

Zwackhiomyces echinulatus sp. nov. and other lichenicolous fungi from Sicily, Italy

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Abstract: BRACKEL, W. v. 2008. *Zwackhiomyces echinulatus* sp. nov. and other lichenicolous fungi from Sicily, Italy. – *Herzogia* 21: 181–198.

During an excursion through Sicily in summer 2007, several sites of lichenological interest in the north of the island were investigated, such as the forests of Ficuzza, the Madonie, Nebrodi, and Peloritani mountains. The new species *Zwackhiomyces echinulatus*, lichenicolous on *Physconia distorta*, is described, and a list of 76 taxa is provided. New for Sicily are: *Abrothallus bertianus*, *A. caerulescens*, *A. parmiliarum*, *Acremonium rhabdosporum*, *Arthonia destruens*, *A. subfuscicola*, *Cercidospora macrospora*, *Cladosporium licheniphilum*, *Cornutispora lichenicola*, *Dactylospora parellaria*, *Echinothecium reticulatum*, *Endococcus exerrans*, *E. macrosporus*, *E. rugulosus*, *E. verrucosus*, *Intralichen lichenum*, *Lichenoconium xanthoriae*, *Lichenopeltella ramalinae*, *Marchandiomyces aurantiacus*, *Mixtoconidium canariense*, *Muellerella atricola*, *Nectriopsis rubefaciens*, *Opegrapha rotunda*, *Paranectria oropensis*, *Phaeosporobolus alpinus*, *Phoma epiphyscia*, *Pronectria echinulata*, *P. santessonii* with its *Acremonium* anamorph, *P. xanthoriae*, *Pyrenochaeta xanthoriae*, *Roselliniella atlantica*, *Sclerococcum montagnei*, *Sphaerellothecium araneosum*, *Stigmatidium acetabuli*, *S. fuscatae*, *S. lecidellae*, *S. pumilum*, *S. tabacinae*, *Unguiculariopsis thallophila*, *Weddellomyces epicallopisma*, and the parasitic lichen *Rinodina insularis*.

Zusammenfassung: BRACKEL, W. v. 2008. *Zwackhiomyces echinulatus* sp. nov. und andere flechtenbewohnende Pilze aus Sizilien, Italien. – *Herzogia* 21: 181–198.

Während einer Exkursion durch Sizilien im Sommer 2007 wurden etliche lichenologisch interessante Orte im Norden der Insel besucht, so die Wälder von Ficuzza, in der Madonie, in den Monti Nebrodi und den Monti Peloritani. Die neue Art *Zwackhiomyces echinulatus*, parasitisch auf *Physconia distorta*, wird beschrieben und eine Liste von 76 Arten vorgestellt. Neu für Sizilien sind: *Abrothallus bertianus*, *A. caerulescens*, *A. parmiliarum*, *Acremonium rhabdosporum*, *Arthonia destruens*, *A. subfuscicola*, *Cercidospora macrospora*, *Cladosporium licheniphilum*, *Cornutispora lichenicola*, *Dactylospora parellaria*, *Echinothecium reticulatum*, *Endococcus exerrans*, *E. macrosporus*, *E. rugulosus*, *E. verrucosus*, *Intralichen lichenum*, *Lichenoconium xanthoriae*, *Lichenopeltella ramalinae*, *Marchandiomyces aurantiacus*, *Mixtoconidium canariense*, *Muellerella atricola*, *Nectriopsis rubefaciens*, *Opegrapha rotunda*, *Paranectria oropensis*, *Phaeosporobolus alpinus*, *Phoma epiphyscia*, *Pronectria echinulata*, *P. santessonii* mit ihrem *Acremonium* Anamorph, *P. xanthoriae*, *Pyrenochaeta xanthoriae*, *Roselliniella atlantica*, *Sclerococcum montagnei*, *Sphaerellothecium araneosum*, *Stigmatidium acetabuli*, *S. fuscatae*, *S. lecidellae*, *S. pumilum*, *S. tabacinae*, *Unguiculariopsis thallophila*, *Weddellomyces epicallopisma* und die parasitische Flechte *Rinodina insularis*.

Key words: Ascomycotina, Basidiomycotina, anamorphic fungi, Mediterranean, lichens.

Introduction

In addition to our excursion to Sicily in 2006 (BRACKEL 2008), we visited some further localities of lichenological interest, mainly in the northern forests of the island, in summer 2007. Because of its richness in lichens and lichenicolous fungi, the Bosco della Ficuzza was re-visited, as were the lava boulder fields of Mt. Etna. Additional locations lie in the northern

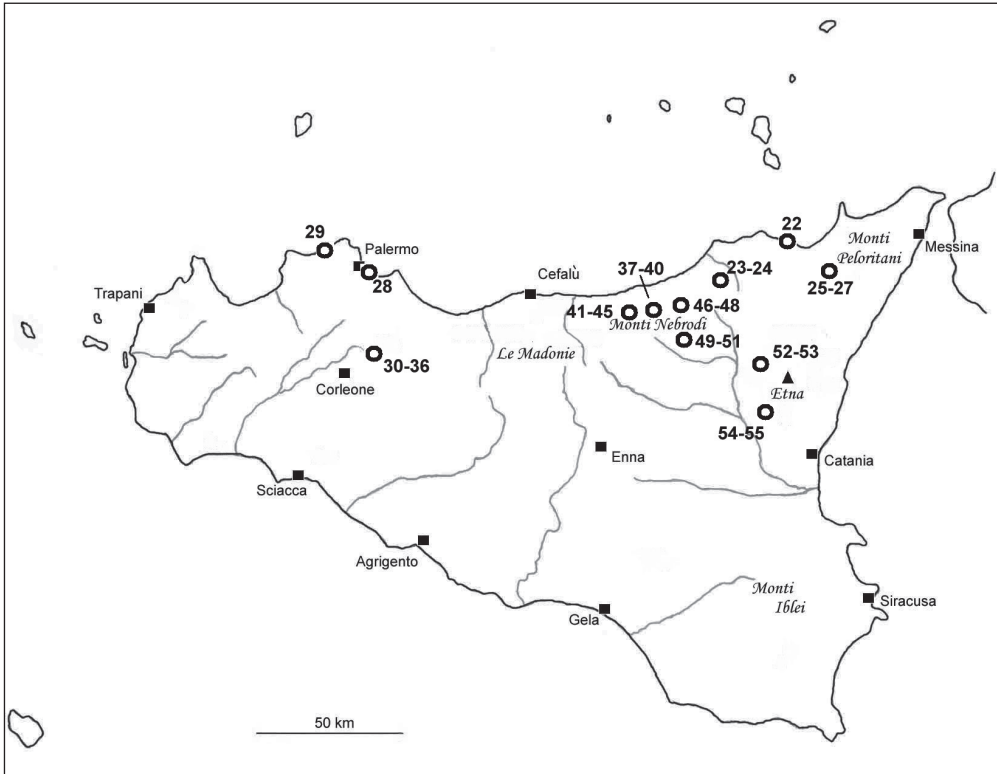


Fig. 1: Collection sites 22–55.

mountain belt of Sicily, the Madonie, Monti Nebrodi and Monti Peloritani (Fig. 1). The lichen flora of these mountains is of special interest because of its oceanic elements such as *Lobaria pulmonaria*, *Nephroma laevigatum*, *Peltigera collina* and *Leptogium saturninum*.

Material and Methods

The specimens were studied macroscopically with a Zeiss stereo microscope at magnifications up to $\times 40$ 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. Statistical measurements are indicated as

$$(\text{minimum}) - \bar{X} - \sigma_x - \bar{X} + \sigma_x \quad (\text{maximum})$$

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 iodine solution, and cotton blue, were used. The specimens are deposited in the private herbarium of the author at the Institut für Vegetationskunde und Landschaftsökologie (hb ivl), the holotype of *Zwackhiomyces echinulatus* in M.

Results

The underlined numbers 22–55 indicate the localities described below. All specimens leg. W. & G. v. Brackel, det. W. v. Brackel. The species marked with an “^l” were already mentioned in the first part (BRACKEL 2008) for other localities in Sicily; they are not or only shortly commented. Species marked with an “^L” are lichenised (parasitic lichens).

Abrothallus bertianus De Not.

26b: on *Melanohalea exasperata*, thallus (hb ivl 4361); 38: on *M. exasperata*, thallus and margin of apothecia (hb ivl 4334). The species was described from Liguria (DE NOTARIS 1845). New for Sicily.

Abrothallus caerulescens I.Kotte

46b: on *Xanthoparmelia conspersa*, thallus (hb ivl 4510).

This species, confined to *Xanthoparmelia* species, was treated for a long time as synonymous with *A. parmeliarum*. In Italy, it was known from Trentino-Alto Adige (KERNSTOCK 1890). New for Sicily.

Abrothallus parmeliarum (Sommerf.) Arnold

55: on *Parmelia saxatilis*, thallus (hb ivl 4537).

Abrothallus parmeliarum is confined to hosts of the genus *Parmelia* s. str. In Italy, it was known from Veneto (MASSALONGO 1852), Lombardia (ANZI 1860), Piemonte (BAGLIETTO & CARESTIA 1867), Puglia (JATTA 1875) and Friuli-Venezia Giulia (HAFELLNER 1998). New for Sicily. Our specimen was co-infected with *Echinothecium reticulatum* Zopf.

Acremonium rhabdosporum W.Gams

38: on *Ramalina farinacea*, thallus (hb ivl 4335).

Anamorph of *Trichonectria rubefaciens*. In our specimen, it caused dark brown patches on the host thallus and, in a later state, the death of the infected parts. New for Sicily.

Arthonia destruens Rehm in Rabenh.

41: on *Physcia leptalea* (hb ivl 4341).

Known hosts of *Arthonia destruens* in the narrower concept of GRUBE et al. (1995) are *Physcia aipolia* and *P. stellaris*: therefore *P. leptalea* is a new host. Our specimen clearly shows the described features such as the yellowish tinge of the epithecium, and hymenium, and the K+ violet hypothecium, 4-spored, I– asci of $30 \times 10 \mu\text{m}$, and ascospores of $13\text{--}16 \times 5\text{--}5.5 \mu\text{m}$, becoming brown and verrucose. So it is different from *A. epiphyscia* as well as from the species on *P. adscendens* mentioned in GRUBE et al. (1995). *Arthonia destruens* s. str. is known from Germany and Austria (REHM 1891, GRUBE et al. 1995). There are reports of *A. destruens* growing on *Xanthoria* and *Caloplaca* from several other countries in Europe, Africa, and America, but these may belong to other species of *A. destruens* agg. New for Sicily.

^l*Arthonia galactinaria* Leight.

25a: on *Lecanora dispersa* agg. (hb ivl 4356).

Arthonia subfuscicola (Linds.) Triebel

41: on *Lecanora carpinea*, apothecia (hb ivl 4340); 32b: on *L. carpinea*, thallus and apothecia (hb ivl 4384).

This species causes dark spots on the whitish apothecia of *Lecanora carpinea* and *L. albella* (ALMQUIST 1880, TRIEBEL et al. 1991). In our specimen 4340, the 3-septate hyaline spores measured $15 \times 6 \mu\text{m}$. In Italy, the species was known from Lombardia (ANZI 1860). New for Sicily.

^l*Arthonia varians* (Davies) Nyl.

55: on *Lecanora rupicola* (hb ivl 4546).

Athelia arachnoidea (Berk.) Jüil.

26e: on *Physcia adscendens*, *P. tenella*, *Physconia distorta*, and *Xanthoria parietina*, thallus (hb ivl 4363); 37: on *Physcia adscendens*, thallus.

Due to the climatic situation in both locations, the fungus was in the sclerotic state: only a small part showed the white net of hyphae. We follow ARVIDSSON (1976) by designating the lichen-parasites producing sclerotia as *A. arachnoidea* (in contrary to *A. epiphylla*, which never produces sclerotia).

Carbonea vitellinaria (Nyl.) Hertel

55: on *Candelariella vitellina*, thallus (hb ivl 4539).

This widespread and almost common species was recorded from several Italian provinces (see NIMIS 1993, TRETIACH & HAFELLNER 2000, HAFELLNER 2006) including Sicily (GRILLO & CANIGLIA 1989, VAN DEN BOOM 1992).

^L*Catillaria mediterranea* Hafellner

23: on *Psora testacea*, thallus (hb ivl 4372); 31a: on *Anaptychia ciliaris*, thallus (hb ivl 4373); 38: on *Parmotrema perlatum*, thallus (hb ivl 4504); 49a: on *Anaptychia ciliaris*, thallus.

Catillaria mediterranea was recognised as a parasitic lichen, living on *Anaptychia* and *Ramalina* (HAFELLNER 1982); first it was described as *Scutula pleiospora* Vouaux, a lichenicolous fungus. HAFELLNER (1982) mentions a record from Basilicata, NIMIS & TRETIACH (1999) from Molise and Basilicata on *Anaptychia ciliaris* and *A. crinalis*, and TRETIACH & HAFELLNER (1998) two records from Sicily, both on *Anaptychia ciliaris* (Madonie, Portella Mandarinini and Bosco Pomieri, between Piano Battaglia and Petralia).

NIMIS & POELT (1987) mention a sample from Sardinia free-living on bark, with doubts whether it is the same species; this proved to be *Catillaria praedicta* Tretiach & Hafellner (TRETIACH & HAFELLNER 1998). In our specimen from the Monti Nebrodi (4372) the lichen was growing on the squamules of *Psora testacea* without doing any visible harm to the host. In the specimen from the Bosco della Ficuzza (4373), the thallus was spread in a very thin layer of about 15 µm between the hairs of the upper and lower surface of *Anaptychia ciliaris*. The contact zone between the host and the parasite thallus was not sharp, and some of the hyphae of *Catillaria mediterranea* reached about 10 µm into the cortex of *Anaptychia ciliaris*. Besides this, no damage was to be seen and the algae of the host beneath the cortex had the same appearance as those in uninfected parts.

^L*Cercidospora epipolytropa* (Mudd) Arnold

51: on *Lecanora polytropa*, apothecia (hb ivl 4521).

This and the following species were growing close together on one stone, each one on its specific host.

Cercidospora macrospora (Uloth) Hafellner & Nav.-Ros.

51: on *Lecanora bolcana*, apothecia (hb ivl 4522).

Cercidospora macrospora is a common fungus with a worldwide distribution. In Italy, it was known from Trentino-Alto Adige (HAFELLNER 1987), Veneto (HAFELLNER 1987), and Sardinia (NIMIS & POELT 1987). New for Sicily.

Cladosporium licheniphilum Heuchert & U.Braun

39: on *Ochrolechia balcanica*, thallus (hb ivl 4506).

This recently described hyphomycete (HEUCHERT & BRAUN 2006) is new for Sicily.

Cornutispora lichenicola D.Hawksw. & B.Sutton

26b: on *Ramalina fastigiata* (hb ivl 4359).

There is one Italian record from Trentino-Alto Adige (HAWKSWORTH 1981). The species grows on many foliose and on some crustose lichens, especially on Parmeliaceae, Lecanoraceae and Pertusariaceae. Our specimen shows some tendencies towards *Cornutispora intermedia* Punith. & D.Hawksw. in the shape of the conidia with broad, somewhat swollen bases, and narrow ends of the arms of some conidia, but most of them are narrowed gradually to the ends and the measurements of the conidia (6–8 × 2 µm) correspond to *C. lichenicola* (PUNITHALINGAM 2003). New for Sicily.

Dactylospora parasitica (Floerke) Zopf

40: on *Pertusaria albescens*, thallus (hb ivl 4508); 47: on *P. albescens*, thallus (hb ivl 4518).

A worldwide distributed species on *Ochrolechia* and *Pertusaria*. In Italy, it was found in Trentino-Alto Adige (TRIEBEL 2007), in the Toscana (HAFELLNER 1979, BELLEMÈRE & HAFELLNER 1982), in Sardinia (BAGLIETTO 1879, NIMIS & POELT 1987), and in Sicily (GRILLO & CANIGLIA 2004).

Dactylospora parellaria (Nyl.) Arnold

46b: on *Ochrolechia parella*, thallus and apothecia (hb ivl 4511); 52: on *O. parella*, thallus (hb ivl 4527).

This species is restricted to *Ochrolechia parella*. New for Sicily.

***Echinothecium reticulatum* Zopf**

52: on *Parmelia saxatilis* (hb ivl 4553); 55: on *P. saxatilis*, thallus (hb ivl 4538, 4554).

The worldwide distributed species was known in Italy from Trentino-Alto Adige on *Parmelia saxatilis* (ARNOLD 1897) and from Sardinia on *Xanthoparmelia conspersa* (NIMIS & POELT 1987). Like all older records of the species on *Xanthoparmelia* (and other hosts than *Parmelia* s. str.), the specimen from Sardinia should be checked to assure it is not *Lichenostigma cosmopolites* (HAFELLNER & CALATAYUD 1999). In our specimens, we found mostly young perithecia with asci in an early stage of development. In this stage, the setae are rudimentary (ZOPF 1898) and not easy to see, which may cause it to be confused with *Lichenostigma*. A similar fungus on *Parmelia* with netforming brown hyphae is *Sphaerellothecium parmeliae* Diederich & Etayo, which causes black necrotic patches on the host thallus. Our specimen 4538 was co-infected with *Abrothallus parmeliarum* (see above). New for Sicily.

***Endococcus exerrans* Nyl.**

55: on *Rhizocarpon geographicum* (hb ivl 4542).

Endococcus exerrans is confined to *Rhizocarpon*-species (SÉRUSIAUX et al. 1999). New for Sicily.

***Endococcus macrosporus* (Arnold) Nyl.**

52: on *Rhizocarpon geographicum* (hb ivl 4525).

Endococcus macrosporus is confined to yellow *Rhizocarpon* species and distinguished from *E. exerrans* by having larger spores: $16.5\text{--}19.5 \times 5.5\text{--}7 \mu\text{m}$ vs. $13\text{--}16 \times 4\text{--}5 \mu\text{m}$ (SÉRUSIAUX et al. 1999, HAFELLNER et al. 2002). In our specimen, they measured approximately $17 \times 7 \mu\text{m}$; we could not observe the formation of galls. This worldwide distributed species was known in Italy from Friuli-Venezia-Giulia (TRETIACH & HAFELLNER 2000). New for Sicily.

***Endococcus rugulosus* Nyl.**

35d: on *Verrucaria nigrescens*, thallus (hb ivl 4399).

Endococcus rugulosus is characterised by the broad ellipsoid, verruculose ascospores. It is confined to the genus *Verrucaria*.

The records of TRIEBEL (1989) from Trentino-Alto Adige on *Rhizocarpon geminatum* and of NIMIS & POELT (1987) from Sardinia on *Aspicilia* spec. and on *Acarospora sphaerospora* may belong to other species. New for Sicily.

***Endococcus verrucosus* Hafellner**

52: on *Aspicilia cinerea* agg., thallus (hb ivl 4536), on *A. spec.*, thallus (hb ivl 4532); 53: on *A. spec.*, thallus (hb ivl 4523); 55: on *A. cinerea* agg., thallus (hb ivl 4550).

Endococcus verrucosus, widespread over the Northern Hemisphere, is confined to *Aspicilia* (HAFELLNER 1994). In Italy it was known so far from Trentino-Alto Adige (HAFELLNER 1994) and from Friuli-Venezia Giulia (TRETIACH & HAFELLNER 2000). New for Sicily.

***Intralichen christiansenii* (D. Hawksw.) D.Hawksw. & M.S.Cole**

25a: on *Candelariella aurella*, apothecia; on *Lecanora carpineae*, apothecia (hb ivl 4362); 48a: on *Lecanora chlarotera*, apothecia; 55: on *Diploschistes scruposus*, thallus (hb ivl 4549).

This widely distributed hyphomycete was already known from Sicily (VAN DEN BOOM 1992).

***Intralichen lichenum* (Diederich) D.Hawksw. & M.S.Cole**

39: on *Evernia prunastri*, apothecia (hb ivl 4344); 46: on *Tremella ramalinae*, basidiomata (hb ivl 4349).

This hyphomycete is known to grow in the apothecia (and more rarely on the thallus) of a number of different lichens. In 4344, we found it in the single apothecium of the specimen of *Evernia prunastri*, a rarely fruiting lichen. In 4349, it was growing in the basidiomata of *Tremella ramalinae* on *Ramalina calicaris*. As this is a new and uncommon host, we give a short description:

Colonies dispersed in the hymenium of the basidiomata. Mycelium pale brownish, septate, smooth-walled. Conidiophores semi-macronematous, mononematous, branched, pale brown, septate, distinctly constricted at the septa, $25\text{--}75 \mu\text{m}$ long and $2\text{--}2.5 \mu\text{m}$ thick. Conidiogenous cells monoblastic, integrated, terminal, subcylindrical to ellipsoid, pale brown. Conidia globose to ellipsoid, pale brownish, simple, rarely 1-septate, thin- and smooth-walled, catenate, composed of 1–12 conidia, $2.5\text{--}4.5 \mu\text{m}$ in diameter. This is almost identical to the description given by DIEDERICH (1990). The colour of the basidiomata changes from beige to grey at an advanced stage, and the production of basidia is reduced. New for Sicily.

Leptosphaeria ramalinae (Desm.) Sacc.

26a: on *Ramalina fastigiata*, thallus and apothecia (hb ivl 4321); 26b: on *R. fastigiata*, thallus (hb ivl 4324); 38: on *R. farinacea*, thallus (hb ivl 4330); 39: on *R. fastigiata*, thallus (hb ivl 4342); 40: on *R. fastigiata*, thallus (hb ivl 4509); 41: on *R. farinacea*, thallus (hb ivl 4337); 46: on *R. fastigiata* (hb ivl 4348).

This rarely collected species seems to be widespread in the forests of the northern Sicilian mountains.

Lichenochora obscuroides (Linds.) Triebel & Rambold

32b: on *Physcia adscendens*, thallus (hb ivl 4385).

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

38: on *Ramalina farinacea*, thallus (hb ivl 4331), on *R. farinacea*, thallus; 39: on *Hypogymnia tubulosa*, *Melanelixia glabra*, *Parmelia sulcata*, *Ramalina fastigiata*, thallus, on *R. calicaris*, thallus and apothecia; 40: on *Parmelina pastillifera*, thallus; 54: on *Pseudevernia furfuracea*, thallus.

Lichenocodium lecanorae (Jaap) D.Hawksw.

46a: on *Parmelina quercina*, apothecia (hb ivl 4513); 47: on *P. pastillifera*, thallus (hb ivl 4516), on *Lecanora strobilina*, apothecia (hb ivl 4519); 48a: on *L. chlarotera*, apothecia; 49b: on *Xanthoparmelia pulla*, apothecia; 55: on *X. pulla*, apothecia.

Lichenocodium xanthoriae M.S.Christ.

41: on *Melanohalea exasperata*, apothecia.

This widespread but not common species is new for Sicily.

Lichenodiplis lecanorae (Vouaux) Dyko & D.Hawksw.

27: on *Caloplaca crenularia*, apothecia (hb ivl 4367); 32b: on *C. flavorubescens* var. *quercina* (hb ivl 4387); 34b: on *C. flavorubescens* var. *quercina*; 52: on *C. crenularia*, apothecia, on *Xanthoria calcicola*, thallus (hb ivl 4535).

Xanthoria calcicola is a new host for the species. *Lichenodiplis poeltii* S.Y.Kondr. & D.Hawksw., which is known to grow on *Xanthoria* species (KONDRATYUK 1996), has longer conidia than our specimen on *Xanthoria calcicola*: (8–)9–12 × (2.0–)2.5–3.0(–3.5) μm vs. 6–7.5 × 2.5–3 μm in our specimen.

Lichenopeltella ramalinae Etayo & Diederich

39: on *Ramalina farinacea*, thallus (hb ivl 4345); 41: on *R. farinacea*, thallus (hb ivl 4338).

An obviously rare species, new for Sicily.

Lichenostigma cosmopolites Hafellner & Calat.

27: on *Xanthoparmelia conspersa*, thallus; 52: on *X. conspersa*, thallus (hb ivl 4533 in the specimen of *Phacopsis fusca*); 55: on *X. conspersa*, thallus.

Lichenostigma elongata Nav.-Ros. & Hafellner

25a: on *Aspicilia* spec., thallus (hb ivl 4352), on *Lobothallia radiosa*, thallus (hb ivl 4354); 27: on *A. caesiocinerea*, *L. radiosa*, thallus (hb ivl 4368); 35d: on *L. radiosa*, thallus; 52: on *A. contorta*, thallus.

Lichenostigma rugosa Thor

55: on *Diploschistes scruposus*, thallus and apothecia (hb ivl 4541).

Lichenostigma rugosa is a worldwide distributed, almost common species. In Italy, it was known so far from Liguria (THOR 1985) and from the island of Marettimo, which belongs to Sicily (NIMIS et al. 1994).

Marchandiomyces aurantiacus (Lasch) Diederich & Etayo

30b: on *Physcia tenella*, thallus (hb ivl 4318); 43: on *P. leptalea*, thallus (hb ivl 4505); 49a: on *P. leptalea*, thallus.

This anamorphic basidiomycete species is known from several European countries, growing on *Physcia*, *Physconia* and *Xanthoria* species. New for Sicily.

Mixtoconidium canariense Etayo

46: on *Ramalina fraxinea*, thallus (hb ivl 4346).

As written in the description of ETAYO (1995), the gall with the conidiomata looks like an infected, small, and malformed apothecium with a black disc and a thalline exciple. Despite the characteristic appearance: among hundreds of *Ramalina* thalli we checked for lichenicolous fungi, we could find this species only once. *Mixtoconidium canariense* is known from the Canary Islands and from Mallorca (ETAYO 1995, 1996). New for Italy.

Muellerella atricola (Linds.) Sacc. & D.Sacc.

49b: on *Tephromela atra*, thallus (hb ivl 4559).

According to HAFELLNER (2007) *Muellerella atricola* is confined to *Tephromela atra*. In Italy, it was known from Emilia-Romagna (HAFELLNER 2007), and there are some older reports from STEINER (1911) and ANZI (1861–1868) of *Tichothecium erraticum* on *Tephromela atra* from Piemonte, Lombardia, and Veneto that should be checked. New for Sicily.

Muellerella erratica (A.Massal.) Hafellner & V.John

23: on *Lecanora albescens*, thallus; 25a: on *Caloplaca erythrocarpa*, thallus (hb ivl 4355); 25b: on *Fulgensia fulgida*, thallus and apothecia (hb ivl 4357), and on *Rinodina immersa*, thallus; 29: on *Caloplaca flavescens*, thallus; 35d: on *Aspicilia contorta*, thallus.

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

23: on *Verrucaria baldensis*, next to the perithecia (hb ivl 4351), 30b: on *Physcia tenella*, thallus (hb ivl 4312); 32a: on *Caloplaca flavorubescens* var. *quercina* (hb ivl 4381).

Muellerella pygmaea (Körb.) D.Hawksw. s.str.

55: on *Lecidea fuscoatra* (hb ivl 4542 in the specimen of *Endococcus exerrans* on *Rhizocarpon geographicum*).

Muellerella ventosicola (Mudd) D.Hawksw.

52: on *Protoparmelia badia* (hb ivl 4528); 55: on *P. badia* (hb ivl 4543).

According to TRIEBEL (1989), the species usually grows on *Rhizocarpon* species and on *Ophioparma ventosa*; only once it was found on *Dimelaena oreina* and on *Protoparmelia badia*. So this is a confirmation of the last host. In the narrower concept of HAFELLNER et al. (2005), the species is restricted to *Ophioparma*, but our specimens fit well to the description of *M. ventosicola*.

Nectriopsis rubefaciens (Ellis & Everh.) M.S.Cole & D.Hawksw.

38: on *Parmelina quercina*, thallus (hb ivl 4503).

The species grows on different fruticose and foliose, mainly epiphytic, lichens. New for Sicily.

Diederich & Schroers (in SÉRUSIAUX et al. 1999) transferred the species to the genus *Trichonectria* because of the thick-walled, ascumal hairs and aspects of ascospore and ascus morphology. Because of the vermiform and multiseptate ascospores of the type species, *Trichonectria hirta* (Bloxam) Petch, we hesitate to follow their argumentation.

Opegrapha rotunda Hafellner

30a: on *Physconia distorta*, thallus (hb ivl 4370).

This rare species is known only from the host *Physconia distorta* (HAFELLNER 1994, HITCH 1995, VAN DEN BOOM & ETAYO 2000). New for Sicily.

Paranectria oropensis (Ces.) D.Hawksw. & Piroz.

31a: on *Physconia venusta*, thallus (hb ivl 4376), on *Pleurosticta acetabulum*, thallus (hb ivl 4377).

The specimen of *Physconia venusta* was co-infected with *Pronectria echinulata*. Some of the ascospores (in both specimens) were shorter (22–24 µm) and less septate, as they are described for *Paranectria oropensis* subsp. *parviseptata* (COLE & HAWKSWORTH 2001), but also ascospores with normal length (up to 37 µm) and septation occurred. In the Sicilian material, the two subspecies cannot be distinguished (see also DIEDERICH 2003).

Paranectria oropensis is widely distributed in the northern hemisphere and grows on several different hosts; in Italy, so far, it was known from Piemonte (TRIEBEL 1989) and Friuli-Venezia Giulia (TRETIACH 1993). New for Sicily.

Phacopsis fusca (Triebel & Rambold) Diederich

52: on *Xanthoparmelia conspersa*, thallus (hb ivl 4533); 55: on *X. conspersa*, thallus (hb ivl 4548).

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

35b: on *Pertusaria albescens*, thallus (hb ivl 4396).

This worldwide distributed species is new for Sicily.

Phoma epiphyscia Vouaux

46a: on *Xanthoria parietina* (hb ivl 4512).

We assign our specimen only with some hesitation to this species. The measurements of the conidiomata (65–75 µm) and of the conidia (5–5.5 × 2.5 µm) range on the lower margin of the reported variation of *Phoma epiphyscia*. On the other hand, there is no doubt that the species also occurs on *Xanthoria parietina*, as samples from Bavaria (Germany) show. New for Sicily.

***Phoma ficuzzae* Brackel**

26a: on *Ramalina fastigiata*, thallus and apothecia (hb ivl 4322); 41: on *R. farinacea* (hb ivl 4339); 46a: on *R. fastigiata*, thallus (hb ivl 4515).

This recently described species (BRACKEL 2008) seems to be not rare in the Sicilian mountains. All hitherto known hosts are epiphytic *Ramalina* species.

***Pronectria echinulata* Lowen**

8: on *Physconia venusta*, thallus and apothecia (hb ivl 3973); 31a: on *P. venusta*, thallus and apothecia, together with the possible anamorph (hb ivl 4375, 4558).

This rare species is confined to *Physcia* and *Physconia*. New to Sicily.

In the infected thallus of 4375 (and 4558) we found, intermixed with the perithecia, the possible anamorph of *Pronectria echinulata*: smooth orange amorphous patches, consisting of a mass of conidia; conidiophores were not found. Conidia hyaline, smooth, ellipsoid, most of them truncate at one end, (7–)8.2–10.1(–11.2) × (4–)4.5–5.8(–6.7), l/b = (1.3–)1.5–2.1(–2.4) (n = 40).

***Pronectria leptaleae* (J.Steiner) Lowen**

30b: on *Physcia leptalea*, apothecia (hb ivl 4309); 32a: on *Physconia distorta*, thallus (hb ivl 4557); 32b: on *Physcia aipolia*, apothecia (hb ivl 4380); 34a: on *P. aipolia*, apothecia (hb ivl 4392); 38: on *P. leptalea*, apothecia (hb ivl 4502).

***Pronectria santessonii* (Lowen & D.Hawksw.) Lowen**

31a: on *Anaptychia ciliaris*, thallus (hb ivl 4374); 35c: on *A. ciliaris*, thallus (hb ivl sub *Acremonium* anamorph of *Pronectria santessonii* 4398).

This rare species seems to be restricted to the genus *Anaptychia*. In one of our specimens (4374), the host was co-infected by *Catillaria mediterranea*. New for Sicily.

In 4398, *Pronectria santessonii* was growing together with its *Acremonium* anamorph. We found features slightly different from the description of LOWEN & HAWKSWORTH (1986) from cultures grown of a single ascospore isolation, which obviously represent the same fungus. To our knowledge, this is the first record of the anamorph in nature, so a short description is given here:

Acremonium anamorph of *Pronectria santessonii* (Fig. 2)

Italy, Sicily, Prov. Palermo, Bosco della Ficuzza, road from Ficuzza to Santa Barbara, coppice forest, on the bark of *Quercus ilex*, on *Anaptychia ciliaris*, thallus, 740 m, 37°52'52.5"N/13°23'28.8"E, leg. W. & G. v. Brackel, 14.VIII.2007 (hb ivl 4398).

Conidiophores arising from the subtending hyphae, usually not septate, usually unbranched, sometimes 1-septate or branched ± in the middle, hyaline, finely verrucose and wavy in outline, circa 3 µm wide at the base, widening up to 4 µm in the lower half and tapering to 2 µm at the top, 26–50 µm tall. Conidiogenous cells integrated, terminal, enteroblastic. Conidia macronematous, hyaline, terminal, ellipsoid, truncate at the base, simple, usually with 2 guttules, (8–)8.7–10.3(–11) × (4–)4.2–5.1(–5.5) µm (n = 10).

***Pronectria xanthoriae* Lowen & Diederich**

30b: on *Xanthoria parietina*, thallus and apothecia (hb ivl 4313); 34a: on *X. parietina*, thallus and apothecia (hb ivl 4391).

The species grows on epiphytic and epipetric species of *Xanthoria*. New for Sicily.

***Pyrenochaeta xanthoriae* Diederich**

30b: on *Xanthoria parietina*, thallus (hb ivl 4314).

In our specimen, only some of the conidiomata showed the characteristic brown setae around the ostiole. New for Sicily.

***Rimularia insularis* (Nyl.) Rambold & Hertel**

55: on *Lecanora rupicola* (hb ivl 4435).

A widespread lichen, parasitic on the *Lecanora rupicola* group, known from several Italian provinces including Sicily (HERTEL & RAMBOLD 1990, NIMIS 1993).

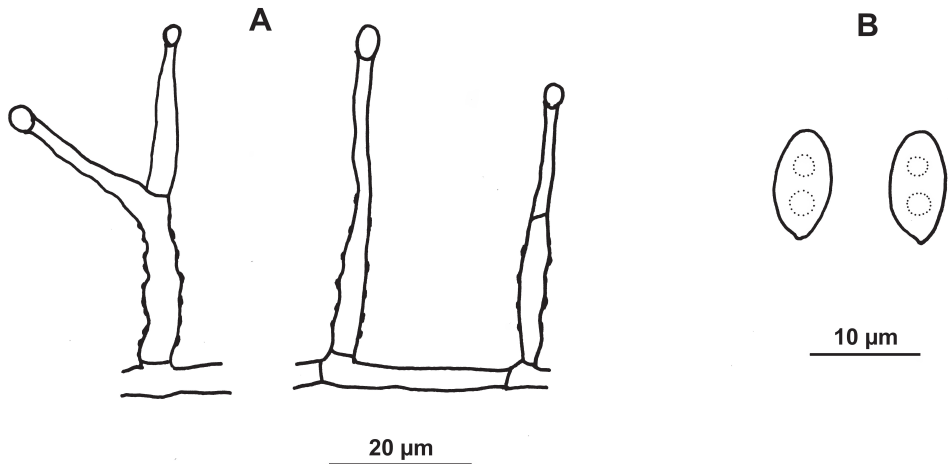


Fig. 2: *Acremonium* anamorph of *Pronectria santessonii* (hb ivl 4398). A – Conidiophores. B – Conidia.

¹*Rinodina insularis* (Arnold) Hafellner

55: on *Lecanora rupicola* (hb ivl 4440).

A rare parasitic lichen; known in Italy from Trentino-Alto Adige (MAYRHOFER 1984, NIMIS 1993). New for Sicily.

Roselliniella atlantica Matzer & Hafellner

36: on *Xanthoparmelia verruculifera*, isidious parts of the thallus (hb ivl 4394).

This widespread but obviously rare species is new for Sicily.

Sclerococcum montagnei Hafellner

52: on *Lecanora rupicola*, thallus (hb ivl 4530); 55: on *L. rupicola*, thallus (4435, in the specimen of *Rimularia insularis*) and on *L. rupicola*, thallus and apothecia (hb ivl 4551).

A rarely reported species. In our specimen 4551, *Sclerococcum montagnei* was also growing in the apothecia of the host; usually it is found on the margin of the areoles (HAFELLNER 1996). New for Sicily.

Sphaerellothecium araneosum (Arnold) Zopf

55: on *Ochrolechia* cf. *androgyna*, thallus (hb ivl 4552).

This worldwide distributed species was known in Italy from Trentino-Alto Adige, growing on *Ochrolechia tartarea* (ARNOLD 1897, KEISSLER 1930). Although Keissler had a broad concept of *Sphaerellothecium araneosum*, the host shows that this species was meant. New for Sicily.

Sphinctrina leucopoda Nyl.

52: on *Protoparmelia badia* (hb ivl 4531).

Italian records of *Sphinctrina leucopoda* are from Toscana (NIMIS et al. 1990), Sardinia (NIMIS & POELT 1987), Calabria (VAN DEN BOOM & APTROOT 1990), and from Sicily (GRILLO & CANIGLIA 2004). Known hosts are various species of *Pertusaria* and *Ochrolechia*, rarer *Lecanora* spp., *Diploschistes* spp., and *Rhizocarpon geographicum*. *Protoparmelia badia* is a new host, so we give a short description of our specimen:

Ascomata 0.3–0.5 mm high, with a short but distinct stalk. Capitulum 0.2–0.3 mm diam., spherical, shining black. Excipulum sclerotised, with a cover of brown isodiametric cells of 4–5 µm diam. over hyaline, periclinally arranged thick hyphae. Hypothecium hyaline, 20 µm high, consisting of irregular cells. All parts of the ascoma K–. Asci 40–43 × 5–5.5 µm with uniseriate spores. Spores dark brown, globose, simple, 4.5–5.5 µm diam., minutely warted, mostly with one guttule. Spore coat thick and distinct.

Stigmatidium acetabuli Calat. & Triebel

31b: on *Pleurosticta acetabulum*, apothecia (hb ivl 4378); 40: on *P. acetabulum*, apothecia (hb ivl 4507).

This recently described species was known so far from Spain and France (CALATAYUD & TRIEBEL 2001). New for Sicily.

Stigmatidium congestum (Körb.) Triebel

26b (hb ivl 4360); 30b (hb ivl 4371); 33 (hb ivl 4389); 34; 35a: all on *Lecanora chlarotera*, apothecia.

Stigmatidium fuscatae (Arnold) R.Sant.

55: on *Acarospora fuscata*, thallus (hb ivl 4545).

Stigmatidium fuscatae seems to be rather common and widespread in the Northern Hemisphere. In Italy, it has been known so far from Valle d'Aosta (VOUAX 1912). New for Sicily.

Stigmatidium lecidellae Triebel, Cl.Roux & Le Coeur

46a: on *Lecidella elaeochroma*, apothecia (hb ivl 4514).

This rarely reported species is known in Italy from Sardinia (NIMIS & POELT 1987, ROUX et al. 1995). New for Sicily.

Stigmatidium neofusceliae Calat. & Triebel

52: on *Xanthoparmelia pulla*, thallus (hb ivl 4526); 55: on *X. pulla*, thallus (hb ivl 4544).

Stigmatidium pumilum (Lettau) Matzer & Hafellner

35e: on *Physconia perisidiosa*, thallus (hb ivl 4397).

S. pumilum is known from several species of the genera *Physcia* and *Phaeophyscia*. Here we report it from *Physconia*. In contrary to the description in MATZER & HAFELLNER (1990), the perithecia are not immersed, but erumpent to almost sessile. We have also seen this characteristic in specimens on *Physcia* in Bavaria. The species has a worldwide distribution and is reported here for the first time for Sicily.

Stigmatidium squamariae (de Lesd.) Cl.Roux & Triebel

48b: on *Lecanora muralis*, apothecia (hb ivl 4520).

Stigmatidium tabacinae (Arnold) Triebel

23: on *Toninia sedifolia*, thallus (hb ivl 4350).

The species is restricted to the genus *Toninia*. It is distributed over the Northern Hemisphere and is also known from Italy: Veneto (TRIEBEL 1989, lectotype), Emilia-Romagna (NIMIS et al. 1996), and Sardinia (NIMIS & POELT 1987). In our specimen, the ascospores measured 11–11.5–12 × 4.5 µm, so they are a little broader than described by TRIEBEL (1989) with (10–)11.5–12.5(–14) × (3–)3.5–4 µm. New for Sicily.

Taeniolella beschiana Diederich

35e: on *Cladonia monomorpha*, squamules (hb ivl 4501).

We have already reported this species for Sicily, but *Cladonia monomorpha* is a new host. We follow APTROOT et al. (2001) to treat *C. monomorpha* as a distinct species in the *C. pyxidata* group.

Telogalla olivieri (Vouaux) Nik.Hoffm. & Hafellner

26d (hb ivl 4364); 30; 32a; 34a: all on *Xanthoria parietina*, thallus; 52: on *X. calcicola*, thallus (hb ivl 4529).

Tremella ramalinae Diederich

46: on *Ramalina calicaris* and *R. fraxinea*, thallus (hb ivl 4347).

Toninia episema (Nyl.) Timdal

35d: on *Aspicilia calcarea*, thallus (hb ivl 4500).

Toninia episema was mentioned for Sicily by VAN DEN BOOM (1992) from San Vito lo Capo and by NIMIS et al. (1994) from the island of Marettimo, both on *Aspicilia calcarea*. In our specimen, we found next to the thallus of *A. calcarea* a similar fungus with a developed but poorly organised thallus as in *Toninia athallina* (Hepp) Timdal. Further investigations are necessary to establish clarity on the relations between both species: moreover, as TIMDAL (1991) writes: "There are apparently no diagnostic anatomical differences between these species".

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

32b: on *Lecanora carpinea*, thallus and margin of apothecia (hb ivl 4386); 33: on *L. chlarotera*, margin of apothecia (hb ivl 4388). New for Sicily.

¹***Vouauxiomyces ramalinae*** (Nordin) D.Hawksw.

39: on *Ramalina fastigiata*, thallus and apothecia (hb ivl 4343).

Weddellomyces epicallopisma (Wedd.) D.Hawksw.

25b: on *Caloplaca aurantia*, thallus (hb ivl 4358).

Known in Italy from Sardinia (NIMIS & POELT 1987) and Basilicata (CALATAYUD & NAVARRO-ROSINÉS 1998). New for Sicily.

¹***Zwackhiomyces coepulonus*** (Norman) Grube & R.Sant.

32b: on *Caloplaca cerina*, thallus (hb ivl 4383); 34b: on *C. flavorubescens* var. *quercina*, apothecia (hb ivl 4390); 35a: on *C. cerina*, apothecia (hb ivl 4395).

Zwackhiomyces echinulatus Brackel sp. nov. (Fig. 3)

Species lichenicola. Ascomata perithecia, globosa, nigra, in thallis et apotheciis speciei *Physconia distorta* crescentia, superficialia, 100–250 µm in diametro. Peridium in sectione longitudinali 30–55 µm crassum, extrinsecus nigro-fuscum, intus castaneum. Elementa hamathecii 2–2.5 µm crassa. Asci cylindrici, 82–100 × 13–17 µm magni, 4(–6–8)-spori. Ascosporeae hyalinae, (22.5–)24.0–27.4(–28.0) × (8.0–)9.3–11.0 µm magnae, uniseptatae, ad septa constrictae, parietibus echinulatis; cellula superiore inferiorem latitudine superante.

Type: Italy, Sicily, Prov. Palermo, Bosco della Ficuzza, road from Rifugio Alpe Cucco to the Crocifisso, forest of *Fraxinus* and *Quercus*, on the bark of *Quercus pubescens*, on *Physconia distorta*, 920 m, 37°52'09.1"N/13°23'39.8"E, W. & G. v. Brackel, 14.8.2007 (M-0141713 – holotype).

Ascomata perithecioid, superficial on the thallus, the outer margin of the host apothecia, and on the apothecial disc, scattered or in groups, 100–250 µm diam., black, globose. Wall pseudoparenchymatous, dark blackish brown in the outer parts, castaneous brown in the middle, and hyaline in the inner parts, brown parts turning black with K; in section 30–55 µm wide, with 4–9 layers of cells. Cells of the wall in section rounded to irregular in the outer parts of the wall, compressed in the inner parts; in superficial view ± rounded to irregular, 5–8 µm diam., granular brown pigments deposited between the cells.

Hamathecial filaments branched and anastomosing, embedded in a gelatinous mass, 2–2.5 µm wide. Asci cylindrical, with a distinct ocular chamber, 82–100 × 13–17 µm, 4-spored, very rarely 6–8-spored, ascospores oblique uniseriate; dehiscence fissitunicate; epiplasm strong dextrinoid, I+ red brown, all other parts I–.

Ascospores hyaline, later very pale brownish, 1-septate, slightly constricted at the septum, ellipsoid, upper cell rounded, lower cell narrower and slightly attenuated; one big guttule in each cell, rarely two in the lower cell, surrounded by an echinulate perispore; (22.5–)24.0–27.4(–28.0) × (8.0–)9.3–11.0 µm, l/b = (2.1–)2.2–2.9(–3.3) (n = 20).

Vegetative hyphae near the ascomata pigmented pale brown, with ± globose cells of 2.5–3 µm diam.

Host and ecology: To date, the fungus has only been found on *Physconia distorta*, growing on *Quercus pubescens*, *Q. cerris* and *Pyrus amygdaliformis* in mixed coppice forests. The infection does not cause any apparent damage to the host.

Etymology: The species is named according to the echinulate ornamentation of the ascospores, similar to those of *Pronectria echinulata*.

Distribution: *Z. echinulatus* is known from three closely neighboured locations in the Bosco della Ficuzza NE of Corleone and one location between Mistretta and Nicosia in the Monti Nebrodi, all in Sicily/Italy.

Additional material examined: Locations 9: (hb ivl 4555); 32b: (hb ivl 4382); 41: (hb ivl 4556), all on *Physconia distorta*.

Discussion: The new species is distinguished from all other species of the genus by the combination of 4-spored asci and the size of the ascospores; the other species with mostly (*Z. kantvilasii*, *Z. lithoiceae*, *Z. physciicola*), or sometimes (*Z. coepulonus*, *Z. dispersus*, *Z. sphinctrinoides*), 4-spored asci have smaller ascospores. Moreover, in none of the hitherto described species is the ornamentation of the ascospores indicated as “echinulate”: the types of ornamentation are from smooth to roughened, gra-

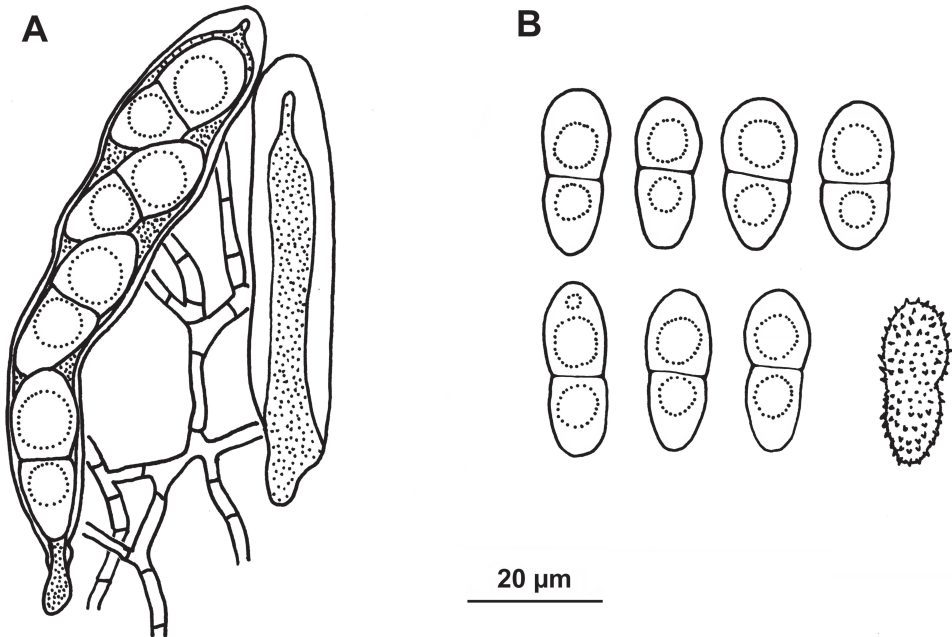


Fig. 3: *Zwackhiomyces echinulatus* (holotype). **A** – Mature ascus, young ascus, and hamathecial filaments. **B** – Ascospores in optical section (ornamentation not indicated), the last one in surface view with ornamentation.

nulose, warted and verrucose. As species of the genus seem to be rather host-specific, only *Z. physcicola* could be imagined to occur also on *Physconia*, and this species has shorter and much narrower ascospores ($18\text{--}22 \times 5.5\text{--}6.5 \mu\text{m}$) and another type of hamathecial elements; because of this, there has been some uncertainty as to whether it belongs to *Zwackhiomyces* (SÉRUSIAUX et al. 1999).

In the key of CALATAYUD et al. (2007), the species could be easily added at 18**:
 Ascospores ($22.5\text{--}24\text{--}27.4\text{--}(28) \times (8\text{--})9.3\text{--}11 \mu\text{m}$, asci mostly 4-spored, $82\text{--}100 \times 13\text{--}17 \mu\text{m}$, pseudothecia $100\text{--}250 \mu\text{m}$, on *Physconia distorta*.

Localities (all Italy, Sicily) with lists of lichens checked for lichenicolous fungi (for nos 1–21 see BRACKEL 2008).

- 22) Prov. Messina, beach of Oliveri, dunes of the “Mare Secco” below Santuário della Madonna Nera near Tindari, mix of pebbles and sand below steep rocks, 5 m, $38^{\circ}08'28.2''\text{N}/15^{\circ}02'57.8''\text{E}$, 6.8.2007. – *Cladonia foliacea*.
- 23) Prov. Messina, Monti Nebrodi, SE Galati-Mamertino, Vallone Galati below the waterfall, on limestone-rocks, 800 m, $37^{\circ}59'37.0''\text{N}/14^{\circ}48'16.9''\text{E}$, 7.8.2007. – *Acarospora cervina*, *Aspicilia contorta*, *Caloplaca erythrocarpa*, *Candelariella aurella*, *Lecanora albescens*, *Lecidella stigmatea*, *Lobothallia radiosa*, *Protoblastenia rupestris*, *Psora testacea*, *Toninia sedifolia*, *Verrucaria baldensis*, *V. nigrescens*.
- 24) Prov. Messina, Monti Nebrodi, SE Galati-Mamertino, at the entrance to the Vallone Galati, on *Pyrus* spec., 800 m, $38^{\circ}00'48.8''\text{N}/14^{\circ}47'1.5''\text{E}$, 7.8.2007. – *Caloplaca cerina* var. *cerina*, *Lecanora chlarotera*, *Lecidella elaeochroma*, *Phaeophyscia orbicularis*, *Physcia leptalea*, *P. stellaris*, *Physconia distorta*, *Xanthoria parietina*.

- 25a) Prov Messina, Monti Peloritani, S Novara di Sicilia, peak of the Rocco di Novara, limestone rocks, 1380 m, 37°59'42.3"N/15°08'47.5"E, 8.8.2007. – *Acarospora cervina*, *Aspicilia calcarea*, *A. spec.*, *Buellia epipolia*, *Caloplaca coronata*, *C. dolomiticola* (= *C. velana*), *C. erythrocarpa*, *Candelariella aurella*, *Fulgensia schistidii* (hb ivl 4194, on *Grimmia anodon*), *Lecanora dispersa*, *Lobothallia radiosa*, *Phaeophyscia orbicularis*, *Rinodina spec.*, *Squamarina cartilaginea*, *Verrucaria subfuscella*.
- 25b) near 25a, E below the peak, on limestone rocks and on the soil between, 1250 m, 37°59'39.3"N/15°08'51.5"E, 8.8.2007. – *Caloplaca aurantia*, *Collema tenax*, *Fulgensia fulgida* (hb ivl 4195), *Lecanora pruinosa*, *Lepraria spec.*, *Protoblastenia rupestris*, *Rinodina immersa*, *Tephromela atra*, *Toninia philippea* (hb ivl 4196).
- 26) Prov. Messina, Monti Peloritani, km 27 of the road from Novara di Sicilia to Portella Mandrazzi, forest of oaks, pines and Spanish chestnut, on *Quercus pubescens* (a), *Castanea sativa* (b), *Fraxinus excelsior* (c), *Populus hybrida* (d), *Cupressus spec.* (e), 990 m, 37°59'12.5"N/15°08'45.9"E, 8.8.2007. – *Anaptychia ciliaris*, *Collema nigrescens*, *Evernia prunastri*, *Lecanora carpinea*, *L. chlarotera*, *Lecidella elaeochroma*, *Melanelixia subaurifera*, *Melanohalea exasperata*, *Parmelia sulcata*, *Parmelina tiliacea*, *Parmotrema perlatum* (hb ivl 4199), *Pertusaria albescens*, *Physcia adscendens*, *P. aipolia*, *P. leptalea*, *P. stellaris*, *P. tenella*, *Physconia distorta*, *P. venusta*, *Pleurosticta acetabulum*, *Ramalina farinacea*, *R. fastigiata*, *Xanthoria parietina*.
- 27) Prov. Messina, Monti Peloritani, beside the road from Mazzarrà to Novara di Sicilia at km 9/IX, in the valley of Torrente Romito, on siliceous rocks, 230 m, 38°03'36.5"N/15°07'33.3"E, 8.8.2007. – *Acarospora fuscata*, *Aspicilia caesiocinerea*, *A. contorta* subsp. *hoffmanniana*, *Caloplaca crenularia*, *Candelariella vitellina*, *Lecidea fuscoatra*, *L. grisella*, *Lecidella carpathica*, *Lepraria spec.*, *Leprocaulon microscopicum*, *Lobothallia radiosa*, *Porpidia macrocarpa*, *Rhizocarpon geographicum*, *R. hochstetteri*, *R. viridiatrum* (partly on *Aspicilia caesiocinerea*), *Tephromela atra*, *Xanthoparmelia conspersa*, *X. pulla*, *Xanthoria calcicola*.
- 28) Prov Palermo, Palermo, S part of the botanical garden, on *Fraxinus spec.*, 7 m, 38°06'37.7"N/13°22.2'28.7"E, 11.8.2007. – *Physconia grisea* subsp. *algeriensis*.
- 29) Prov. Palermo, Ísola delle Fémmine, on limestone rocks at the coast, reached by the spindrift, 2 m, 38°11'47.2"N/13°14'35.5"E, 12.8.2007. – *Caloplaca flavescens*, *Caloplaca holocarpa* agg.
- 30) Prov. Palermo, Bosco della Ficuzza, road from Ficuzza to S, in grazed coppice forest of *Fraxinus excelsior* and *Quercus pubescens*, on *Quercus pubescens* (a), *Pyrus amygdaliformis* (b), *Fraxinus excelsior* (c), and on limestone outcrops (d), 930 m, 37°52'00.4"N/13°23'16.4"E, 13.8.2007 (in the neighbourhood of loc. 9 from the 2006-trip). – loc. 30-34: *Anaptychia ciliaris*, *Arthonia radiata*, *Bacidia rubella* (hb ivl 4404), *Caloplaca cerina*, *C. flavorubescens* var. *quercina*, *Collema nigrescens*, *Fuscopannaria ignobilis* (hb ivl 4406), *Lecania cyrtella*, *Lecanora bolcana*, *L. carpinea*, *L. chlarotera*, *L. horiza* (hb ivl 4408), *Lecidella elaeochroma*, *Leptogium lichenoides*, *L. saturninum* (hb ivl 4405), *Melanohalea exasperata*, *Nephroma laevigatum* (hb ivl 4402), *Ochrolechia balcanica* (hb ivl 4407), *Parmelina quercina*, *Pertusaria albescens*, *P. amara*, *P. pertusa*, *Phaeophyscia orbicularis*, *Physcia adscendens*, *P. aipolia*, *P. leptalea*, *P. tenella*, *Physconia distorta*, *P. perisidi-osa* (hb ivl 4403), *Physconia venusta*, *Pleurosticta acetabulum*, *Ramalina farinacea*, *R. fastigiata*, *R. fraxinea*, *Rinodina exigua*, *Tephromela atra*, *Xanthoria parietina*.
- 31) Prov. Palermo, Bosco della Ficuzza, in forest of *Quercus ilex*, on *Quercus ilex* (a), on *Quercus pubescens* (b), 945 m, 37°51'51.5"N/13°24'56.9"E, 13.8.2007. – lichens see 30.
- 32) Prov. Palermo, Bosco della Ficuzza, at the "Crocifisso", mixed forest with *Acer campestre*, on *Acer campestre* (a), on *Quercus ilex* (b), on *Fraxinus excelsior* (c), 925 m, 37°51'51.6"N/13°23'00.9"E, 13.8.2007. – lichens see 30.
- 33) Prov. Palermo, Bosco della Ficuzza, near Rifugio Alpe Cucco, solitary trees in grazed meadow, 935 m, 37°52'06.0"N/13°24'37.6"E, 13.8.2007. – lichens see 30.
- 34) Prov. Palermo, Bosco della Ficuzza, road from Rifugio Alpe Cucco to the Crocifisso, forest of *Fraxinus* and *Quercus pubescens*, on *Quercus pubescens* (a), on *Fraxinus excelsior* (b), 920 m, 37°52'09.1"N/13°23'39.8"E, 14.8.2007. – lichens see 30.
- 35) Prov. Palermo, Bosco della Ficuzza, road from Ficuzza to Santa Barbara, forest of *Fraxinus excelsior* (a), *Quercus pubescens* (b) and *Qu. ilex* (c) with rocks of limestone (d) and sandstone (e), 740 m, 37°52'52.5"N/13°23'28.8"E, 14.8.2007. – a-c: *Caloplaca cerina*, *Lecanora chlarotera*, *Lecidella*

- elaeochroma*, *Pertusaria albescens*, *Phlyctis argena*, d: *Aspicilia calcarea*, *A. contorta*, *Caloplaca erythrocarpa*, *C. inconnexa* on *Aspicilia calcarea*, *C. variabilis*, *C. velana*, *Candelariella aurella*, *Clauzadea monticola*, *Diploschistes gypsaceus* (hb ivl 4413), *Lecanora dispersa*, *Lecidella stigmataea*, *Leptogium lichenoides*, *Lobothallia radiosa*, *Placynthium nigrum*, *Solenopsora candicans* (hb ivl 4411), *Verrucaria calciseda*, *V. nigrescens*, *V. subfuscella*; e: *Cladonia foliacea*, *C. monomorpha* (hb ivl 4410), *C. rangiformis*, *Lecanora campestris*, *Physconia perisidiosa*.
- 36) Prov. Palermo, Bosco della Ficuzza, large sandstone boulder, in sunny situation, 790 m, 37°53'11.1"N/13°23'45.8"E, 14.8.2007. – *Cladonia cervicornis*, *Lecanora bolcana*, *L. muralis*, *Xanthoparmelia verruculifera*.
- 37) Prov. Messina, Monti Nebrodi, road from Caronia to Capizzi (SP 168 km 12), forest of *Quercus cerris*, 675 m, 37°58'54.0"N/14°28'22.8"E, 15.8.2007. – *Lecanora carpinea*, *L. chlarotera*, *Lecidella elaeochroma*, *Melanelixia subaurifera*, *Parmelia sulcata*, *Parmelina tiliacea*, *Physcia adscendens*, *P. leptalea* (hb ivl 4409), *Ramalina farinacea*, *R. fastigiata*, *Xanthoria parietina*.
- 38) Prov. Messina, Monti Nebrodi, road from Caronia to Capizzi (SP 168 km 15/II), forest of *Quercus cerris*, on *Quercus cerris*, 865 m, 37°58'01.6"N/14°29'14.8"E, 15.8.2007. – *Cladonia parasitica* (hb ivl 4415), *Evernia prunastri*, *Lecanora carpinea*, *Lecidella elaeochroma*, *Melanohalea exasperata*, *Parmelia sulcata*, *Parmelina quercina*, *Parmotrema perlatum*, *Physcia leptalea*, *P. tenella*, *Physconia perisidiosa*, *Pleurosticta acetabulum*, *Ramalina calicaris*, *R. farinacea*, *R. fastigiata*, *Xanthoria parietina*.
- 39) Prov. Messina, Monti Nebrodi, road from Caronia to Capizzi (SP 168 km 19/VI), forest of *Quercus cerris*, 1150 m, 37°57'17.7"N/14°30'28.6"E, 15.8.2007. – *Anaptychia ciliaris*, *Caloplaca ferruginea* (hb ivl 4422), *Degelia plumbea* (hb ivl 4418), *Evernia prunastri*, *Hypogymnia tubulosa*, *Lecania naegelii*, *Lecanora carpinea*, *Lecidella elaeochroma*, *Melanelixia glabra* (hb ivl 4419), *M. subaurifera*, *Melanohalea exasperata*, *Nephroma laevigatum* (hb ivl 4421), *Ochrolechia balcanica*, *Parmelia sulcata*, *Parmelina pastillifera* (hb ivl 4417), *P. quercina*, *P. tiliacea*, *Pertusaria flavida* (hb ivl 4420), *Physconia distorta*, *Ramalina calicaris*, *R. farinacea*, *R. fastigiata*, *Rinodina exigua*.
- 40) Prov. Messina, Monti Nebrodi, road from Caronia to Capizzi (SP 168 km 27), forest of *Fagus sylvatica*, 1400 m, 37°54'23.7"N/14°30'43.3"E, 15.8.2007. – *Anaptychia ciliaris*, *Lecanora carpinea*, *L. chlarotera*, *Lecidella elaeochroma*, *Lobaria pulmonaria*, *Melanelixia glabrata*, *Melanohalea exasperata*, *Parmelia submontana*, *P. sulcata*, *Parmelina pastillifera*, *P. quercina*, *P. tiliacea*, *Pertusaria albescens*, *P. amara*, *P. pertusa*, *Physcia stellaris*, *P. tenella*, *Physconia distorta*, *Pleurosticta acetabulum*, *Pseudevernia furfuracea*, *Ramalina farinacea*, *R. fastigiata*, *R. fraxinea*, *Xanthoria parietina*.
- 41) Prov. Messina, Monti Nebrodi, between Mistretta and Nicosia, Bosco della Giumenta, N of Monte Sambughetti, forest of *Quercus cerris* and *Qu. pubescens*, on *Quercus cerris*, 1225 m, 37°50'39.8"N/14°22'13.0"E, 16.8.2007. – *Anaptychia ciliaris*, *Evernia prunastri*, *Lecanora carpinea*, *L. symmicta*, *Lecidella elaeochroma*, *Lobaria pulmonaria*, *Melanohalea exasperata*, *Parmelia submontana*, *P. sulcata*, *Parmelina quercina*, *P. tiliacea*, *Pertusaria albescens*, *Physcia tenella*, *Physconia distorta*, *Pleurosticta acetabulum*, *Pseudevernia furfuracea*, *Ramalina farinacea*, *R. fastigiata*, *R. fraxinea*, *Xanthoria parietina*.
- 42) Prov. Messina, Monti Nebrodi, between Mistretta and Nicosia, Bosco della Giumenta, W of Monte Sambughetti, forest of *Quercus cerris* and *Qu. pubescens*, 1250 m, 37°50'27.2"N/14°21'14.8"E, 16.8.2007. – *Peltigera collina*.
- 43) Prov. Messina, Monti Nebrodi, between Mistretta and Nicosia, Bosco della Giumenta, near Pizzo Portella Pantuno, on solitary *Quercus cerris*, 1345 m, 37°50'21.1"N/14°21'50.2"E, 16.VIII.2007. – *Caloplaca spec.*, *Hypogymnia tubulosa*, *Lecanora carpinea*, *L. chlarotera*, *Lecidella elaeochroma*, *Parmelia submontana*, *P. sulcata*, *Parmelina pastillifera*, *Physcia leptalea*, *P. stellaris*, *P. tenella*, *Pleurosticta acetabulum*, *Ramalina farinacea*, *Xanthoria parietina*.
- 44) Prov. Messina, Monti Nebrodi, between Mistretta and Nicosia, Bosco della Giumenta, top of Monte Sambughetti, sandstone outcrops, 1550 m, 37°50'05.8"N/14°22'25.7"E, 16.8.2007. – *Candelariella coralliza*, *Lasallia pustulata*, *Lecanora sulphurea*, *Parmelia saxatilis*, *Rhizocarpon geographicum*.

- 45) Prov. Messina, Monti Nebrodi, between Mistretta and Nicosia, Bosco della Giumenta, N of Monte Sambughetti, heath on sand, with small stones, 1370 m, 37°50'26.2"N/14°22'52.6"E, 16.8.2007. – *Cladonia furcata*, *Leptogium corniculatum* (hb ivl 4420), *Peltigera canina*, *Porpidia macrocarpa*.
- 46) Prov. Messina, Monti Nebrodi, road between San Fratello and Portella Fémmina Morta (SS 289 km 19/VII), forest of *Quercus cerris*, on *Quercus cerris* (a), on siliceous rocks (b), 850 m, 37°58'27.3"N/14°36'56.6"E, 18.8.2007. – a: *Caloplaca ferruginea*, *Lecidella elaeochroma*, *Ochrolechia balcanica*, *Parmelina quercina*, *P. tiliacea*, *Pertusaria flavida*, *Pertusaria pertusa*, *Physcia leptalea*, *Physconia distorta*, *Ramalina calicaris*, *R. fastigiata*, *R. fraxinea*, *Xanthoria parietina*; b: *Ochrolechia parella*, *Rinodina gennarii*, *Xanthoparmelia conspersa*.
- 47) Prov. Messina, Monti Nebrodi, road between San Fratello and Portella Fémmina Morta, near Casa Forestale (SS 289 km 29/II), forest of *Fagus sylvatica*, 1300 m, 37°56'25.0"N/14°38'04.3"E, 18.8.2007. – *Lecanora strobilina* (hb ivl 4519, sub *Lichenocodium lecanorae*), *Lobaria pulmonaria*, *Nephroma laevigatum* (hb ivl 4424), *Parmelina pastillifera*, *Pertusaria pertusa*, *Ramalina fastigiata*.
- 48) Prov. Messina, Monti Nebrodi, Portella Fémmina Morta, 1 km in direction of Póggio della Cattiva, coppice forest of *Fagus sylvatica*, on *Fagus sylvatica* (a), on sandstone (b), 1575 m, 37°55'38.7"N/14°40'11.7"E, 18.8.2007. – a: *Lecanora chlarotera*, *Lecidella elaeochroma*, *Leptogium saturninum* (hb ivl 4425), *Pertusaria albescens*, *Ramalina farinacea*; b: *Lecanora muralis*.
- 49) Prov. Messina, from the road (SS 289) at Portella Sella Maria to W, light coppice forest of *Fagus sylvatica*, *Crataegus* and *Pyrus*, on *Crataegus* spec. (a), on sandstone rocks (b), 1520 m, 37°54'05.6"N/14°38'41.0"E, 18.8.2007. – a: *Anaptychia ciliaris*, *Caloplaca cerina*, *Lecanora carpinea*, *Lecidella elaeochroma*, *Leptogium saturninum*, *Melanohalea exasperata*, *Parmelina pastillifera*, *Peltigera collina* (hb ivl 4426), *Physcia leptalea*, *Physconia distorta*, *Pleurosticta acetabulum*; b: *Acarospora fuscata*, *Tephromela atra*, *Rhizocarpon geographicum*, *Xanthoparmelia pulla* (hb ivl 4427), *X. verruculifera*.
- 50) Prov. Messina, from the road (SS 289) at Portella Sella Maria to W, forest of *Fagus sylvatica*, on *Fagus sylvatica*, 1490 m, 37°53'26.8"N/14°37'49.2"E, 18.8.2007. – *Lobaria pulmonaria* (hb ivl 4428).
- 51) Prov. Messina, from the road (SS 289) at Portella Sella Maria to W, meadow with sandstone outcrops, 1555 m, 37°53'05.4"N/14°37'17.1"E, 18.8.2007. – *Lecanora bolcana*, *Lecanora polytropa*, *Lecanora rupicola* subsp. *rupicola*, *Lecidea fuscoatra*, *Lecidella carpathica*, *Rhizocarpon geographicum*, *Tephromela atra*.
- 52) Prov. Catania, NW slope of Mt. Etna, between Maletto and Grotta delle Vanette, on lava boulders, 1190 m, 37°49'45.2"N/14°55'37.1"E, 19.8.2007. – *Acarospora fuscata*, *A. smaragdula*, *Aspicilia caesiocinerea*, *A. contorta*, *A. spec.*, *Buellia badia* (hb ivl 4434) on *Xanthoparmelia conspersa*, *Caloplaca crenularia*, *Candelariella vitellina*, *Cetraria muricata* (hb ivl 4431), *Lecanora rupicola*, *L. sulphurea*, *Lecidea fuscoatra*, *L. grisella*, *L. lapicida* var. *pantherina*, *Lecidella carpathica*, *Lethariella intricata* (hb ivl 4432), *Parmelia saxatilis*, *Protoparmelia badia*, *Ramalina polymorpha* (hb ivl 4198), *Rhizocarpon geographicum*, *R. cf. hochstetteri*, *R. lecanorinum*, *Stereocaulon vesuvianum*, *Tephromela atra*, *Xanthoparmelia pulla*, *Xanthoria calcicola*.
- 53) Prov. Catania, NW slope of Mt. Etna, between Maletto and Grotta delle Vanette, on lava boulders, 1170 m, 37°49'24.9"N/14°54'45.4"E, 19.8.2007. – *Acarospora smaragdula*, *Caloplaca crenularia*, *Caloplaca grimmiae* (hb ivl 4430) on *Candelariella vitellina*, *Chromatochlamys muscorum*, *Lecanora rupicola*, *Lecidea fuscoatra*, *Lecidella carpathica*, *Physcia wainioi*, *Protoparmelia badia*, *Rhizocarpon geographicum*, *Xanthoparmelia pulla*.
- 54) Prov. Catania, SW slope of Mt. Etna, near Mt. Albano NE Adrano, forest of *Pinus nigra* above old lava, on *Pinus nigra* (a), on soil (b), 1525 m, 37°43'39.2"N/14°55'10.3"E, 22.8.2007. – a: *Hypogymnia physodes*, *H. tubulosa*, *Lecanora conizaeoides*, *Melanelixia glabrata*, *Melanohalea exasperatula*, *Physcia tenella*, *Pseudevernia furfuracea*; b: *Cladonia chlorophaea*, *Peltigera canina*, *P. didactyla*.
- 55) Prov. Catania, SW slope of Mt. Etna, near Mt. Albano NE Adrano, lava boulders, 1490 m, 37°43'34.3"N/14°54'55.3"E, 22.8.2007. – *Acarospora fuscata*, *Aspicilia cinerea* agg., *Aspicilia contorta*, *Buellia badia* on *Xanthoparmelia pulla* (hb ivl 4436), *Candelariella vitellina*, *Diploschistes scruposus*, *Lecanora bolcana*, *Lecanora rupicola*, *Lecanora dispersa* agg., *Lecidea fuscoatra*,

Lecidella carpathica, *Lepraria lobificans*, *Parmelia saxatilis*, *Parmelina tiliacea*, *Physcia caesia*, *Protoparmelia badia*, *Ramalina polymorpha* (hb ivl 4197), *Rhizocarpon geographicum*, *Rhizocarpon lecanorinum*, *Schaereria fuscocinerea* (hb ivl 4439), *Tephromela atra*, *Xanthoparmelia conspersa*.

Additions to the first part (BRACKEL 2008)

Arthonia molendoi (Heufl. ex Frauenfeld) R.Sant. was already mentioned for Italy by NIMIS & TRETIACH (1999) from Abruzzo.

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