFELLNER, on *Lecanora albescens*, Marettimo (HOFFMANN & HAFELLNER 2000).

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Literature

ALBO, G., 1926: La vita delle piante vascolari nella Sicilia orientale. III Licheni. – Atti Acc. Sc. Lett. Palermo.

ALSTRUP, V., 2004: New records in distibution of lichens and lichenicolous fungi. – Graphis Scripta **16**: 46–57

ALSTRUP, V & Hawksworth, D.L., 1990: The lichenicolous fungi of Greenland. – Meddel. Greenland, Biosci. **31**: 1–90.

ANZI, M., 1860: Catalogus lichenum quos in Provincia Sondriensi collegit et ordinavit et in ordinem systematicum digessit presbyter M. Anzi. – Novi-Comi. Tip. C. Franchi.

ANZI, M., 1868: Analecta Lichenum Rariorum vel novorum Italiae superioris. Atti Soc. Ital. Sci. Nat. Milano **11**: 156-181.

CALATAYUD, V & TRIEBEL, D., 1999: *Stigmidium neofusceliae* (Dothideales s. l.), a new lichenicolous fungus from Spain. – Nova Hedwigia **69**: 439–448.

DIEDERICH, P., 2003: New species and new records of American lichenicolous fungi. – Herzogia **16**: 41–90.

DIEDERICH, P., KOCOURKOVÁ, J., ETAYO, J. & ZHURBENKO, M., 2007: The lichenicolous *Phoma* species (coelomycetes) on *Cladonia* (coelomycetes). – Lichenologist **39**: 153–163.

ETAYO, J., 1996: Contribución al conocimiento de los liquenes y hongos liquenícolas de Mallorca (Islas Baleares). – Bull. Soc. linn. Provence **47**: 111–121.

GRILLO, M., 1993: Florula lichenica del territorio di Capizzi (Sicilia nebrodense). – Arch. Bot. Ital. **68**: 9–25.

GRILLO, M., 1996: I licheni del territorio ibleo – Boll. Sedute Accad. Gioenia Sci. Nat. **29**(352): 325–358.

GRILLO, M. & CANIGLIA, G., 1989: Florula lichenica del versante sud-orientale dell'Etna – 1. – Arch.Bot. Ital. **64**: 142–168.

GRILLO, M. & CANIGLIA, G.M., 2004: A check-list of Iblean Lichens (Sicily). – Fl. Medit. **14**: 219–251.

GRILLO, M. & CRISTAUDO, A., 1995: Flora e vegetazione lichenica epifita su *Corylus avellana* L. in colture della Sicilia. – Allionia **33**: 131–151.

GRILLO, M. & ROMANO, E., 1989: I licheni del bosco die Santo Pietro nel Caltagironese (Sicilia meridionale-orientale). – Arch. Bot. Ital. **65**: 17–38.

GRUBE, M. & HAFELLNER, J., 1990: Studien an flechtenbewohnenden Pilzen der Sammelgattung *Didymella* (Ascomycetes, Dothideales). – Nova Hedwigia **51**: 283–360.

GRUBE, M. & MATZER, M., 1997: Taxonomic concept of lichenicolous *Arthonia* species. – Biblioth. Lichenol. **68**: 1–17.

HAFELLNER, J., 1987: Studien über lichenicole Pilze und Flechten VI. Ein verändertes Gattungskonzept für Cercidospora. – Herzogia **7**(3-4): 353–365.

HAFELLNER, J. & CALATAYUD, V., 1999: *Lichenostigma cosmopolites*, a common lichenicolous fungus on *Xanthoparmelia* species. – Mycotaxon **72**: 107–114.

HAFELLNER, J. & MAYRHOFER, H., 2007: A contribution to the knowledge of lichenicolous fungi and lichens occuring in New Zealand. – Biblioth. Lichenol. **95**: 225–266.

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HAWKSWORTH, D.L., 1977: Taxonomic and biological observations on the genus *Lichenoconium* (Sphaeropsidales). – Persoonia **9**: 159–198.

HAWKSWORTH, D.L., 1981: The lichenicolous coelomycetes. – Bull. Brit. Mus. (Nat. Hist.) Bot. **9**: 1–98.

HAWKSWORTH, D.L. & COLE, M.S., 2002: *Intralichen*, a new genus for lichenicolous ‚*Bispora*' and ‚*Trimatostomma*' species. – Fungal diversity **11**: 87–97

HAWKSWORTH, D.L. & COLE, M.S., 2004: *Phoma fuliginosa* sp. nov., from *Caloplaca trachyphylla* in Nebraska, with a key to the known lichenicolous species. – Lichenologist **36**: 7–13.

HERTEL, H., 1969: *Arthonia intexta* Almq., ein vielfach verkannter fruchtkörperloser Flechtenparasit. – Ber. Dtsch. Bot. Ges. **82**: 209–220.

HOFFMANN, N. & HAFELLNER, J., 2000: Eine Revision der lichenicolen Arten der Sammelgattungen *Guignardia* und *Physalospora* (Ascomycotina). – Biblioth. Lichenol. **77**: 1–181.

JATTA, A., 1875. Lichenum inferioris Italiae manipulus secundus, quem collegit et ordinavit A. Jatta. N. Gior. Bot. Ital., n.ser., **7**, 3: 211-238

KEISSLER, K. VON, 1913: Über einige Flechtenparasiten aus Steiermark. – Centralbl. Bakteriologie **37**: 384–392.

KEISSLER, K. VON, 1930: Die Flechtenparasiten. – In: Dr. L. RABENHORST'S Kryptogamen-Flora von Deutschland, Österreich und der Schweiz. 2. Aufl., Bd. 8. – Leipzig: Akad. Verlagsanst.

KOCOURKOVÁ, J., 2000: Lichenicolous fungi of the Czech Republic. (The first commented checklist). – Sborn. Nar. Mus. v Praze, Rada B, Prir. Vedy **55**: 59–169.

NAVARRO-ROSINÉS, P. & HAFELLNER, J., 1996: *Lichenostigma elongata* spec. nov. (Dothideales), a lichenicolous ascomycete on *Lobothallia* and *Aspicilia* species. – Mycotaxon **57**: 211–225.

NIMIS, P.L. & POELT, J., 1987: The lichens and lichenicolous fungi of Sardinia (Italy). An annotated list. – Stud. Geobot. **7** (suppl. 1): 1–269.

NIMIS, P.L., 1993: The lichens of Italy (an annotated catalogue). – Monogr. Mus. Reg. Sci. Nat. Torino **12**: 1–897

NIMIS, P.L., POELT, J., TRETIACH, M., OTTONELLO, D., PUNTILLO, D. & VĚZDA, A., 1994: Contribution to lichen floristics in Italy VII The lichens of Marettimo (Egadi Islands, Sicily). – Bull. Soc. Linn. Provence **45**: 247–262.

POELT, J., 1957: Mitteleuropäische Flechten. IV — Mitt. Bot. Staatssamml. München **16**: 273–283.

POELT, J., 1972: ein zweiter Beitrag zur Flechtenflora des Bayerisch-Böhmischen Waldes bayerischen Anteils. — Hoppea **30**: 111–143.

ROUX, C. & TRIEBEL, D., 1994: Révision des espèces de *Stigmidium* et de *Sphaerellothecium* (champignons lichénicoles non lichénisés, Ascomycetes) cor-

respondant à *Pharcidia epicymatia* sensu Keissler ou à *Stigmidium schaereri* auct. – Bull. Soc. Linn. Provence **45**: 451–542.

SANTESSON, R., MOBERG, R., NORDIN, A., TØNSBERG, T. & VITIKAINEN, O., 2004: Lichen-forming and lichenicolous fungi of Fennoscandia. – Uppsala: Museum of Evolution.

SERUSIAUX, E., DIEDERICH, P., ERTZ, D. & VAN DEN BOOM, P.P.G., 2003: New or interesting lichens and lichenicolous fungi from Belgum, Luxembourg and Northern France. IX. – Lejeunia N.S. **173**: 1–48.

TRETIACH, M. & HAFELLNER, J., 2000: Lichens and lichenicolous fungi of Mt. Fleons (Carnic Alps, Italy). I. Epilithic and epigaeic species. – Herzogia **14**: 99–111.

TRIEBEL, D., 1989: Lecideicole Ascomyceten. Eine Revision der obligat lichenicolen Ascomyceten auf lecideoiden Flechten. – Biblioth. Lichenol. **35**: 1–278.

TRIEBEL, D., 2007 The collection of lichenicolous fungi at the Botanische Staatssammlung München. – http://www.botanischestaatssammlung.de/Database Clients/BSMlichfungicoll

TRIEBEL, D. & RAMBOLD, G., 1988: *Cecidonia* und *Phacopsis* (Lecanorales): zwei lichenicole Pilzgattungen mit cecidogenen Arten. – Nova Hedwigia **47**: 279–309.

TRIEBEL, D., RAMBOLD, G. & ELIX, J.A., 1995: A conspectus of the genus *Phacopsis* (Lecanorales). – Bryologist **98**: 71–83.

VAN DEN BOOM, P., 1992: Contribution to the lichen flora of Sicily. – Cryptog., Bryol. Lichénol. **13**: 93–103.

VOUAUX, A., 1914: Synopsis des champignons parasites des lichens. – Bull. Soc. Mycol. France **30**: 135–198, 281–329.

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