

An addition to the knowledge of lichenicolous fungi of Greece with a key to the lichenicolous fungi on *Collema* s.l.

Wolfgang von Brackel¹ & Peter Döbbeler²

¹Kirchenweg 2, 91341 Röttenbach, Germany. E-mail: wolfgang@vonbrackel.de

²Ludwig-Maximilians-Universität München, Systematische Botanik und Mykologie,
Menzinger Str. 67, 80638 München, Germany.

Abstract: *Didymellopsis pulposi*, *Pronectria diplococca*, *P. pedemontana*, *Stigmidium hageniae* and *Tremella anaptychia* are reported as new to Greece. *Pronectria diplococca* is reported as new to Austria. A key to the lichenicolous fungi on *Collema* s.l. is provided.

Keywords: lichen-inhabiting fungi, Mediterranean area, Bionectriaceae

INTRODUCTION

The knowledge about lichenicolous fungi of Greece was summarized in Abbott (2009), who listed 72 species known from the country. Together with four species from obviously overlooked papers (Calatayud et al., 2002; Navarro-Rosinés & Hladún, 1990; Orange, 1990; Roux et al., 1995) and ten species reported after the publication of aforementioned survey (Calatayud et al., 2013; Christensen & Alstrup, 2013; Fleischhacker et al., 2016; Hafellner, 2009; Sipman & Raus, 2015), 86 taxa of lichenicolous fungi were known from Greece until now.

In 1971 and 1981 the second author collected microfungi on bryophytes in Greece, and took by chance also some fungi living on lichens, which were subsequently identified by the first author.

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 up to $\times 1000$. Measurements were taken from thin hand-cut razor-blade sections mounted in water and indicated as (minimum-)X- σ_x -X+ σ_x (-maximum), followed by the number of measurements (n) when $n \geq 10$; the length/breadth ratio of ascospores is indicated as l/b and given in the same way. For testing chemical reactions and staining the standard reagents, 10% KOH (K), Lugol's iodine, directly or after 10% KOH pre-treatment, and phloxin were used. Specimens are kept in the

private herbarium of W. v. Brackel (hb Brackel). Species new to Greece are denoted with an asterisk (*) in the list below.

RESULTS

The species

CATILLARIA MEDITERRANEA Hafellner – Greece, Attiki, Párnis N of Athen, above Agia Trias, 38°10' 24"N, 23°43' 30"E, on bark of a coniferous tree, on *Anaptychia ciliaris*, 24.09.1981, leg. G. & P. Döbbeler (hb Brackel 8411, 8418). – This is a lichenized species often growing on *Anaptychia ciliaris* but reported also from *Niebla bourgeana*, *Parmelina tiliacea*, *Physcia semipinnata*, *P. stellaris*, *Seirophora villosa* and *Squamarina* sp. It is known from several countries around the Mediterranean Basin including Greece, and from the Canary Islands.

*DIDYMELLOPSIS PULPOSI (Zopf) Grube & Hafellner – Greece, Attiki, Párnis N of Athen, *Abies cephalonica* forest near Agia Trias, 38°10' 24"N, 23°43'30"E, on rocks, on *Collema* sp., 1100–1200 m, 11.04.1971, leg. P. Döbbeler (hb Brackel 8414, Fig. 1B). – This is a species confined to host lichens of the family Collemataceae, widespread in Europe and known also from Asia and both Americas (Brackel, 2014).

DIDYMELLOPSIS sp. – Greece, Fokis, *Abies* forest W of Pass Amvléma, S of Graviá, near the road between Lamía and Ámfissa, 38°37'10"N, 22°22'38"E, on limestone rock, on *Collema auriforme*, 900 m, 19.09.1981, leg. G. & P. Döb-

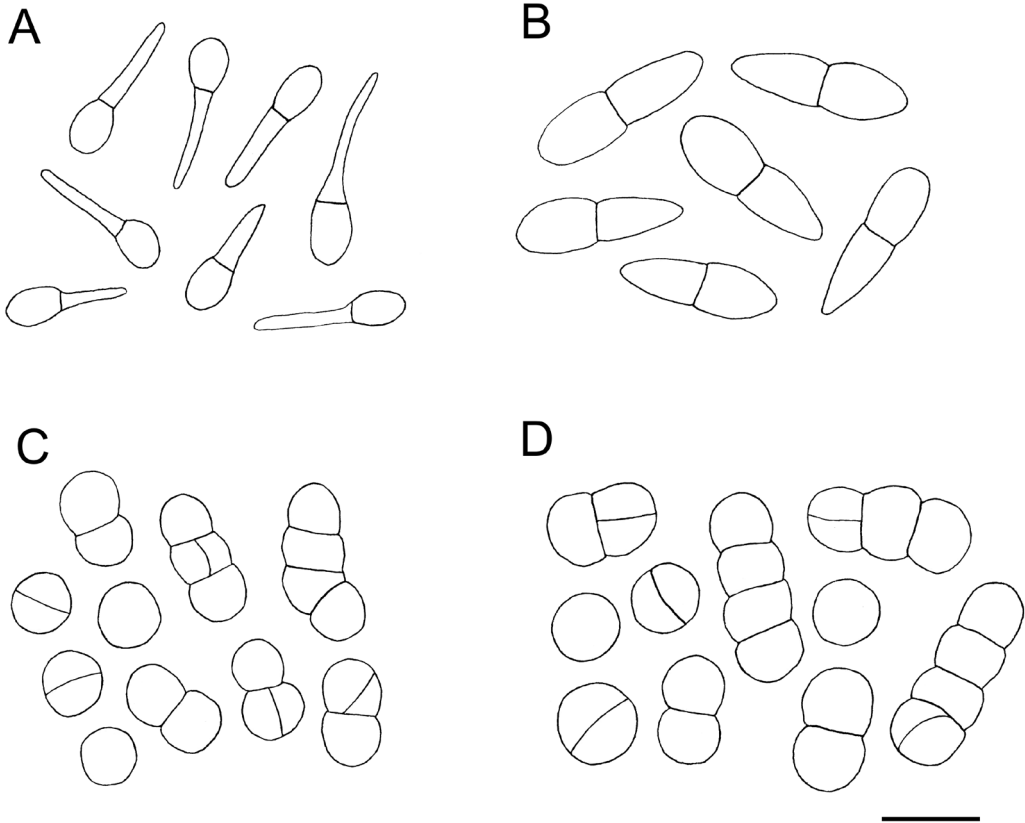


Fig. 1. Outlines of ascospores: A. *Didymellopsis* sp. (hb Brackel 8412); B. *Didymellopsis pulposi* (hb Brackel 8414); C. *Pronectria diplococca* from Greece (hb Brackel 8419); D. *Pronectria diplococca* from Austria (hb Brackel 8420). Scale bar = 10 μm .

beler (hb Brackel 8412, Fig. 1A). – The examined specimen fits the features of *Didymellopsis pulposi*, except for the shape of the ascospores, with the upper cell ellipsoid to almost orbicular, the lower one long and extremely narrow, giving the spore a caudate appearance; they measure $(12.5\text{--}14.4\text{--}18.6\text{--}20.0) \times (4.0\text{--}4.1\text{--}4.8\text{--}5.0)$ μm , $1/b = (2.6\text{--}3.2\text{--}4.2\text{--}4.5)$ ($n = 20$). None of the described species of the genus has such ascospores. Caudate 1-septate ascospores are known from some species in the genus *Cercidospora*. The well delimited brown wall of the apothecia in our find shows that it does not belong to *Cercidospora*, where the mostly bluish or greenish pigmented wall is not well delimited from the host tissue. Further finds must prove if the specimen belongs to an undescribed species of *Didymellopsis* or represents an aberrant morph of *D. pulposi*.

*PRONECTRIA DIPLOCOCCA Kocourk., Khodos., Naumovich, Vondrák & Motiej. – Greece, Pelopónnisos, Achaía, E of Patras, *Abies* forest c. 9 km S of Ano Diakoptón near the road Kaláyrita in direction to Diakoptón at the coast, $38^{\circ}04'38''\text{N}$, $22^{\circ}10'04''\text{E}$, on *Collema* sp., 02.10.1981, leg. G. & P. Döbbeler (hb Brackel 8419, Fig. 1C). – A very characteristic species due to its initially 1-septate ascospores, $(9.0\text{--}9.5\text{--}10.5\text{--}11.0) \times (6.0\text{--}6.2\text{--}6.9\text{--}7.0)$ μm , $1/b = 1.4\text{--}1.6\text{--}1.7)$ ($n = 20$; only 1-septate ascospores measured) $[(8.75\text{--}9.56\text{--}12.34\text{--}13.5) \times (4.75\text{--}5.76\text{--}7.56\text{--}8.75)]$ μm ($n = 30$) according to Khodosovtsev et al., 2012], strongly constricted at the septum, easily disintegrating. Both the 2-celled ascospores and the one-celled spore parts often develop secondary septa, mostly perpendicular to the primary septum or oblique, rarely parallel. This results in a mixture of 1–6-celled

ascospores, some of them submuriform. If they aggregate secondarily as mentioned in the original description is not quite clear to us. The species was known until now from the Czech Republic, Germany, Lithuania and Ukraine (Khodosovtsev et al., 2012; Wagner & Schacherer, 2019). We report this species also as new for Austria: Salzburg, Lungau, Radstädter Tauern, W Mauterndorf, slopes between Speiereck and Kl. Lanschütz, on *Collema* cf. *auriforme*, MTB 8847, 2300 m, 07.09.1981, leg. P. Döbbeler (hb Brackel 8420, Fig. 1D).

*PRONECTRIA PEDEMONTANA Brackel – Greece, Pelopónnisos, Táigetos, road from Sparta to Kalamáta, c. 2 km E of Artemisia, 37°04'52"N, 22°14'31"E, wet place, on *Collema* sp., 28.09.1981, leg. G. & P. Döbbeler (hb Brackel 8413). – The species, confined to the host genus *Collema*, was known until now only from Germany and Italy (Brackel, 2013).

*STIGMIDIUM HAGENIAE (Rehm) Hafellner – Greece, Attiki, Párnis N of Athen, above Agia Trias, 38°10'24"N, 23°43'30"E, on bark, on *Anaptychia ciliaris*, 24.09.1981, leg. G. & P. Döbbeler (hb Brackel 8416). – Ascomata 50–70 µm in diameter; asci 8-spored, 35–42 × 12–14 µm; ascospores hyaline, 2-celled, soleiform, (11.0–)11.6–13.5(–14.0) × (3.0–)3.3–4.0 µm, l/b = (2.8–)3.0–4.0(–4.7) (n = 10). This is in accordance with the measurements given by Winter (1872): ascomata 36–100 µm diam., asci 29–43

µm long, ascospores 8–14 × 3–4 µm. Vondrák et al. (2008) reported *Stigmidium* aff. *hageniae* from Crete with bigger ascospores, 13–16 × 5 µm.

*TREMELLA ANAPTYCHIAE J. C. Zamora & Diederich – Greece, Attiki, Párnis N of Athen, above Agia Trias, 38°10'24"N, 23°43'30"E, on bark, on *Anaptychia ciliaris*, 24.09.1981, leg. G. & P. Döbbeler (hb Brackel 8417). – This recently described species was previously known from Italy (mainland and Sardinia), Macedonia, Spain (mainland and Canary Islands) and Sweden (Zamora et al., 2017; Brackel & Berger, 2019).

Identifying the above-mentioned fungi on lichens of the genus *Collema* we found that literature regarding these fungi is very scattered and the available keys to lichenicolous fungi are not very helpful, as several of the species have been described recently. Thus we present the following key, based on information from Aptroot et al. (1997), Brackel (2013, 2014), Brackel & Etayo (2010), Clauzade et al. (1989), David & Etayo (1995), Diederich & Puntillo (1995), Etayo (2001, 2002, 2010), Etayo & Sancho (2008), Grube & Hafellner (1990), Hawksworth (1980, 1981), Hoffmann & Hafellner (2000), Keissler (1930), Khodosovtsev et al. (2012), López de Silanes et al. (2009), Navarro-Rosinés et al. (1999), Nylander (1873), Rossmann et al. (1999), Roux & Triebel (1994), Timdal (1991), Vouaux (1913, 1914) and Zhurbenko (2009).

Key to the lichenicolous fungi growing on *Collema* s.l.

- | | | |
|-----|--|---|
| 1 | Spores produced in asci | 2 |
| 1' | Spores produced in pycnidia, pycnidia setose, conidia 5–6 × 2 µm | |
| | | « <i>Pyrenochaeta</i> » <i>collematis</i> Vouaux |
| 2 | Ascomata apothecioid | 3 |
| 2' | Ascomata perithecioid, black or dark brown. | 5 |
| 2'' | Ascomata nectrioid, red, orange or almost colourless | 15 |
| 3 | Apothecial disc grey, margin whitish, ascospores aseptate | « <i>Mollisia</i> » <i>collematis</i> Boud. |
| 3' | Apothecial disc and margin black, ascospores septate | (<i>Toninia</i>) 4 |
| 4 | Ascospores 3(–5)-septate, bacilliform to acicular | <i>Toninia collematicola</i> Timdal |
| 4' | Ascospores 1-septate, narrowly fusiform to bacilliform. | <i>Toninia leptogii</i> Timdal |
| 5 | Ascospores aseptate. | 6 |
| 5' | Ascospores 1-septate | 8 |
| 5'' | Ascospores with 3 or more septa | 14 |
| 6 | Ascomata c. 50 µm diameter, growing in the hymenium. | |
| | | <i>Physalospora collematis</i> (Stein) G. Winter |
| 6' | Ascomata bigger, 70–400 µm, growing on the thallus | (<i>Myxophora</i>) 7 |
| 7 | Asci 4-spored, ascospores (11–)14.5–19.2(–20) × (4.0–)4.7–6.9(–7.0) µm | |
| | | <i>Myxophora tetraspora</i> Nik. Hoffm. & Hafellner |

- 7' Asci 8-spored, ascospores $(10-10.7-20.6(-23.0) \times (3.0-3.9-6.4(-7.5) \mu\text{m} \dots \dots \dots$
 $\dots \dots \dots$ *Myxophora leptogiophila* (Minks ex G. Winter) Nik. Hoffm. & Hafellner
- 7'' Asci 8-spored, ascospores $(9.0-10.4-13.7(-14.0) \times (6.0-7.0-8.2(-9.0) \mu\text{m} \dots \dots \dots$
 $\dots \dots \dots$ *Myxophora ovalispora* Nik. Hoffm. & Hafellner
- 8 Ascospores brown, hamathecial elements soon gelatinising $\dots \dots \dots$ (*Endococcus*) 9
- 8' Ascospores hyaline, hamathecial elements mostly persistent $\dots \dots \dots$ 10
- 9 Ascospores caudate, with a tail-like lower cell, $13-21 \times (3.5-4.0-5.5 \mu\text{m} \dots \dots \dots$
 $\dots \dots \dots$ *Endococcus caudisporus* J. C. David & Etayo
- 9' Ascospores heteropolar, not caudate, ascospores $9-18 \times 5-7 \mu\text{m} \dots \dots \dots$
 $\dots \dots \dots$ *Endococcus pseudocarpus* Nyl. (incl. *E. peltax* Nyl. and "*Tichothecium*" *latzelii* Keissl.)
- 10 Ascomata carbonised, opening with radial ruptures $\dots \dots \dots$
 $\dots \dots \dots$ *Rhagadostoma collematum* Etayo & Nav.-Ros.
- 10' Ascomata not carbonised, opening with a regular ostiole $\dots \dots \dots$ 11
- 11 Infection gall-inducing, ascomata with numerous lipid droplets $\dots \dots \dots$
 $\dots \dots \dots$ *Lichenochora collematum* Nik. Hoffm. & Hafellner
- 11' Infection not gall-inducing, ascomata without numerous lipid droplets \dots (*Didymellopsis*) 12
- 12 Ascospores $20-26 \times 5-19 \mu\text{m} \dots \dots \dots$ *Didymellopsis collematum* (J. Steiner) Grube & Hafellner
- 12' Ascospores smaller, up to $21 \mu\text{m}$ long $\dots \dots \dots$ 13
- 13 Ascospores heteropolar, not caudate, $14-21 \times 5-7 \mu\text{m} \dots \dots \dots$
 $\dots \dots \dots$ *Didymellopsis pulposi* (Zopf) Grube & Hafellner
- 13' Ascospores caudate, $(12.5-14.4-18.6(-20.0) \times (4.0-4.1-4.8(-5.0) \mu\text{m} \dots \dots \dots$
 $\dots \dots \dots$ *Didymellopsis* sp. (this paper)
- 14 Ascospores parallel 3-septate, dark brown, apically paler $\dots \dots \dots$ *Pyrenidium actinellum* Nyl.
- 14' Ascospores parallel 3-5-septate, hyaline $\dots \dots \dots$ *Sphaerulina dolichotera* (Nyl.) Vouaux
- 14'' Ascospores submuriform, reddish brown $\dots \dots \dots$ *Pleospora collematum* Zukal
- 15 Ascomata superficial $\dots \dots \dots$ 16
- 15' Ascomata completely or half immersed $\dots \dots \dots$ 18
- 16 Ascomata without setae or hairs $\dots \dots \dots$ "*Nectria*" *brutia* Diederich & Puntillo
- 16' Ascomata with setae or hairs $\dots \dots \dots$ 17
- 17 Ascospores striate-granularly ornamented, $8-10 \times 3-4 \mu\text{m} \dots \dots \dots$ *Trichonectria leptogiocola* Etayo
- 17' Ascospores smooth, $8.5-10.5 \times 2.5-3 \mu\text{m} \dots \dots \dots$ *Nectriopsis collematis* Diederich
- 18 Ascomatal wall K⁺ violet, ascospores $(19-22-38(-65) \times (7-9-11(-13) \mu\text{m} \dots \dots \dots$
 $\dots \dots \dots$ *Xenonectriella lutescens* (Arnold) Weese
- 18' Ascomatal wall K⁻ $\dots \dots \dots$ (*Pronectria*) 19
- 19 Ascomata with hyaline setae around the ostiole \dots *Pronectria pilosa* Etayo & López de Silanes
- 19' Ascomata without setae $\dots \dots \dots$ 20
- 20 Ascomata growing in the hymenium of the host, ascospores $5-7 \mu\text{m}$ long $\dots \dots \dots$
 $\dots \dots \dots$ *Pronectria hymeniicola* Etayo
- 20' Ascomata growing on the thallus of the host, ascospores longer $\dots \dots \dots$ 21
- 21 Ascospores easily disintegrating, secondarily developing 1-6-celled units $\dots \dots \dots$
 $\dots \dots \dots$ *Pronectria diplococca* Kocourk. et al.
- 21' Ascospores remaining 1-septate, not easily disintegrating $\dots \dots \dots$ 22
- 22 Ascospores smooth, $8.5-10.5 \times 2.5-3 \mu\text{m} \dots \dots \dots$ *Pronectria collematis* Etayo & Brackel
- 22' Ascospores verruculose $\dots \dots \dots$ 23
- 23 Ascomata yellowish, ascospores hyaline, c. $14-16.5 \times 5-6.5 \mu\text{m} \dots \dots \dots$
 $\dots \dots \dots$ *Pronectria pedemontana* Brackel
- 23'' Ascomata red-orange, purple-red around the ostiole, ascospores pale orange, $10-16 \times 5-6 \mu\text{m}$
 $\dots \dots \dots$ *Pronectria tenacis* (Vouaux) Lowen

REFERENCES

- Abbott, B. F. M. 2009. Checklist of the lichens and lichenicolous fungi of Greece. *Bibliotheca Lichenologica* 103: 1–368.
- Aptroot, A., Diederich, P., Sérusiaux, E. & Sipman, H. J. M. 1997. Lichens and lichenicolous fungi from New Guinea. *Bibliotheca Lichenologica* 64: 1–220.
- Brackel, W. v. 2013. Miscellaneous records of lichenicolous fungi from the Italian Alps. *Herzogia* 26: 141–157. <https://doi.org/10.13158/hea.26.1.2013.141>
- Brackel, W. v. 2014. Kommentierter Katalog der flechtenbewohnenden Pilze Bayerns. *Bibliotheca Lichenologica* 109: 1–476.
- Brackel, W. v. & Berger, F. 2019. Lichenicolous fungi from Sardinia (Italy): new records and a first synopsis. *Herzogia* 32: 444–471. <https://doi.org/10.13158/hea.32.2.2019.444>
- Brackel, W. v. & Etayo, J. 2010. *Pronectria collematis* (Bionectriaceae, Hypocreales), a new species on *Collema* from Germany and Spain. *Lichenologist* 42: 361–364. <https://doi.org/10.1017/S0024282910000095>
- Calatayud, V., Navarro-Rosinés, P. & Hafellner, J. 2002. A synopsis of *Lichenostigma* subgen. *Lichenogramma* (Arthoniales), with a key to the species. *Mycological Research* 106: 1230–1242. <https://doi.org/10.1017/S095375620200655X>
- Calatayud, V., Navarro-Rosinés, P. & Hafellner, J. 2013. Contributions to a revision of *Cercidospora* (Dothideales), 2: Species on *Lecanora* s.l., *Rhizoplaca* and *Squamarina*. *Mycosphere* 4: 539–557. <https://doi.org/10.5943/mycosphere/4/3/8>
- Christensen, S. N. & Alstrup, V. 2013. Notes on epilithic, epigeic and muscicolous lichens and lichenicolous fungi from rock outcrops in the mountains of northern Greece. *Mycobiota* 1: 25–50. <https://doi.org/10.12664/mycobiota.2013.01.04>
- Clauzade, G., Diederich, P. & Roux, C. 1989. Nelik-enigintai fungoj likenlogaj. Ilustrita determinlibro. *Bulletin de la Société Linnéenne de Provence*, Numéro spéc. 1: 1–142.
- David, J. C. & Etayo, J. 1995. A new lichenicolous fungus from Collema: *Endococcus caudisporus* sp. nov. (Dothideales, incertae sedis). *Lichenologist* 27: 314–316. <https://doi.org/10.1006/lich.1995.0030>
- Diederich, P. & Puntillo, D. 1995. New or interesting lichenicolous fungi: 7. *Nectria brutia* sp. nov. (Ascomycotina, Hypocreales). *Bulletin de la Société des naturalistes luxembourgeois* 96: 95–98.
- Etayo, J. 2001. Hongos liquenícolas de Ecuador. I. Dos especies nuevas del orden Hypocreales (Ascomycota): *Pronectria parmotrematis* y *Trichonectria leptogüicola*. *Anales del Jardín Botánico de Madrid* 58(2): 219–222. <https://doi.org/10.3989/ajbm.2000.v58.i2.152>
- Etayo, J. 2002. Aportación al conocimiento de los hongos liquenícolas de Colombia. *Bibliotheca Lichenologica* 84: 1–154.
- Etayo, J. 2010. Hongos liquenícolas de Peru. *Bulletin de la Société Linnéenne de Provence* 61: 83–128.
- Etayo, J. & Sancho, L. G. 2008. Hongos liquenícolas del Sur de Sudamérica, especialmente de Isla Navarino (Chile). *Bibliotheca Lichenologica* 98: 1–302.
- Fleischhacker, A., Grube, M., Frisch, A., Obermayer, W. & Hafellner, J. 2016. *Arthonia parietinaria* – a common but frequently misunderstood lichenicolous fungus on species of the *Xanthoria parietina*-group. *Fungal Biology* 120: 1341–1353. <https://doi.org/10.1016/j.funbio.2016.06.009>
- Grube, M. & Hafellner, J. 1990. Studien an flechtenbewohnenden Pilzen der Sammelgattung *Didymella* (Ascomycetes, Dothideales). *Nova Hedwigia* 51: 283–360.
- Hafellner, J. 2009. *Phacothecium* resurrected and the new genus *Phacographa* (Arthoniales) proposed. *Bibliotheca Lichenologica* 100: 85–121.
- Hawksworth, D. L. 1980. Notes on British lichenicolous fungi III. *Notes from the Royal Botanical Garden Edinburgh* 38: 165–183.
- Hawksworth, D. L. 1981. The lichenicolous coelomyces. *Bulletin of the British Museum, Botany* 9: 1–98.
- Hoffmann, N. & Hafellner, J. 2000. Eine Revision der lichenicolen Arten der Sammelgattungen *Guignardia* und *Physalospora* (Ascomycotina). *Bibliotheca Lichenologica* 77: 1–181.
- Keissler, K. v. 1930. Die Flechtenparasiten. – In: *Dr. L. Rabenhorst's Kryptogamen-Flora von Deutschland, Österreich und der Schweiz*. 2. Aufl., Bd. 8., Leipzig.
- Khodosovtsev, A., Vondrák, J., Naumovich, A., Kourková, J., Vondráková, O. & Motiejūnaitė, J. 2012. Three new *Pronectria* species in terricolous and saxicolous microlichen communities (Bionectriaceae, Ascomycota). *Nova Hedwigia* 95: 211–220. <https://doi.org/10.1127/0029-5035/2012/0026>
- López de Silanes, M. E., Etayo, J. & Paz-Bermúdez, G. 2009. *Pronectria pilosa* (Hypocreaceae) sp. nov. and other lichenicolous fungi found on *Collema* in the Iberian Peninsula. *Bryologist* 112: 101–108. <https://doi.org/10.1639/0007-2745-112.1.101>
- Navarro-Rosinés, P., Etayo, J. & Calatayud, P. 1999. *Rhagadostoma collematum* sp. nov. (ascomycetes liquenícolas, Sordariales) y nuevos datos para otras especies del género. *Bulletin de la Société Linnéenne de Provence* 50: 233–241.
- Navarro-Rosinés, P. & Hladün, N. L. 1990. El género *Sarcopyrenia* Nyl. (ascomycetes liquenícolas) en Europa y norte de Africa. *Candollea* 45: 469–489.
- Nylander, W. 1873. Observata lichenologica in Pyrenaeis orientalibus. *Flora* 56: 194–207.
- Orange, A. 1990. New or interesting lichens and lichenicolous fungi from Iceland. *Acta Botanica Islandica* 10: 37–44.
- Rossmann, A. Y., Samuels, G. J., Rogerson, C. T. & Lowen, R. 1999. Genera of Bionectriaceae, Hypo-

- creaceae and Nectriaceae (Hypocreales, Ascomycetes). *Studies in Mycology* 42: 1–248.
- Roux, C. & Triebel, D. 1994. Révision des espèces de *Stigmidium* et de *Sphaerellothecium* (champignons lichénicoles non lichénisés, Ascomycetes) correspondant à *Pharcidia epicymatia* sensu Keissler ou à *Stigmidium schaeereri* auct. *Bulletin de la Société Linnéenne de Provence* 45: 451–542.
- Roux, C., Triebel, D., Bricaud, O. & Le Coeur, D. 1995. Le *Stigmidium lecidellae* sp. nov. et remarques sur le genre *Stigmidium* (champignons lichénicoles non lichénisés, Ascomycetes). *Canadian Journal of Botany* 73: 662–672. <https://doi.org/10.1139/b95-070>
- Sipman, H. J. M. & Raus, T. 2015. Lichens and lichenicolous fungi from the island of Chios (Aegean Sea, Greece). *Herzogia* 28: 496–519. <https://doi.org/10.13158/heia.28.2.2015.496>
- Timdal, E. 1991. A monograph of the genus *Toninia* (Lecideaceae, Ascomycetes). *Opera Botanica* 110: 1–137.
- Vondrák, J., Guttova, A. & Mayrhofer, H. 2008. A further contribution to the knowledge of lichen-forming and lichenicolous fungi in Crete. *Herzogia* 21: 105–124.
- Vouaux, A. 1913. Synopsis des champignons parasites des lichens. *Bulletin de la Société Mycologique de France* 29: 33–128, 399–446, 447–494.
- Vouaux, A. 1914. Synopsis des champignons parasites des lichens. *Bulletin de la Société Mycologique de France* 30: 135–198, 281–329.
- Wagner, H.-G. & Schacherer, A. 2019. Einige für Niedersachsen neue lichenicole Pilze sowie weitere bemerkenswerte Funde. *Braunschweiger Naturkundliche Schriften* 15: 45–79.
- Winter, G. 1872. Diagnosen und Notizen zu Rehm's Ascomyceten. *Flora* 55: 508–511, 523–527, 542–544.
- Zamora, J. C., Diederich, P., Milanes, A. M. & Wedin, M. 2017. An old familiar face: *Tremella anaptychia* sp. nov. (Tremellales, Basidiomycota). *Phytotaxa* 307: 254–262. <https://doi.org/10.11646/phytotaxa.307.4.3>
- Zhurbenko, M. P. 2009. New and interesting lichenicolous hypocrealean fungi from the Northern Hemisphere. *Sydowia* 61: 177–188.