



Article

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Mycosphere Notes 225–274: types and other specimens of some genera of *Ascomycota*

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Abstract

This is the fifth in a series, *Mycosphere notes*, wherein 50 notes are provided on types of genera and other specimens with descriptions and illustrations. This includes one genus in *Arthoniomycetes*, one genus in *Eurotiomycetes*, 38 genera in *Dothideomycetes*, six genera in *Sordariomycetes*, two genera in *Ascomycota*, families *incertae sedis*, one genus in *Pezizomycotina*, and one taxon, *Angatia rondoniensis*, is treated as a doubtful species. *Pycnocarpon magnificum* is classified in *Asterinaceae*. We reinstate *Eopyrenula* in *Dacampiaceae* on the basis of its

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morphological characters, which are similar to other members in this family. *Eopyrenula leucoplaca* is designated as a reference specimen. *Fasciatispora arengae* is described as a new species. The isotype specimen (GZU 000301526), which was formerly named as *Thyridium concinnum* is transferred to *Platystomum* based on morphology. *Syrropeltis* is placed in the family *Parmulariaceae* based on morphology. *Rivilata* and *Vonarxella* are excluded from *Saccardiaceae*, and treated in *Phaeothecoidiaceae* and *Schizothyriaceae*, respectively. The family *Saccardiaceae* based on *Saccardia quercina* is maintained and includes *Ascolectus*, *Cyanodiscus*, *Henningsiella*, *Phillipsiella*, *Pseudodiscus* and *Schenckiella*. *Johansoniaceae* is introduced as a new family. We hope to motivate fresh collecting of type species included of taxa in genera *incertae sedis*, so that molecular data can be obtained to confirm their natural classification.

Key words – two new taxa – *Asterinaceae* – *Astrosphaeriellaceae* – *Barbatosphaeriaceae* – *Dacampiaceae* – *Davidiellaceae* – *Didymellaceae* – *Dothideomycetes* – *Didymosphaeriaceae* – *Gloniaceae* – *Hysteriaceae* – *Johansoniaceae* – *Leptosphaeriaceae* – *Lindgomycetaceae* – *Lophiostomataceae* – *Microtheliopsidaceae* – *Mytilinidiaceae* – *Myriangiales* – *Naetrocymbaceae* – *Parmulariaceae* – *Phaeothecoidiaceae* – *Polycoccaceae* – *Roccellaceae* – *Saccardiaceae* – *Schizothyriaceae* – *Sordariomycetes* – *Strangosporaceae* – *Testudinaceae* – *Venturiaceae* – *Xylariales*

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The following list of taxa is a continuation from the fourth paper in the series *Mycosphere notes* (Hyde et al. 2018, 169–224), organized following the *Outline of Ascomycetes* (Wijayawardene et al. 2018) and the classification of some taxa is updated in this study.

Arthoniomycetes O.E. Erikss. & Winka

Arthoniales Henssen ex D. Hawksw. & O.E. Erikss.

Roccellaceae Chevall.

225. *Mazosia phyllosema* (Nyl.) Zahlbr., Cat. Lich. Univers. 2: 503 (1923) [1924]

Eurotiomycetes O.E. Erikss. & Winka

Chaetothyriales M.E. Barr

Microtheliopsidaceae O.E. Erikss.

226. *Microtheliopsis uleana* Müll. Arg., Flora, Regensburg 73: 195 (1890)

Dothideomycetes O.E. Erikss. & Winka

Asterinales M.E. Barr ex D. Hawksw. & O.E. Erikss.

Asterinaceae Hansf.

227. *Pycnocarpon magnificum* (Syd., P. Syd. & E.J. Butler) Theiss., Abh. K.K. Zool.-Bot. Ges. Wien 7(3): 31 (1913)

Capnodiales Woron.

Cladosporiaceae Nann.

228. *Cladosporium herbarum* (Pers.) Link, Mag. Gesell. naturf. Freunde, Berlin 8: 37 (1816) [1815]

Johansoniaceae Doilom, Phookamsak & K.D. Hyde, fam. nov.

229. *Johansonia setosa* (G. Winter) Sacc., Syll. fung. (Abellini) 8: 785 (1889)

Phaeothecoidiaceae K.D. Hyde & Hongsanan

230. *Rivilata ius* Kohlm., Volkm.-Kohlm. & O.E. Erikss., Can. J. Bot. 76(3): 472 (1998)

Schizothyriaceae Höhn. ex Trotter, Sacc., D. Sacc. & Traverso [as '*Schizothyriaceae*']

231. *Vonarxella dipterygis* Bat., J.L. Bezerra & Peres [as '*diptericis*'], Riv. Patol. veg., Pavia, sér. 4 1(1-2): 62 (1965)

Gloniales Jayasiri & K.D. Hyde

Gloniaceae E. Boehm, C.L. Schoch & Spatafora

232. *Glonium lineare* (Fr.) De Not., G. bot. ital. 2(1.1): 594 (1846)

Hysteriales Lindau

Hysteriaceae Chevall.

233. *Gloniopsis praelonga* (Schwein.) Underw. & Earle [as '*praelongum*'], Bull. Alabama Agricultural Experiment Station 80: 196 (1897)
234. *Hysterocharina paulistae* H. Zogg, Ber. schweiz. bot. Ges. 59: 42 (1949)
235. *Hysterocharina ovatum* (Cooke) Lindau, in Engler & Prantl, Nat. Pflanzenfam., Teil. I (Leipzig) 1(1): 272 (1896)
236. *Ostreichnion sassafras* (Schwein.) M.E. Barr, Mycotaxon 3(1): 83 (1975)

Myriangiiales, genus incertae sedis

237. *Dictyonella erysiphoides* (Rehm) Höhn. [as '*erysiphoides*'], Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 369 [95 repr.] (1909)

Mytilinidiales E. Boehm, C.L. Schoch & Spatafora

Mytilinidiaceae Kirschst.

238. *Actidium hysteroioides* Fr., Observ. mycol. (Havniae) 2: 353 (1818)
239. *Quasiconcha reticulata* Barr & Blackwell, Mycologia 72: 1224 (1980)

Pleosporales Luttrell ex M.E. Barr

Astrophaeriellaceae Phook. & K.D. Hyde

240. *Mycopezon guianensis* Boise, Syst. Ascom. 6(1): 168 (1987)

Dacampiaceae Körb.

241. *Eopyrenula leucoplaca* (Wallr.) R.C. Harris, Michigan Bot. 12(1): 19 (1973)
242. *Pyrenidium actinellum* Nyl., Flora, Regensburg 48: 210 (1865)
243. *Pseudonitschkia parmotrematis* Coppins & S.Y. Kondr., Edinb. J. Bot. 52(2): 232 (1995)

Didymellaceae Gruyter, Aveskamp & Verkley

244. *Macroventuria anomochaeta* Aa, Persoonia 6(3): 362 (1971)
245. *Monascostroma innumerosum* (Desm.) Höhn. [as '*innumerosa*'], Annl. mycol. 16(1/2): 160 (1918)

Didymosphaeriaceae Munk

246. *Montagnula donacina* (Niessl) Wanas., E.B.G. Jones & K.D. Hyde, in Wanasinghe, Gareth Jones, Camporesi, Dissanayake, Kamolhan, Mortimer, Xu, Elsalam & Hyde, Index Fungorum 319: 1 (2017)

Leptosphaeriaceae M.E. Barr

247. *Chaetoplea dasyilirii* A.W. Ramaley [as '*dasyilirionis*'], Aliso 14(2): 151 (1995)

Lindgomycetaceae K. Hiray., Kaz. Tanaka & Shearer

248. *Lindgomyces ingoldianus* (Shearer & K.D. Hyde) K. Hiray., Kaz. Tanaka & Shearer, in Hirayama, Tanaka, Raja, Miller & Shearer, Mycologia 102(3): 733 (2010)

Lophiostomataceae Sacc.

249. *Platystomum concinnum* (Petr.) Doilom & K.D. Hyde, comb. Nov.

Roussoellaceae Jian K. Liu, Phookamsak, D.Q. Dai & K.D. Hyde

250. *Immotthia atroseptata* (Piroz.) M.E. Barr, Mycotaxon 82: 383 (2002)

Testudinaceae Arx

251. *Lepidosphaeria nicotiae* Parg.-Leduc, Pubbl. Staz. Zool. Napoli, I 270: 2786 (1970)
252. *Neotestudina rosatii* Segretain & Drestombes, C. r. hebd. Séane. Acad. Sci. Paris 253: 2579 (1961)
253. *Ulospora bilgramii* D. Hawksw., Malloch & Sivan., Can. J. Bot. 57: 96 (1979)

Pleosporales, genus incertae sedis

254. *Homostegia piggotii* (Berk. & Broome) P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 222 (1873)

Venturiales Y. Zhang ter, C.L. Schoch & K.D. Hyde

Venturiaceae E. Müll. & Arx ex M.E. Barr

255. *Venturia chlorospora* (Ces.) P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 189 (1873)

Trypetheliales Lücking, Aptroot & Sipman

Polycoccaceae Ertz, Hafellner & Diederich

256. *Clypeococcum cladonema* (Wedd.) D. Hawksw., Bot. J. Linn. Soc. 75(2): 197 (1977)
257. *Polycoccum sauteri* Körb., Parerga lichenol. (Breslau) 5: 470 (1865)

Dothideomycetes, families incertae sedis

Naetrocymbaceae Höhn. ex R.C. Harris

258. *Jarxia thelenula* (Müll. Arg.) D. Hawksw., Stud. Mycol. 31: 95 (1989)
259. *Leptorhaphis epidermidis* (Ach.) Th. Fr., Nova Acta R. Soc. Scient. upsal., Ser. 3 3: 373 (1861) [1860]
260. *Tomasellia arthonioides* (A. Massal.) A. Massal., Flora, Regensburg 39: 284 (1856)

Parmulariaceae E. Müll. & Arx ex M.E. Barr

261. *Syrropeltis xylopi* Bat., J.L. Bezerra & Matta, in Batista & Bezerra, Portug. acta biol., Sér. B 7(4): 377 (1964)

Dothideomycetes, genera incertae sedis

262. *Epibelonium gaeumannii* E. Müll. [as 'gaeumanni'], Phytopath. Z. 47: 240 (1963)
263. *Othia spiraeae* (Fuckel) Fuckel, Jb. nassau. Ver. Naturk. 23-24: 170 (1870) [1869-70]
264. *Phycorella scytonematis* Döbbeler, Sydowia 33: 33 (1980)

Sordariomycetes O.E. Erikss. & Winka

Amphisphaeriales, genus incertae sedis

265. *Fasciatispora arengae* Konta & K. D. Hyde, sp. nov.

Diaporthomycetidae, family incertae sedis

***Barbatosphaeriaceae* H. Zhang, K.D. Hyde & Maharachch.**

266. *Barbatosphaeria hippocrepida* (Réblová) Réblová, *Persoonia* 35: 32 (2015)

Xylariales, genus incertae sedis

267. *Diamantinia citrina* A.N. Mill., Læssøe & Huhndorf, *Sydowia* 55(1): 94 (2003)

Sordariomycetes, genera incertae sedis

268. *Urupe guadauae* Viégas, *Bragantia* 4(1-6): 125 (1944)

269. *Phialemoniopsis ocularis* (Gené & Guarro) Perdomo, Dania García, Gené & Guarro, *Mycologia* 105(2): 411 (2013)

270. *Rhizophila marina* K.D. Hyde & E.B.G. Jones, *Mycotaxon* 34(2): 528 (1989)

Ascomycota, families incertae sedis

***Saccardiaceae* Höhn.**

271. *Saccardia quercina* Cooke, *Grevillea* 7(no. 42): 49 (1878)

***Strangosporaceae* S. Stenroos, Miądl. & Lutzoni**

272. *Strangospora moriformis* (Ach.) Stein, in Cohn, *Krypt.-Fl. Schlesien (Breslau)* 2(2): 176 (1879)

Pezizomycotina, genus incertae sedis

273. *Thelenidia monosporella* Nyl., *Flora, Regensburg* 69: 463 (1886)

Doubtful genus

274. *Angatia rondoniensis* Bat., J.L. Bezerra & Castr., *Atas Inst. Micol. Univ. Recife* 3: 65 (1966)

Introduction

The classification of fungi is of crucial importance as it improves our understanding of fungal relationships. A higher-level phylogenetic classification of the kingdom Fungi was proposed by Hibbett et al. (2007), while outlines of *Ascomycota* were compiled by Lumbsch & Huhndorf (2007, 2010) and Wijayawardene et al. (2018). Hyde et al. (2013) provided comprehensive descriptions, illustrations and notes of families of *Dothideomycetes* with notes of the sexual and asexual morphs of their type genera. Liu et al. (2017) provided an updated classification for *Dothideomycetes* based on phylogenetic analyses and divergence times from an evolutionary clock. The family level classification of *Sordariomycetes* was carried out by Maharachchikumbura et al. (2016). Hongsanan et al. (2017a) provided an updated classification of accepted subclasses and orders of *Sordariomycetes* based on phylogenetic and molecular clock evidence. Lücking et al. (2016) presented a recent classification of lichenized fungi in the *Ascomycota* and *Basidiomycota*. An outline of discomycete families was offered by Ekanayaka et al. (2017).

Wijayawardene et al. (2018) provided a current classification of *Ascomycota* with generic placements, although over 230 genera were listed in *Dothideomycetes* as genera *incertae sedis* and 130 in *Sordariomycetes* as genera *incertae sedis*. Many of these genera are poorly known and their classification needs to be revisited. The names lack detailed descriptions and many also lack illustrations or their illustrations are basic and, therefore, type material of these species needs to be re-examined and suitably illustrated (Dayarathne et al. 2016).

This is the fifth contribution in a series of papers where we collaborate with mycologists to put together a set of notes of 50 taxa of fungi. Most of the taxa with notes herein, are poorly known, lack cultures and there is no sequence data in GenBank. Thus, we re-examined and provide descriptions, illustrations and notes from type specimens and other specimens. This basic data can be used as a foundation to facilitate their identification in future collections, and may result in fresh

collections, epitypifications or designation of reference specimens, and generation of DNA sequence data. In this way the natural relationships of these taxa can be established.

Materials & Methods

Examination of herbarium material

The type and other specimens were borrowed from the collections of Botanischer Garten und Botanisches Museum Berlin-Dahlem, Zentraleinrichtung der Freien Universität Berlin (B), The Natural History Museum (BM), US National Fungus Collections, USDA-ARS (BPI), Westerdijk Fungal Biodiversity Institute (CBS), Agriculture and Agri-Food Canada (DAOM), Farlow Reference Library and Herbarium of Cryptogamic Botany in Harvard University (FH), Conservatoire et Jardin botaniques de la Ville de Genève (G), Karl-Franzens-Universität Graz (GZU), University of Helsinki (H), Instituto Agronômico de Campinas (IAC), Illinois Natural History Survey, Illinois Department of Natural Resources (ILLS), University of North Carolina at Chapel Hill (IMS), Kew Royal Botanic Gardens (K & IMI), Naturalis (L), Botanische Staatssammlung München (M), Mae Fah Luang University (MFLU), New York Botanical Garden (NY), Manaaki Whenua Landcare Research (PDD), Swedish Museum of Natural History (S), Universidade Federal de Pernambuco (URM) and Eidgenössische Technische Hochschule Zürich (ZT).

Fungal structures on the host substrates were observed with a stereo microscope (Motic SMZ-168) and photographed with a ZEISS AxioCam ERc 5s attached to a Zeiss discovery v8 stereomicroscope (Carl Zeiss, Jena, Germany). Ascomata were first rehydrated in 5% KOH. Sections were cut by hand with a razor blade. Fine forceps were then used to remove sectioned ascomata and mounted in water. Cotton blue was added to water mounts to observe wall characteristics of fungal structure. Materials mounted in water were examined using a Nikon ECLIPSE 80i light microscope and images recorded with a Canon 550D digital camera. Photomicrographs were processed with Adobe Photoshop CS6 Extended version 10.0 (Adobe Systems, USA). Measurements were made using Tarosoft (R) Image Frame Work. Faces of fungi numbers and Index Fungorum numbers were obtained as detailed in Jayasiri et al. (2015) and Index Fungorum (2018).

Results

Taxonomy

We follow the outline of the Ascomycetes by Wijayawardene et al. (2018) for the arrangement of Ascomycota below.

Arthoniomycetes O.E. Erikss. & Winka, Myconet 1(1): 4 (1997)

Arthoniales Henssen ex D. Hawksw. & O.E. Erikss., Syst. Ascom. 5(1): 177 (1986)

Roccellaceae Chevall. [as '*Rocellaceae*'], Fl. gén. env. Paris (Paris) 1: 604 (1826)

The family *Roccellaceae* belongs to the order *Arthoniales*, class *Arthoniomycetes* (Lücking et al. 2016, Wijayawardene et al. 2018) and represents a complex and diverse assemblage of species, including crustose to fruticose lichens, as well as lichenicolous fungi (Ertz et al. 2014a) and large conspicuous fruticose lichen-forming fungi (Tehler et al. 2007, 2010). Most species of *Roccellaceae* are common in subtropical coastal habitats (Tehler 1990, Follmann & Werner 2003, Aptroot & Sparrius 2008). The phylogenies in the family *Roccellaceae* have mainly been presented in the studies of Tehler et al. (2004, 2009), Tehler & Irestedt (2013) and Ertz et al. (2014b, 2015b) who together provided a large-scale, phylogenetic revision of the family and added eight new genera. Currently, 40 genera are accepted in the family *Roccellaceae* (Lücking et al. 2016, Wijayawardene et al. 2018). Short notes on these genera were provided by Wijayawardene et al. (2017a).

Mazosia A. Massal., Geneac. lich. (Verona): 9 (1854)

- = *Chiodecton* subgen. *Rotularia* Vain., Ann. Acad. Sci. fenn., Ser. A 15(no. 6): 290 (1921)
- = *Gomphospora* A. Massal., Ric. auton. lich. crost. (Verona): 40 (1852)
- = *Gymnographoidea* Fink, in Hedrick, Mycologia 22(5): 249 (1930)
- = *Micrographina* Fink, in Hedrick, Mycologia 22(5): 250 (1930)
- = *Opegrapha* sect. *Rotula* Müll. Arg., Flora, Regensburg 66(22): 348 (1883)
- = *Rotula* (Müll. Arg.) Müll. Arg., Lich. Epiph. Novi: 19 (1890)
- = *Rotularia* (Vain.) Zahlbr., Cat. Lich. Univers. 2: 470 (1923) [1924]

Lichenized on leaves, branches and twigs, or lichenicolous. *Thallus* crustose, continuous or dispersed, ecorticate with thin layer of irregular hyphae of different thickness above algal layer, smooth to verrucose-rugose and/or pilose (Lücking 2008). *Photobiont* trentepohlioid. Sexual morph: *Ascomata* apothecioid, immersed-erumpent, solitary or gregarious, rounded, disc greyish black to black; margin zeorine, innermost part often white, same color as thallus (Lücking 2008). *Excipulum* formed by inclinate layer of parallel hyphae, dark brown to blackish brown, K+ black, externally covered by layer of colorless to grey crystals ('crystallostratum') above which is thin, thallus layer dominated by photobiont and with thin layer of colorless hyphae above (Lücking 2008). *Hypothecium* composed of thin layer of periclinal hyphae (ascogenous hyphae) below and thicker layer of irregularly prosoplectenchymatous hyphae above, colorless to pale yellowish or greenish brown, I+ faintly blue then quickly orange-yellow, KI- (Lücking 2008). *Epithecium* indistinct but paraphyses prolong above asci and forming rather thick, epithecioid layer (Lücking 2008). *Hymenium* colorless, I+ yellow then quickly orange-red, KI+ for a long time blue, then aeruginous, and finally yellow (Lücking 2008). *Hamathecium* of numerous, hypha-like, branched, hyaline, septate, anastomosed paraphyses, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, fissitunicate, clavate to oblong. *Ascospores* fusiform, transversely septate, hyaline, thick-walled. Asexual morph: (see Lücking 2008).

Type species – *Mazosia rotula* (Mont.) A. Massal.

Notes – *Mazosia* was established by Massalongo (1854) with *M. rotula* (Mont.) A. Massal. as the type species. Most *Mazosia* species are obligately foliicolous and occur abundantly on living leaves, some occurring on bark, and others on smooth substrates, such as paint or plastic (Sparrius 2004, Aptroot et al. 2014, Sakata et al. 2017). Aptroot et al. (2014) provided a key to all 13 of the species of *Mazosia* with 3-septate ascospores from both foliicolous and corticolous habits. Sakata et al. (2017) described two corticolous *Mazosia* species from Japan and also provided a key to the corticolous species. We described and illustrated a specimen of *M. phyllosema* (URM 38670) and found that ascospores are longer (25–39 versus 11–12 µm long) than in the description in Nylander (1873), and longer than *M. phyllosema* (15–25 µm long) in the key by Aptroot et al. (2014) and Lücking (2008). The specimen (URM 38670) is obviously different in ascospore dimensions from previous studies.

Mazosia phyllosema (Nyl.) Zahlbr., Cat. Lich. Univers. 2: 503 (1923) [1924]

Fig. 1

≡ *Platygrapha phyllosema* Nyl., Bull. Soc. linn. Normandie, sér. 2 7: 171 (1873)

Index Fungorum number: IF395118; Facesoffungi number: FoF04615

Lichenized on leaves. *Thallus* continuous, thin, smooth, pale greenish grey to pale green. *Photobiont* not observed. Sexual morph: *Ascomata* superficial, solitary or gregarious, circular, black, dome-like, scattered, flattened, globose. *Excipulum* not observed. *Hypothecium* not observed. *Epithecium* not observed. *Hamathecium* comprising numerous, 2–3.5 µm diam., branched, anastomosed, filiform, hypha-like, septate paraphyses, embedded in a gelatinous matrix. *Asci* 58–75 × 12–18 µm (\bar{x} = 65 × 15 µm, n = 20), bitunicate, fissitunicate, 8-spored, cylindrical-subclavate, sessile. *Ascospores* 25–39 × 5–7 µm (\bar{x} = 32 × 6 µm, n = 30), subfusiform, 3-septate, swollen at second celled, hyaline, tapering towards rounded apex, smooth-walled, slightly constricted at the septa. Asexual morph: Undetermined.

Material examined – BRAZIL, Perfil AR-4., Porto Velho, Rondônia, on leaves of *Orbignya martiana* Barb. Rodr. (Arecaceae), 1962, O. Fonseca (URM 38670).

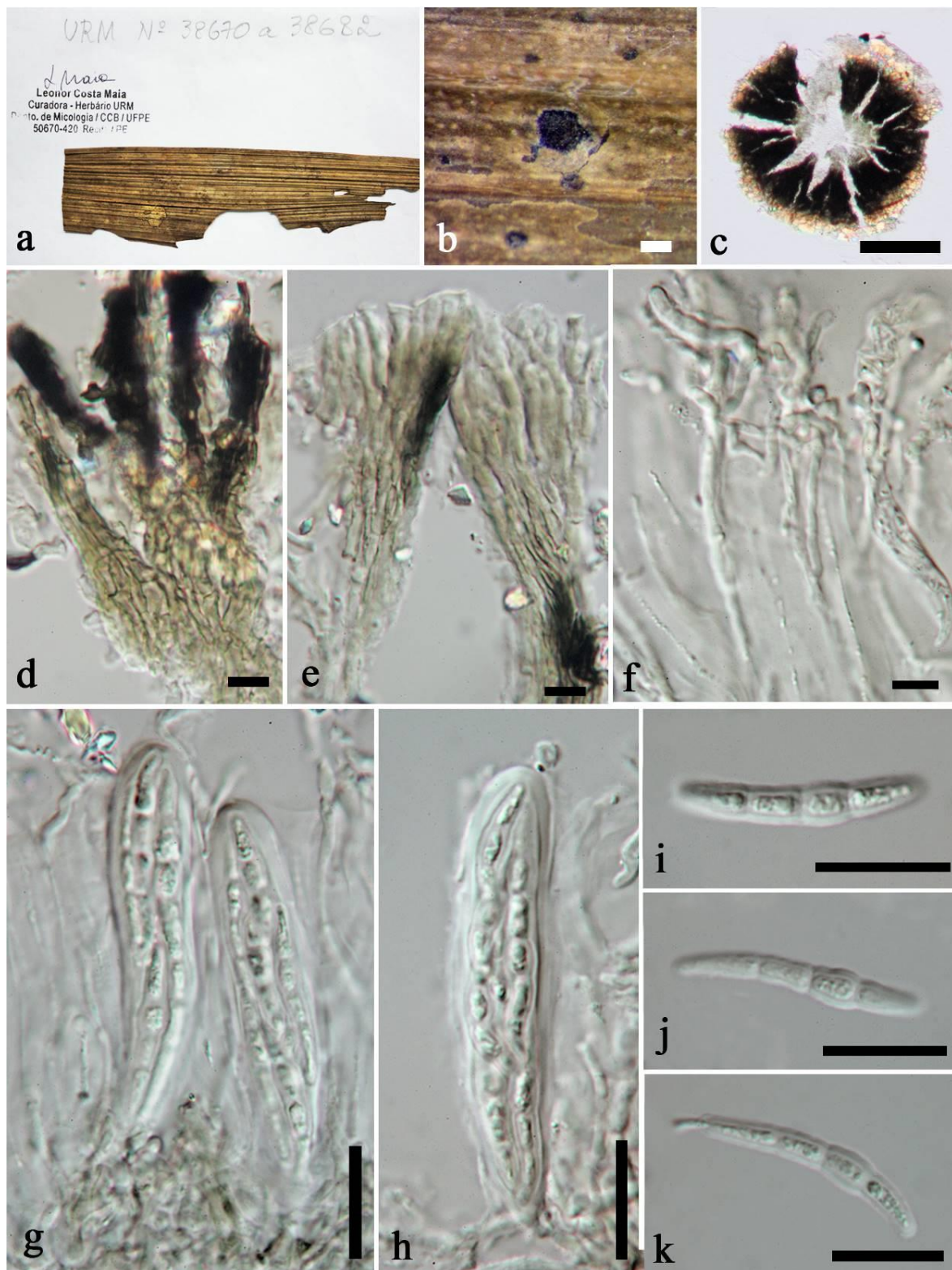


Figure 1 – *Mazosia phyllosema* (URM 38670). a Details of herbarium material and specimen. b Ascoma on host substrate. c–e Squash mounts of ascoma. f Pseudoparaphyses. g, h Asci. i–k Ascospores. Scale bars: b = 200 µm, c = 100 µm, d–f = 5 µm, g–k = 20 µm.

Eurotiomycetes O.E. Erikss. & Winka, Myconet 1(1): 6 (1997)

Chaetothyriales M.E. Barr, Mycotaxon 29: 502 (1987)

Microtheliopsidaceae O.E. Erikss.

Microtheliopsidaceae was introduced to accommodate the monotypic genus *Microtheliopsis*, which was typified by *M. uleana* (Müll. Arg.). Members of this family have been reported as

foliicolous lichenized fungi (Lücking 2008, van den Broeck et al. 2014). They are widespread in tropical and cool temperate rainforests (Cannon & Kirk 2007). Keys to *Microtheliopsis* species were provided by Van den Broeck et al. (2014). The genus presently has five species epithets, but one has been transferred to another genus (Index Fungorum 2018).

***Microtheliopsis* Müll. Arg., Flora, Regensburg 73: 195 (1890)**

Epiphyllous, foliicolous on leaves and other understory plants or shrubs. *Thallus* formed on surface of leaves, composed of algal layer, thin, ecorticate, crustose, rounded to irregular at edge, smooth or thinly setose. Sexual morph: *Ascomata* perithecial, small, solitary, scattered, immersed in algal layer, easily visible from above, subglobose, rounded or slightly radiantly elongate, black to dark brown, edge dark brown, membranous, surrounded by septate, dark brown, irregular, branched hyphae, ostiolate. *Peridium* thin, composed of one layer of large brown cells of *textura epidermoidea* to *angularis*. *Hamathecium* gelatinous, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, clavate, base rounded, with an ocular chamber. *Ascospores* irregularly arranged in asci, fusiform, 1–3-septate or submuriform, smooth-walled, ends rounded. Asexual morph: Undetermined.

Type species – *Microtheliopsis uleana* Müll. Arg.

Notes – *Microtheliopsis uleana* is the type species of genus *Microtheliopsis*, which comprises four species (Lücking 2008, Van Den Broeck 2014). *Microtheliopsis uleana* differs from other species in *Microtheliopsis* by having ascospores with 3 septa. *Microtheliopsis ramazaniana* Van den Broeck, Lücking & Ertz and *M. uniseptata* Herrera-Camp. & Lücking have one-septate ascospores, and *Microtheliopsis winkleri* Lücking produces submuriform ascospores.

***Microtheliopsis uleana* Müll. Arg., Flora, Regensburg 73: 195 (1890)**

Fig. 2

Index Fungorum number: IF395632; Facesoffungi number: FoF04616

Foliicolous on leaves. *Thallus* 4.5–7 mm long, 5–6 mm wide, formed on leaf surface, composed with one algal layer, thin, shell-like, shed easily, ecorticate, irregular at edge, green to yellowish brown, alga producing zoosporangia and gametangia, algal cells surrounded by hyphae of mycobiont, especially near ascomata. Sexual morph: *Ascomata* perithecial, 150–380 µm diam., small, solitary, scattered, immersed in algal layer, easily visible from above, subglobose, top rounded, black to dark brown, edge dark brown, membranous, surrounding by septate, dark brown, irregular, branched hyphae, ostiolate. *Peridium* 5–8 µm thick, composed of one layer of large brown cells of *textura epidermoidea* to *angularis*. *Hamathecium* gelatinous, lacking pseudoparaphyses. *Asci* 18–25 × 7–16 µm (\bar{x} = 20.4 × 8.6, n = 20), 8-spored, bitunicate, clavate, base rounded, with an ocular chamber. *Ascospores* 10–13 × 4–5 µm (\bar{x} = 12.4 × 4.6, n = 20), 3-seriate, irregularly arranged in asci, fusiform, hyaline becoming pale greyish brown, 3-septate, smooth-walled, ends rounded. Asexual morph: Undetermined.

Material examined – COSTA RICA, Puntarenas Province, Reserva Biológica Carara, c.15 km SSW of Orotina. Alt. m. 50 m. Co-ord.: 84° 37' W; 9° 47' N. Disturbed primary, c. 40 m tall forest, along trail near warden's house, foliicolous in undergrowth, 20 November 1988, H. Sipman & P. Döbbeler (B 60 0178769).

***Dothideomycetes* O.E. Erikss. & Winka, Myconet 1(1): 5 (1997)**

In this part, nine orders, 21 families and 35 genera of *Dothideomycetes*, with three taxa of *Dothideomycetes*, genera *incertae sedis* were studied. The classification of *Dothideomycetes* follows Hyde et al. (2013) and Lui et al. (2017) and updated in Wijayawardene et al. (2018). Species descriptions with notes and illustrations are presented under the relevant genus.

***Asterinales* M.E. Barr ex D. Hawksw. & O.E. Erikss., Syst. Ascom. 5(1): 177 (1986)**

***Asterinaceae* Hansf., Mycol. Pap. 15: 188 (1946)**

This family was studied by Hongsanan et al. (2014), however there is confusion surrounding what represents *Asterinaceae sensu stricto* and this has been discussed in Liu et al. (2017).

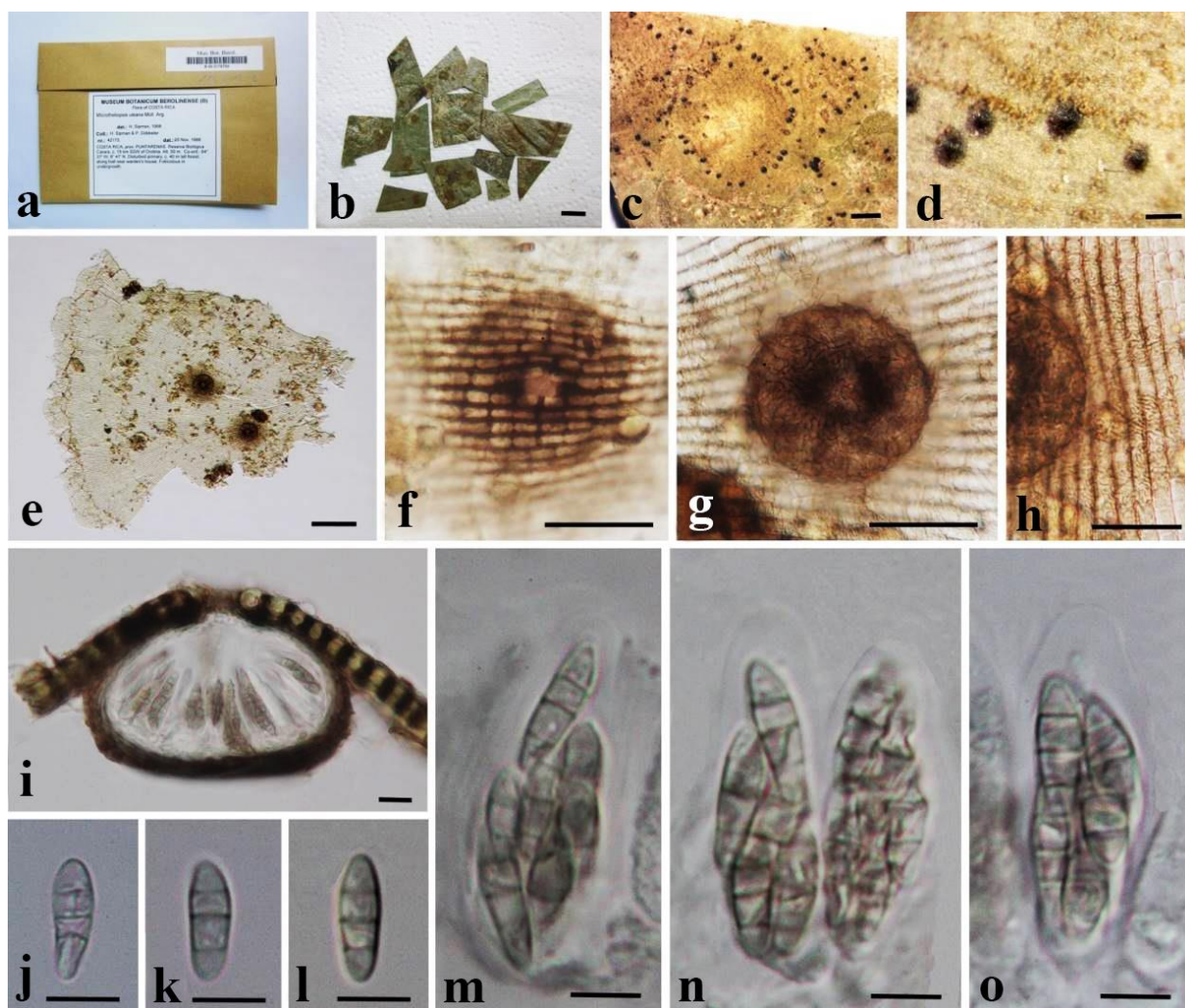


Figure 2 – *Microtheliopsis uleana* (B 60 0178769). a, b Herbarium label and specimen. c Thallus on leaf host. d Black to dark brown ascomata. e Shed thallus from host surface. f Brown ascoma immersed alga cells. g Globose ascoma. h Dark brown hyphae around ascoma. i Vertical section of ascoma. j–l Ascospores with 3-septa. m–o Asci containing ascospores. Scale bars: b = 20 mm, c = 1 mm, d, e = 200 μ m, f–h = 50 μ m, i = 10 μ m, j–o = 5 μ m.

Pycnocarpon Theiss., Abh. K.K. Zool.-Bot. Ges. Wien 7(3): 31 (1913)

Epiphytes on surface of leaves, black, forming circular or irregular colonies on host surface. *Superficial hyphae* brown to black, branched, with appressoria, septate, scattered with thyriothecia. Sexual morph: *Thyriothecia* superficial, flattened, solitary, gregarious, black, circular or irregular, easily removed from the host surface. *Asci* 2–8-spored, bitunicate, fissitunicate, globose to subglobose, lacking a pedicel. *Ascospores* overlapping, brown, hyaline with sheath when immature, becoming brown when mature, upper cell wider than lower cell, 1-septate, strongly constricted at the septum. Asexual morph: Undetermined.

Type species – *Pycnocarpon magnificum* (Syd., P. Syd. & E.J. Butler) Theiss.

Notes – Sydow et al. (1911) placed *Asterina* which included *A. magnificum* in *Microthyriaceae*. Subsequently, Theissen (1913a) introduced *Pycnocarpon* synonymizing *A. magnificum* under *Pycnocarpon magnificum* and placed the genus in *Trichopeltinaceae*. Lumbsch & Huhndorf (2010) and Wijayawardene et al. (2018) accepted *Pycnocarpon* in *Dothideomycetes* genera *incertae sedis*. *Pycnocarpon magnificum* is characterized by superficial, web-like hypha, flattened thyriothecia opening by radiating star-like or longitudinal splits, saccate asci and conglobose ascospores, hyaline when young and becoming brown at maturity, 1-septate, strongly constricted at the septum, which is typical of members of *Asterinaceae* (Hongsanan et al. 2014).

Thus, we place *Pycnocarpon* in the family *Asterinaceae* based on its morphology. In most aspects the taxon is typical of the genus *Asterina* according to the morphology described in Hyde et al. (2013) and Hongsanan et al. (2014), and *Pycnocarpon magnificentum* is probably a species of this genus. However, we maintain it as a distinct genus for the time being, awaiting for molecular data that are needed to resolve the phylogenetic placement of *Pycnocarpon* and to determine if it is distinct from *Asterina*.

Pycnocarpon magnificentum (Syd., P. Syd. & E.J. Butler) Theiss., Abh. K.K. Zool.-Bot. Ges. Wien 7(3): 31 (1913) Fig. 3

Index Fungorum number: IF180663; Facesoffungi number: FoF04617

Epiphytic on the surface of leaves, black, forming circular or irregular thallus on host surface. *Superficial hyphae* brown to black, branched, with appressoria, septate, with scattered thyriothecia and hyphopodia. Sexual morph: *Thyriothecia* 500–800 µm diam., superficial, flattened, solitary, gregarious, black, circular or irregular, easily removed from the host surface. *Asci* 55–95 × 50–75 µm (\bar{x} = 70 × 60 µm, n = 20), 2–8-spored, bitunicate, fissitunicate, globose to subglobose, lacking a pedicel. *Ascospores* 30–40 × 20–25 µm (\bar{x} = 35 × 22 µm, n = 20), overlapping, brown, hyaline with sheath when immature, becoming brown when mature, upper cell wider than lower cell, oval to obovoid, 1-septate, strongly constricted at the septum. Asexual morph: Undetermined.

Material examined – MYANMAR, Moulmein, under surface of leaves of *Terminalia* sp., 7 January 1908, E.J. Butler (S-F46351, holotype).

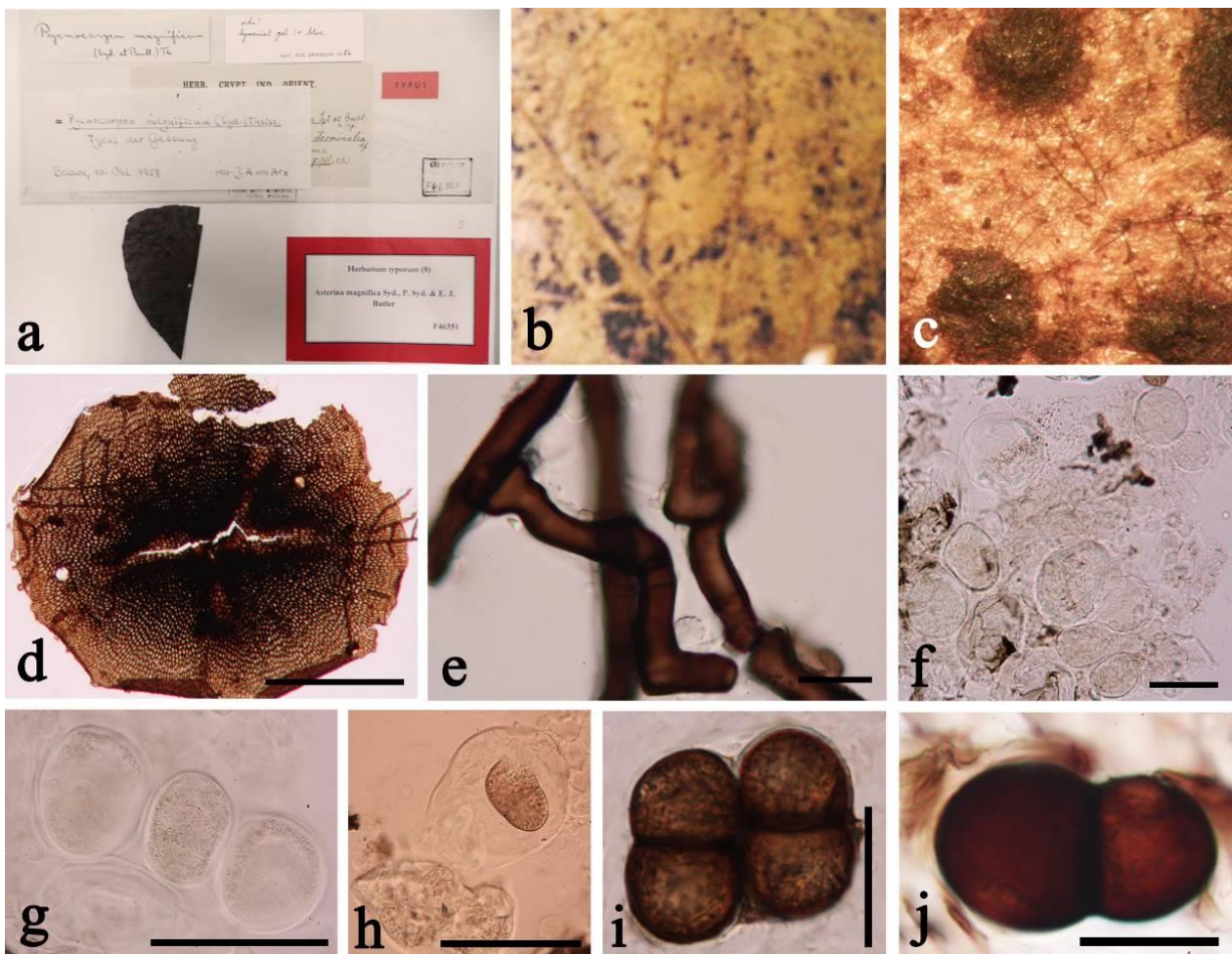


Figure 3 – *Pycnocarpon magnificentum* (S-F46351, holotype). a Herbarium label and specimen. b, c Thyriothecia on host. d Squash mount of thyriothecium. e Hyphopodia. f, g Immature asci. h Mature broken ascus. i, j Ascospores. Scale bars: d = 200 µm, e, = 20 µm, f, h = 50 µm, g = 100 µm, i = 30, j = 20 µm.

Capnodiales Woron., *Annls mycol.* 23(1/2): 177 (1925)

Cladosporiaceae Nann., *Repert. mic. uomo:* 404 (1934)

The genus *Cladosporium* is the generic type of family *Cladosporiaceae* Nannizi. The *Davidiella* was introduced as sexual morph of *Cladosporium s. str.* (Braun et al. 2003), but later this genus was introduced in the family *Davidiellaceae* (Schoch et al. 2006). According to International Code of Nomenclature for algae, fungi and plants, *Davidiella* is synonymized under *Cladosporium* as the name *Cladosporium* has priority over *Davidiella* at generic rank and is also more commonly used in literature (Bensch et al. 2012). Eight genera were listed in *Cladosporiaceae* (Wijayawardene et al. 2018).

Cladosporium Link, *Mag. Gesell. naturf. Freunde, Berlin* 7: 37 (1816) [1815]

Endophytic, hyperparasitic, pathogenic and saprobic on animals, plants, humans and fungi. Asexual morph: (see Bensch et al. 2012). Sexual morph: *Davidiella*; *Ascomata* pseudothecial, gregarious or scattered on host, black, subglobose to globose, uni-loculate, immersed beneath stromata, superficial with a cellular black stroma. *Peridium* thick-walled, dark brown cells of *textura globosa* or *angularis*. *Pseudoparaphyses* frequently present in mature ascomata, hyaline, septate, subcylindrical. *Asci* 8-spored, bitunicate, clavate, pedicellate. *Ascospores* 4–5-seriate, hyaline, ellipsoid or ovoid, 1-septate, constricted at the septum, with broadly to narrowly rounded ends.

Type species – *Cladosporium herbarum* (Pers.) Link

Notes – The genus *Cladosporium* is one of the largest dematiaceous hyphomycetes (Bensch et al. 2012). Members of this genus characterized by a unique coronate structure of the conidiogenous loci and conidial hila, consisting of a central convex dome surrounded by a raised periclinal rim (David 1997). A monographic revision of the hyphomycete genus *Cladosporium* was provided in Bensch et al. (2012). Three major species complexes (*C. cladosporioides*, *C. herbarum* and *C. sphaerospermum*) were resolved based on morphology and DNA phylogeny (Bensch et al. 2015).

Davidiella was introduced by Braun et al. (2003) based on sexual morph connection by using phylogenetic study and these authors mention that all morphological characters of *Davidiella* are identical to *Mycosphaerella*, but are distinct in having *Cladosporium* asexual morphs. Aptroot (2006) transferred several additional species to *Davidiella* based on irregular cellular inclusions in their ascospores. Schoch et al. (2006) placed *Davidiella* in the family *Davidiellaceae* in the *Capnodiales*. Bensch et al. (2012) synonymized *Davidiella* under *Cladosporium*.

Cladosporium herbarum (Pers.) Link, *Mag. Gesell. naturf. Freunde, Berlin* 8: 37 (1816) [1815]

Figs 4, 5

≡ *Dematium herbarum* Pers., *Ann. Bot. (Usteri)* 11: 32 (1794)

Index Fungorum number: IF231458; Facesoffungi number: FoF04618

Pathogenic and saprobic on dry stalks of leaves. Sexual morph: *Davidiella tassiana*: *Ascomata* 113–140 µm diam., 85–115 µm high (\bar{x} = 129.5 × 106 µm, n = 5), pseudothecial, gregarious or scattered on host, black, subglobose to globose, uni-loculate, immersed beneath stromata, superficial with a cellular black stroma. *Peridium* 21–32 µm wide (\bar{x} = 27 µm, n = 10), consisting of 3–4 layers of dark brown cells of *textura globosa* or *angularis*. *Pseudoparaphyses* frequently present in mature ascomata, hyaline, septate, subcylindrical. *Asci* 64–80 × 20–22 µm (\bar{x} = 69 × 21 µm, n = 10), 8-spored, bitunicate, clavate, short-pedicellate. *Ascospores* 28–38 × 7.2–8.8 µm (\bar{x} = 34 × 7.7 µm, n = 20), 4–5-seriate, hyaline, fusiform to oblong, 1-septate, constricted at the septum, with broadly to narrowly rounded ends. Asexual morph: *mycelium* superficial, unbranched, 1–5 µm wide, septate, sometimes constricted at septa, pale brown to brown, thick-walled. *Conidiophores* erect, straight to flexuous, unbranched, brown to dark brown, paler towards the apex, thick-walled. *Conidiogenous cells* conical to almost filiform or narrowly cylindrical with a single apical scar or conidiogenous loci. This type of scar has been called ‘coronate’ or described as

'Cladosporium-type' (David, 1997). *Conidia* pale brown to brown when mature, 2–3 cells, ovoid to ellipsoid, guttulate to somewhat granular, usually only slightly attenuated towards base.

Material examined – ITALY, Trentino-Alto Adige, Bolazano, on dry stalks, June 1884, Rehm (S-F218065); USA, Colorado, Grand Mesa Mtn, on *Carex geyeri* Boott (*Cyperaceae*), 1 July 1930, R.W. Davidson (BPI 609770); USA, MACBRIDE Springs, Mt. Shasta, Siskiyou Co. alt. 5000 ft., Public Camp, on *Carex fracta* Boott (*Cyperaceae*), 7 April 1947, Cooke W.B.; Cooke Vivian G. (19289) (BPI 426946).

Johansoniaceae Doilom, Phookamsak & K.D. Hyde, fam. nov.

Index Fungorum number: IF554793; Facesoffungi number: FoF04619

Epiphytic, saprobic, and associated with brown spots on leaves. Sexual morph: *Mycelium* superficial, septate, brown. *Ascomata* superficial, scattered, solitary, flattened, brown to black, pulvinate, uni-loculate, membranous, lacking ostioles, with or without hyphae at the base, sometimes with dots in hyphae at the central apex, with or without setae. *Setae* pale brown to brown, septate, surrounding ascomata, erect, straight to curved. *Peridium* with meandering arrangement, thin-walled at the base, with cells arranged in a *textura angularis* to *textura globulosa*. *Hamathecium* comprising septate, hypha-like, branched, anastomosing, pseudoparaphyses, intermingled among asci. *Asci* 8-spored, bitunicate, ellipsoid to subcylindrical or clavate, sessile to subsessile or with short furcate pedicel, thick-walled, with ocular chamber. *Ascospores* 2–3-seriate, hyaline, ovoid to ellipsoidal, 1-septate, apical cell wider than basal cell, with mucilaginous sheath. Asexual morph: Undetermined.

Family type – *Johansonia* Sacc.

Notes – The family *Johansoniaceae* is introduced to accommodate *Johansonia* and *Orthobellus* with *Johansonia* as the generic type of this family. *Orthobellus* was formerly placed in *Schizothyriaceae* (Silva et al. 1973, Wijayawardene et al. 2014), and was transferred to *Dothideomycetes* genera *incertae sedis* by Phookamsak et al. (2016). However, *Orthobellus* has morphological similarity to *Johansonia* in ascomata that are membranous, lacking ostioles, narrowly anastomosing pseudoparaphyses, thin-walled at the base and ascospores that are hyaline, ovoid to ellipsoidal, 1-septate, with an apical cell wider than basal cell. Thus, we place these two genera in *Johansoniaceae*.

Based on DNA sequence data of the nuclear ribosomal DNA (LSU) of *J. chapadiensis*, Crous et al. (2010) showed that *Johansonia* was a member of *Dothideomycetes*, *Capnodiales*, families *incertae sedis*, and closely related to *Schizothyriaceae* and *Mycosphaerellaceae*. More representative species and the type species, *Johansonia setosa*, need to be recollected for molecular study to resolve a natural classification. We tentatively place *Johansonia* to the new family *Johansoniaceae* based on morphology together with molecular data by Crous et al. (2010).

Genera in *Johansoniaceae* are similar to some members in *Schizothyriaceae* in having discoid, membranous ascomata, lacking ostioles, hyaline, didymosporous ascospores, but they differ by having uni-loculate ascomata, narrowly anastomosing pseudoparaphyses and a developed peridium at the base, mostly ellipsoid to subcylindrical or clavate asci. *Schizothyriaceae* members have mostly multi-loculate ascostromata, with each ascus forming in a locule in a network-like structure and have a poorly-developed peridium at the base and mostly subglobose to ovoid asci.

Johansonia Sacc., Syll. fung. (Abellini) 8: 785 (1889)

Saprobic on leaves, and associated with brown spots on leaves. Sexual morph: *Ascomata* superficial, on lower leaf surface, situated on a hyphal stroma, loose on the surface, scattered, solitary, pulvinate, dark brown to black, with brown setae. *Setae* pale brown to brown, separate, surrounding ascomata, erect, straight to curved, thick-walled and smooth-walled, with basal T-cell devoid of rhizoids, slightly constricted at the septa, tapering towards the apex, acutely to obtusely rounded, apical septum. *Peridium* comprising brown cells arranged in a *textura angularis* to *textura globulosa*. *Hamathecium* comprising, septate, hypha-like, branched, pseudoparaphyses, intermingled among asci. *Asci* 8-spored, bitunicate, subcylindrical to clavate, with short furcate

pedicel, thick-walled, with an ocular chamber. *Ascospores* 2–3-seriate, hyaline, ovoid to ellipsoidal, septate, slightly constricted at the septum, slightly curved, thick-walled, apical cell wider than basal cell, slightly rounded at both ends. Asexual morph: Undetermined.

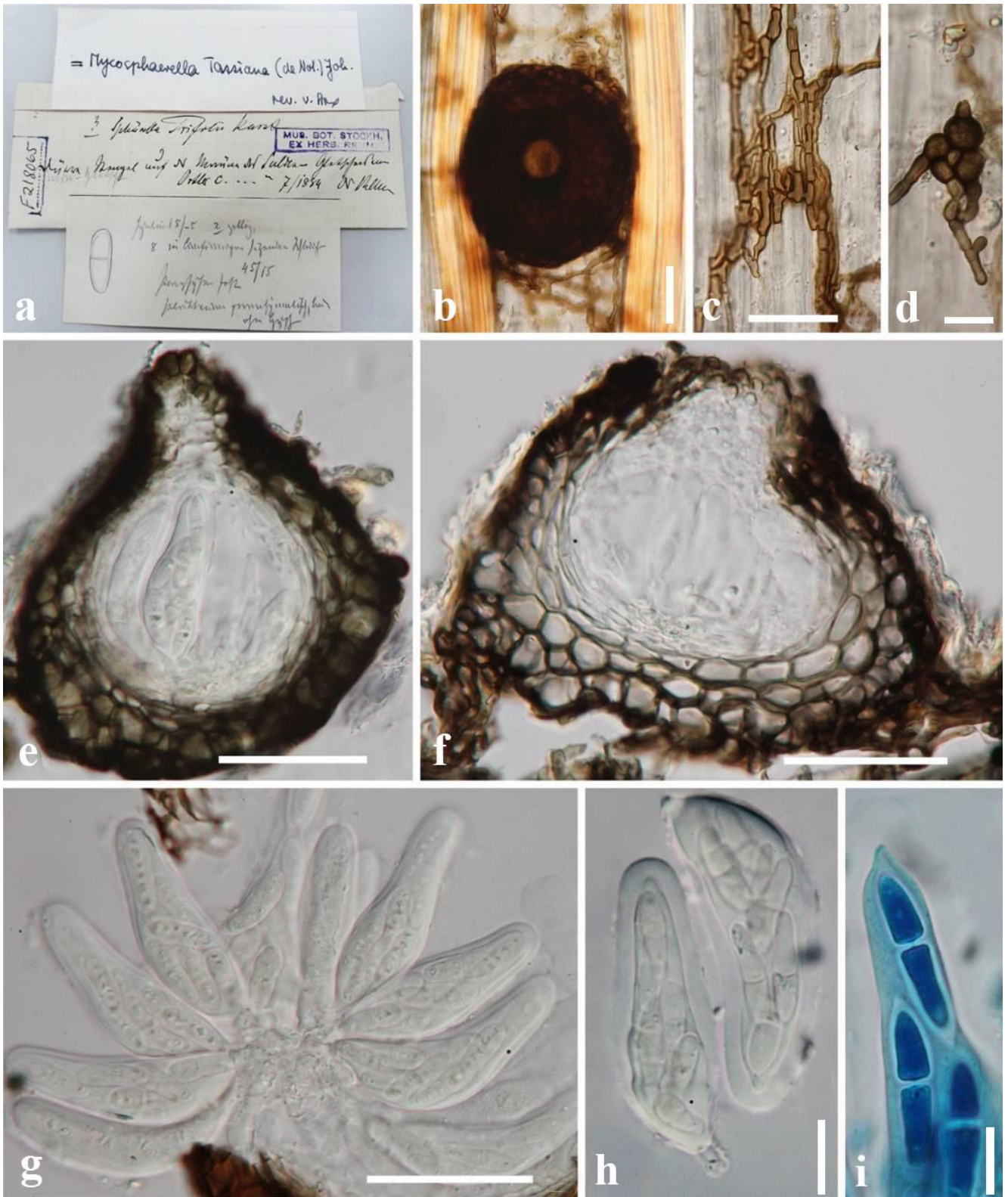


Figure 4 – *Cladosporium herbarum* (S-F218065, sexual morph of *Davidiella tassiana*). a Herbarium label. b Ascoma with ostiole. c, d Hyphae. e, f Vertical sections through the ascomata and peridium. g, h Asci. i Ascospores stained in lactophenol cotton blue. Scale bars: b = 100 μ m, c–f = 50 μ m, g = 20 μ m, h–i = 10 μ m.



Figure 5 – *Cladosporium herbarum* (BPI 426946). a Herbarium label and specimen. b Appearance of black mycelium on host surface. c Hyphae. d, e Conidiophores. f, g Conidiophores with conidia and conidiogenous cell. h, i Immature conidia. j, k Mature conidia. Scale bars: b = 200 μ m, c, e, f = 50 μ m, d, g = 20 μ m, h–k = 10 μ m.

Type species – *Johansonia setosa* (G. Winter) Sacc.

Notes – *Johansonia* comprises 13 species (Index Fungorum 2018), with *J. setosa* as the type species (Wijayawardene et al. 2017a). *Johansonia* was formerly assigned to *Schizothyriaceae* by Müller & von Arx (1962). In a later study, this genus was placed in *Saccardiaceae* (von Arx & Müller 1975) and placed in *Phillipsiellaceae* in *Loculoascomycetes* (Barr 1993). Lumbsch & Huhndorf (2007) and Wijayawardene et al. (2018) listed it in *Saccardiaceae*, *Ascomycota*, family *incertae sedis*. There are no DNA sequence data for the type species in GenBank (2018), although Crous et al. (2010) provided such data for *J. chapadiensis*. We examined the isotype of *Johansonia setosa* and place it in *Johansoniaceae* based on morphology and phylogenetic analysis of Crous et al. (2010).

Johansonia setosa (G. Winter) Sacc., Syll. fung. (Abellini) 8: 785 (1889)

Fig. 6

≡ *Ravenelula setosa* G. Winter, Revue mycol., Toulouse 7(no. 27): 208 (1885)

Index Fungorum number: IF150887; Facesoffungi number: FoF04620

Saprobic on leaves of *Sapindaceae* Juss. Sexual morph: *Ascomata* 50–85 µm high, up to 360 µm diam., superficial, on lower leaf surface, situated on a hyphal stroma, loosely on surface, scattered, solitary, pulvinate, dark brown to black, with brown setae. *Setae* pale brown to brown, separate, surrounding ascomata, erect, straight to curved, thick-walled, smooth, with basal T-cell devoid of rhizoids, slightly constricted at the septa, tapering towards the apex, acutely to obtusely rounded, 7–12-septate, 110–227 × 5–8 µm; 3–6 µm wide at apical septum. *Peridium* 13–22 µm diam., consisting of 3–6 layers of brown cells of *textura angularis* to *textura globulosa*. *Hamathecium* comprising 1.9–3 µm wide, septate, hypha-like, branched pseudoparaphyses, intermingled among asci. *Asci* 32–48 × 10–15 µm (\bar{x} = 39 × 13 µm, n = 30), 8-spored, bitunicate, subcylindrical to clavate, with short furcate pedicel, with an ocular chamber. *Ascospores* 10–16 × 5–7 µm (\bar{x} = 12 × 6 µm, n = 30), 2–3-seriate, hyaline, ovoid to ellipsoidal, medially 1-septate, slightly constricted at the septum, slightly curved, thick-walled, apical cell wider than basal cell, slightly rounded at both ends, with mucilaginous sheath. Asexual morph: Undetermined.

Material examined – PARAGUAY, Guarapi, on leaves of *Sapindaceae*, A. Balansa (S-F5991, isotype).

Phaeothecoidiaceae K.D. Hyde & Hongsanan, Mycosphere 8(1): 140 (2017)

This family was introduced by Hongsanan et al. (2017b) to accommodate *Chaetothyrina*, *Houjia* and *Phaeothecoidiella* and is placed in the order *Capnodiales*. Zeng et al. (2018) added a fourth genus, *Translucidithyrium*. *Chaetothyrina* was introduced by Theissen (1913b) and is characterized by ascomata with setae, hyaline, 1-septate ascospores, and the absence of superficial hyphae (Reynolds & Gilbert 2005). *Houjia* is hyphomycetous and characterized by brown, septate, branched hyphae, solitary, monoblastic conidiogenous cells, and euseptate conidia (Yang et al. 2010). *Phaeothecoidiella* is hyphomycetous and characterized by brown, regularly septate, branched hyphae with internal pigmented, phragmospore-like endoconidia (Yang et al. 2010, Zeng et al. 2018). Because of the similarities of *Rivilata* with *Translucidithyrium*, we place them in the family *Phaeothecoidiaceae* pending molecular confirmation.

Rivilata Kohlm., Volkm.-Kohlm. & O.E. Erikss., Can. J. Bot. 76(3): 470 (1998)

Saprobic on leaves. Sexual morph: *Thyriothecia* pulvinate, flattened or slightly convex on top, dark brown when wet, appearing black when dry, anchored with short hyaline hyphae in the epidermal cells of the host, hymenium covered by an epithecium, developing under the cuticle, which eventually peels off, becoming superficial, single or in small groups. *Epithecium* composed of short dark brown hyphoid cells; opening by irregular slits when moistened and exposing the hymenium. *Hamathecium* comprising pseudoparenchymatous tissue of hyaline stromatal cells surrounding the asci. *Asci* 8-spored, bitunicate, clavate, upper part ellipsoidal to obovate, short pedicellate, thick at the apex, dehiscence rostrate, without an apical apparatus, with oculus. *Ascospores* irregularly arranged in the ascus, ellipsoidal, uniseptate, slightly constricted at the

septum, upper cell wider than the lower one, smooth-walled, hyaline, full of oil droplets. Asexual morph: Undetermined

Type species – *Rivilata ius* Kohlm., Volkm.-Kohlm. & O.E. Erikss.

Notes – Kohlmeyer et al. (1998) introduced the genus *Rivilata* with *R. ius* as a type species. *Rivilata* was thought to be similar to *Schizothyrium*, but all species in *Schizothyrium* have epicuticular ascomata, whereas *Rivilata* has subcuticular ascomata (Kohlmeyer et al. 1998). The genus *Rivilata* resembles members of the *Saccardiaceae* (syn. *Phillipsiellaceae*). Lumbsch & Huhndorf (2010) and Wijayawardene et al. (2018) placed *Rivilata* in *Saccardiaceae*. In this study we re-examined the holotype of *Rivilata ius* and place it in *Phaeothecoidiaceae* based on its morphological similarity to *Translucidithyrium*.

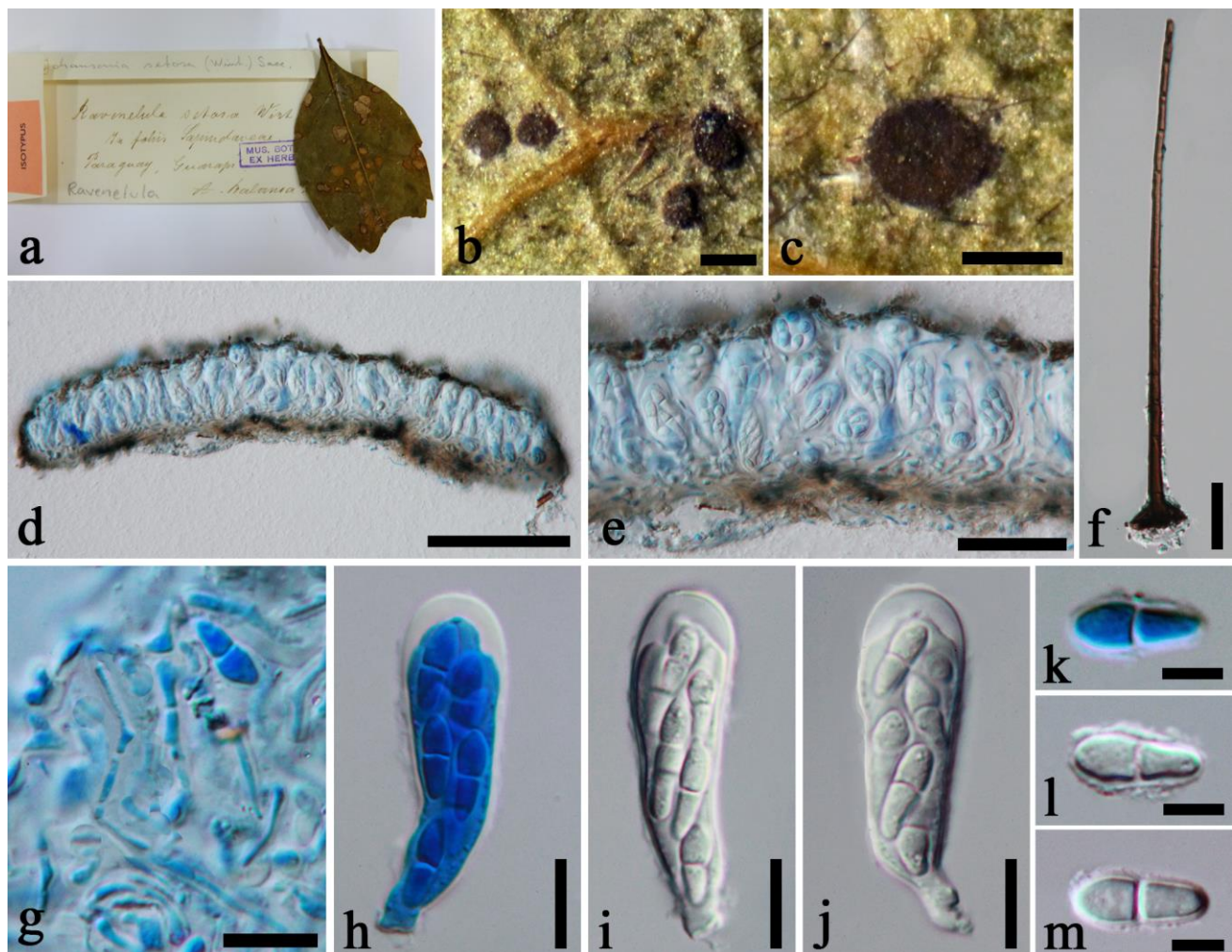


Figure 6 – *Johansonia setosa* (S-F5991, isotype). a Herbarium label and specimen. b Ascomata on leaf surface from above. c Close up of ascoma on leaf surface from above. d–e Vertical section through an ascoma. f Setae. g Pseudoparaphyses. h–j Asci. k–m Ascospores. Note: d, e, g, h, k stained in lactophenol cotton blue. Scale bars: b, c = 300 μ m, d = 100 μ m, e = 30 μ m, f = 20 μ m, g–j = 10 μ m, k–m = 5 μ m.

Rivilata ius Kohlm., Volkm.-Kohlm. & O.E. Erikss., Can. J. Bot. 76(3): 472 (1998) Fig. 7
 Index Fungorum number: IF447035; Facesoffungi number: FoF04621

Saprobic on leaves of *Juncus roemerianus*. Sexual morph: *Thyriothecia* 40–70 μ m high \times 95–145 μ m diam. (\bar{x} = 56 \times 120 μ m, n = 10), superficial, solitary, scattered, flattened or slightly convex on top, dark brown when wet, appearing black when dry, basal peridium poorly developed. *Epithecium* composed of short dark brown hyphoid cells, brown to reddish brown. *Hamathecium* comprising 1–2 μ m wide, *intricata* or pseudoparenchymatous tissue of hyaline stromatal cells

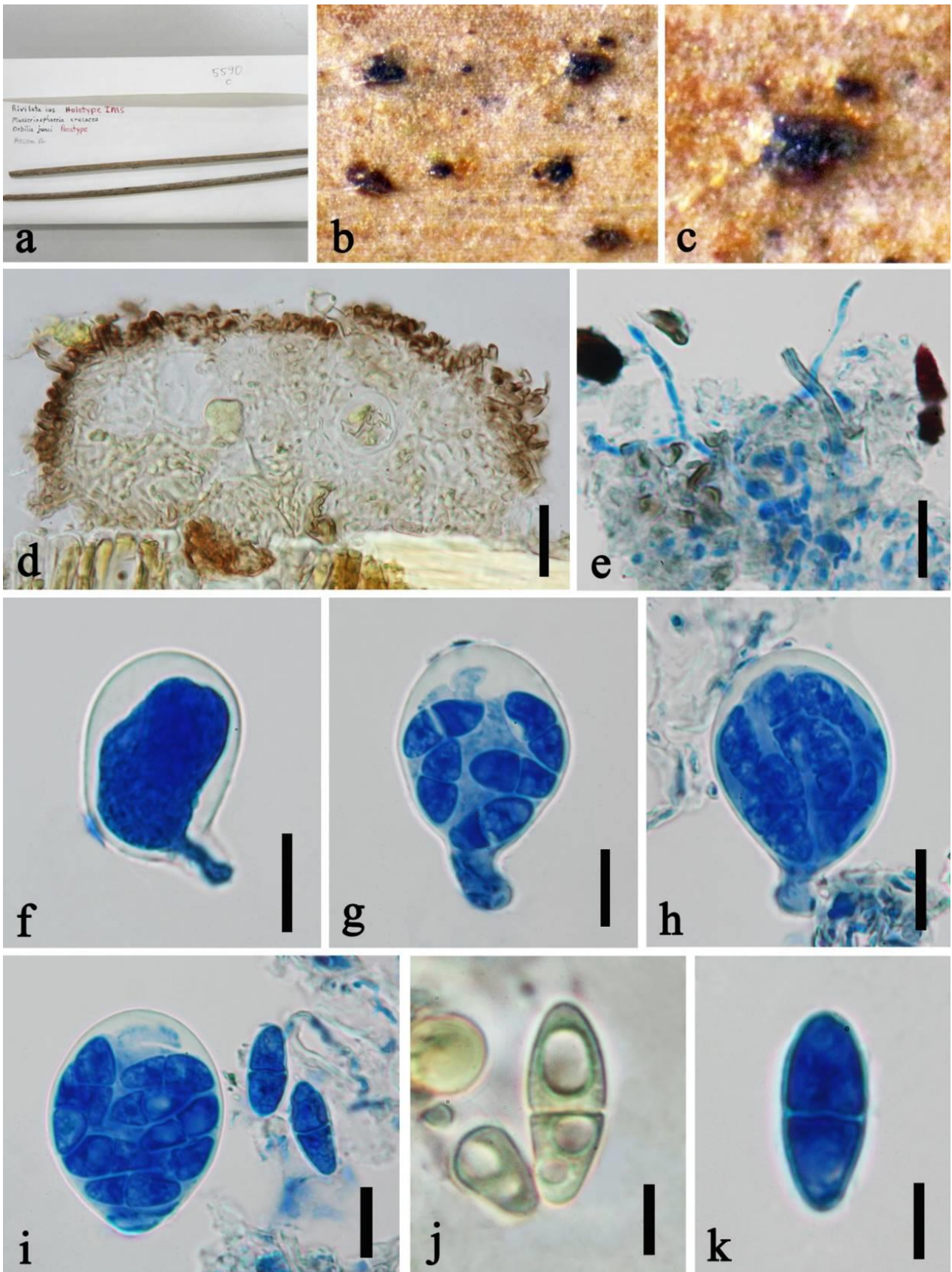


Figure 7 – *Rivilata ius* (J.K. 5590 (IMS), holotype). a Herbarium label and specimen. b Ascomata on substrate. c Close up of ascoma on substrate. d Vertical section through ascoma. e Pseudoparaphyses. f Immature asci. g, h Mature asci. i Asci and ascospores. j, k Ascospores. Note: e–i, k stained in lactophenol cotton blue. Scale bars: d = 20 μm , e–i = 10 μm , j, k = 5 μm .

surrounding the asci, septate. *Asci* 32–42 × 22–26 μm (\bar{x} = 37 × 24 μm, n = 20), 8-spored, bitunicate, globose to subglobose, short-pedicellate, apically rounded with indistinct ocular chamber. *Ascospores* 13–18 × 5–7.5 μm (\bar{x} = 16 × 6.5 μm, n = 20), crowded or irregularly arranged in the ascus, ellipsoid or obovoid, hyaline, smooth-walled, 1-septate, slightly constricted at the septum, upper cell wider than the lower cell, guttulate. Asexual morph: Undetermined.

Material examined – USA, North Carolina, Broad Creek (Atlantic Ocean), 34° 43′ 0″ N, 76° 55′ 7″ W., on leaves of *Juncus roemerianus* Scheele (*Juncaceae*), 7 June 1996, J.J. Kohlmeyer, B. Volkman-Kohlmeyer (J.K. 5590 (IMS), holotype).

Schizothyriaceae Höhn. ex Trotter, Sacc., D. Sacc. & Traverso [as '*Schizothyriaceae*'], in Saccardo, Syll. fung. (Abellini) 24(2): 1254 (1928)

Hyde et al. (2013) provided details of *Schizothyriaceae*. Phookamsak et al. (2016) resolved the genera in *Schizothyriaceae* by examining the type and other specimens from herbaria worldwide. Nine genera were listed under this family by Wijayawardene et al. (2018). In this study we determined that *Vonarxella* are probably similar to this family and thus we place it in *Schizothyriaceae*.

Vonarxella Bat., J.L. Bezerra & Peres, Riv. Patol. veg., Pavia, sér. 4 1(1-2): 61 (1965).

Facesoffungi number: FoF04673

Epiphytic on the lower surface of leaves. *Mycelium* not observed. Sexual morph: *Ascostromata* superficial, solitary, black, flattened, circular, easily removed from the host surface, multi-loculate, hemispherical, lacking ostioles, upper wall composed of meandering cells, arranged and branching from the central to the outer rim. *Peridium* thin-walled, composed of dark brown to black pseudoparenchymatous cells, arranged in a *textura angularis*, comprising irregular meandering arrangement of dark brown, compact cells, poorly-developed at the base. *Hamathecium* comprising numerous, septate, hypha-like pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 8-spored or more, bitunicate, fissionate, cylindro-clavate to clavate, with an ocular chamber, with or without pedicel, asci arising from the base of the ascomata. *Ascospores* overlapping 3–4-seriate, hyaline, obovoid to ellipsoidal, 1-septate, apical cell wider and shorter than lower cell, lower cell narrow and tapering to rounded base. Asexual morph: Undetermined.

Type species – *Vonarxella dipterygis* Bat., J.L. Bezerra & Peres

Notes –The genus *Vonarxella* (*Saccardiaceae*) has only one species, with *V. dipterygis* as the type species. This was found on leaves of *Dipteryx alata* in Brazil in 1965. *Vonarxella* is similar to *Schizothyrium*. It is possibly a member of *Schizothyriaceae* (Phookamsak et al. 2016) based on ascostromata that are flattened, multi-loculate, a peridium that comprises irregular meandering arrangement of dark brown, compact cells, poorly-developed at the base, and ascospores that are 1-septate, slightly constricted at the septum, and wider in upper cell. Thus, we classify *Vonarxella* in the *Schizothyriaceae*.

Vonarxella dipterygis Bat., J.L. Bezerra & Peres [as '*diptericis*'], Riv. Patol. veg., Pavia, sér. 4 1(1-2): 62 (1965) Fig. 8

Index Fungorum number: IF340976; Facesoffungi number: FoF04622

Epiphytic on the lower surface of leaves. *Mycelium* not observed. Sexual morph: *Ascostromata* superficial, solitary, black, flattened, circular, easily removed from the host surface, multi-loculate, hemispherical, lacking ostioles, upper wall composed of meandering cells, arranged and branching from the central to the outer rim. *Peridium* thin-walled, composed of dark brown to black pseudoparenchymatous cells, arranged in a *textura angularis*, comprising irregular meandering arrangement of dark brown, compact cells, poorly-developed at the base. *Hamathecium* comprising numerous, 1–2 μm wide, septate, hypha-like pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 44–58 × 17–24 μm (\bar{x} = 50 × 22 μm, n = 15), 8-spored or more, bitunicate, fissionate, cylindro-clavate to clavate, ocular chamber, with or without pedicel, thick-walled, asci arising from the base of the ascomata. *Ascospores* 11–15 × 3–5 μm (\bar{x} = 14 × 4 μm, n = 15),

overlapping 3–4-seriate, hyaline, obovoid to ellipsoidal, 1-septate, slightly constricted at the septum, slightly curved, apical cell wider and shorter than lower cell, lower cell narrow and tapering to rounded base, smooth-walled, surrounded by a mucilaginous sheath. Asexual morph: Undetermined.

Material examined – BRAZIL, Paracatú, Minas Gerais, on leaves of *Dipteryx alata* Vogel (*Leguminosae*), 3 June 1960, E.P. Henringer (URM 19534, holotype).

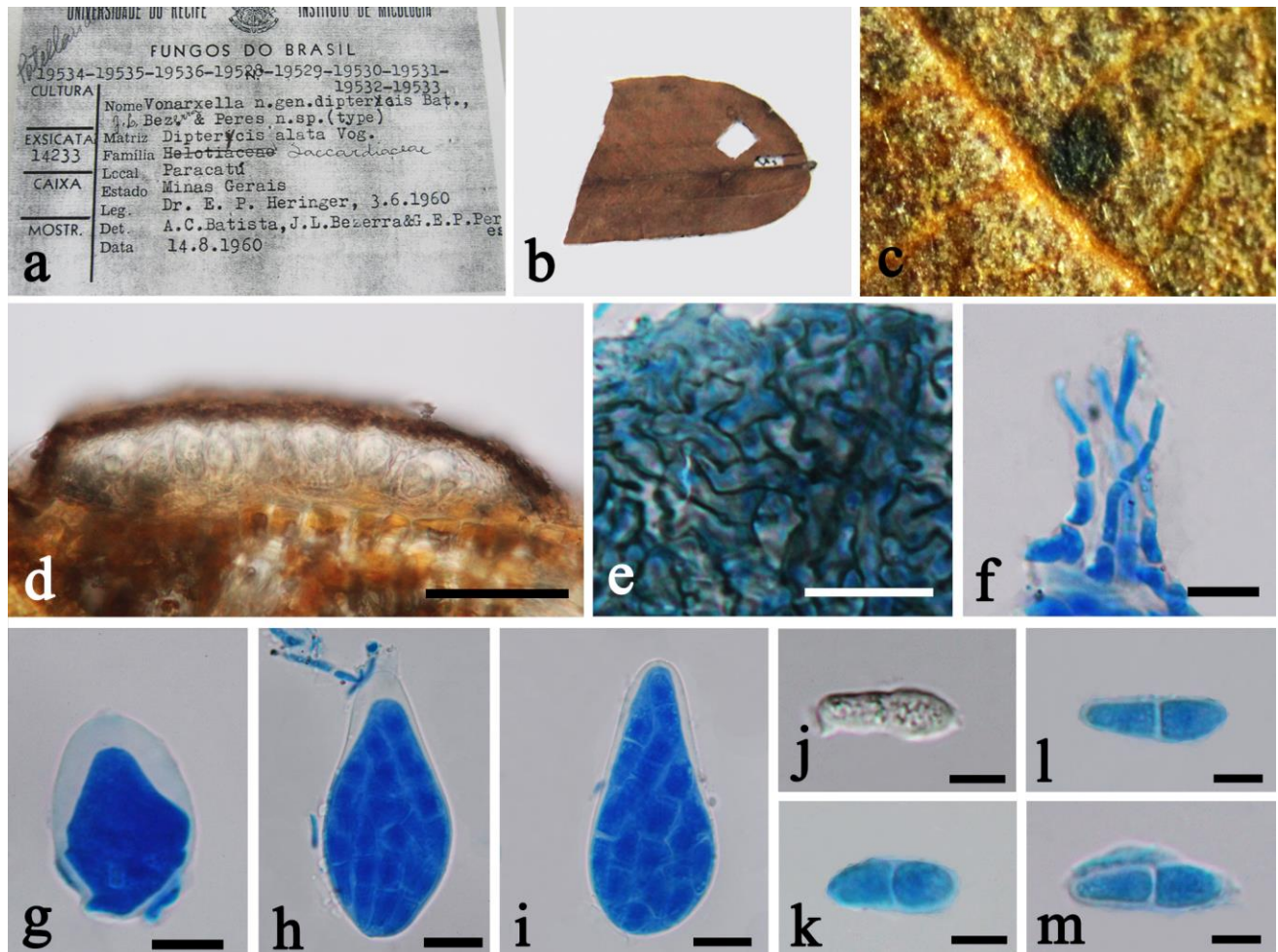


Figure 8 – *Vonarxella dipterygis* (URM 19534, holotype). a Herbarium label. b Specimen. c Ascostroma on host. d Section through ascostroma. e Peridium structure seen from above. f Pseudoparaphyses. g–i Asci. j–m Ascospores. Note: e–i, k–m stained in lactophenol cotton blue. Scale bars: d = 50 μ m, e–i = 10 μ m, j–m = 5 μ m.

Gloniales Jayasiri & K.D. Hyde, Mycosphere (In prep)

Gloniaceae E. Boehm, C.L. Schoch & Spatafora, Mycol. Res. 113(4): 468 (2009)

Originally *Gloniaceae* was proposed as a sub-familial taxonomic rank under the family *Hysteriaceae* based on *Hysterographium* and *Glonium* Corda (1842). Boehm et al. (2009a) emended and restricted this sub-familial rank and elevated *Gloniaceae* to family rank based on a single genus (*Glonium circumserpens* EB 0331, EB 0332 and *G. stellatum* CBS 207.34). *Gloniaceae* was placed close to the *Mytilinidiaceae* in the multigene phylogenies of LSU, SSU, TEF1 and RPB2 (Boehm et al. 2009a). However, Boehm et al. (2009a) did not include *Gloniaceae* within the *Mytilinidiales* but considered *Gloniaceae* in *Pleosporomycetidae incertae sedis*, due to the highly divergent morphology associated with the genus *Glonium*. These include character states related to the hamathecium type or pseudothecial shape (persistent cellular pseudoparaphyses in the *Gloniaceae* versus narrow trabeculate pseudoparaphyses in the *Mytilinidiaceae*), and to the fruitbody (dichotomously branched in the *Gloniaceae* versus conchate in the *Mytilinidiaceae*)

(Boehm et al. 2009b). *Hysteroglyphium* was retained within the *Hysteriaceae* (Zogg 1962). Key to asexual states of *Gloniaceae* was provided in Hyde et al. (2013) with two genera, *Cleistonium* and *Cenococcum*. Later, *Cleistonium* was accepted as Ascomycota, genus *incertae sedis* (Wijayawardene et al. 2017a). *Cenococcum* has been recognized as a member of *Gloniaceae* based on five nuclear loci of SSU, LSU, TEF1, RPB1 and RPB2 (Spatafora et al. 2012). Three genera were recently listed in *Gloniaceae* (Wijayawardene et al. 2018). Jayasiri et al. (2018) placed *Gloniaceae* in the new order *Gloniales*.

Glonium Muhl., Cat. Pl. Amer. Sept.: 101 (1813)

Saxicolous, terricolous or *lignicolous* on bark, wood or soil. Sexual morph: *Ascomata* hysterothecia, carbonaceous to coriaceous, black, scattered, contiguous, semi-immersed to superficial, subiculum or without, with a longitudinal slit at the median, quadrilateral, not branching to dichotomously branching. *Exciple* composed of a *textura angularis*, comprising of two cell layers, outer layer comprising black to dark reddish, thick-walled cells, inner layer comprising hyaline, thin-walled cells. *Hamathecium* comprising hyaline, filiform, hypha-like, dense, septate pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, fissitunicate, subcylindrical to cylindro-clavate, apically rounded, with an ocular chamber, with a short furcate pedicel. *Ascospores* overlapping 1–2-seriate, hyaline, 1-septate, constricted at the transverse septa, upper cell wider than the lower cell, with a gelatinous sheath, smooth-walled. Asexual morph: asteromella-like

Type species – *Glonium stellatum* Muhl.

Notes – The genus *Glonium* was transferred from the *Hysteriaceae* to *Gloniaceae*, which is listed as family *incertae sedis* within the *Pleosporomycetidae* (Boehm et al. 2009b). Jayasiri et al. (2018) placed *Glonium* in the family *Gloniaceae*, order *Gloniales*. It is a genus of saprobic Dothideomycetes that produces darkly pigmented, carbonaceous, hysterioid apothecia, and has not been known as biotrophic (Spatafora et al. 2012). *Glonium stellatum* was established as type species by Mühlenberg (1813) (see description and illustration in Hyde et al. (2013)). The specimen of *G. lineare* labeled as *Psiloglonium lineare* (Fr.) Petr. is described below from S herbarium. It is not type material, but it is typical for the species. A brief description was provided in Fries (1823) as *Hysterium lineare*, and in Saccardo (1883) with descriptions as *G. lineare*.

Glonium lineare (Fr.) De Not., G. bot. ital. 2(1.1): 594 (1846)

Fig. 9

≡ *Hysterium lineare* Fr., Syst. mycol. (Lundae) 2(2): 583 (1823)

= *Hysterium lineare* Fr., Syst. mycol. (Lundae) 2(2): 583 (1823)

= *Glonium lineare* (Fr.) De Not., G. bot. ital. 2(1.1): 594 (1846) f. *lineare*

= *Psiloglonium lineare* (Fr.) Petr., Anns mycol. 21(3/4): 227 (1923)

= *Hysterium lineare* Fr., Syst. mycol. (Lundae) 2(2): 583 (1823) var. *lineare*

= *Glonium lineare* f. *angustissimum* De Not., G. bot. ital. 2(1.1): 594 (1846)

Index Fungorum number: IF140107; Facesoffungi number: FoF04623

Saprobic on dead wood. Sexual morph: *Ascomata* 240–320 µm high × 255–535 µm diam. (\bar{x} = 265 × 490 µm, n = 15), hysterothecia, carbonaceous to coriaceous, black, scattered, contiguous, semi-immersed to superficial, subiculum, with a longitudinal slit at the median, quadrilateral. *Exciple* 25–65 µm thick at the sides, composed of a *textura angularis*, comprising two cell layers, outer layer comprising black to dark reddish, thick-walled cells, inner layer comprising hyaline, thin-walled cells. *Hamathecium* comprising 0.9–1.5 µm wide, filiform, hypha-like, dense, septate pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 65–98 × 9.5–14 µm (\bar{x} = 81 × 11 µm, n = 15), 8-spored, bitunicate, fissitunicate, subcylindrical to cylindro-clavate, apically rounded, with an ocular chamber, with a short furcate pedicel. *Ascospores* 11–15.5 × 5–7.5 µm (\bar{x} = 13 × 6 µm, n = 30), overlapping 1–2-seriate, hyaline, 1-septate, constricted at the transverse septum, upper cell wider than the lower cell, with a gelatinous sheath, overlapping 1–2-seriate, smooth-walled. Asexual morph: Undetermined.

Material examined – *Acer platanoides* L. (*Aceraceae*), M.A. Lindblad (S-F221568).

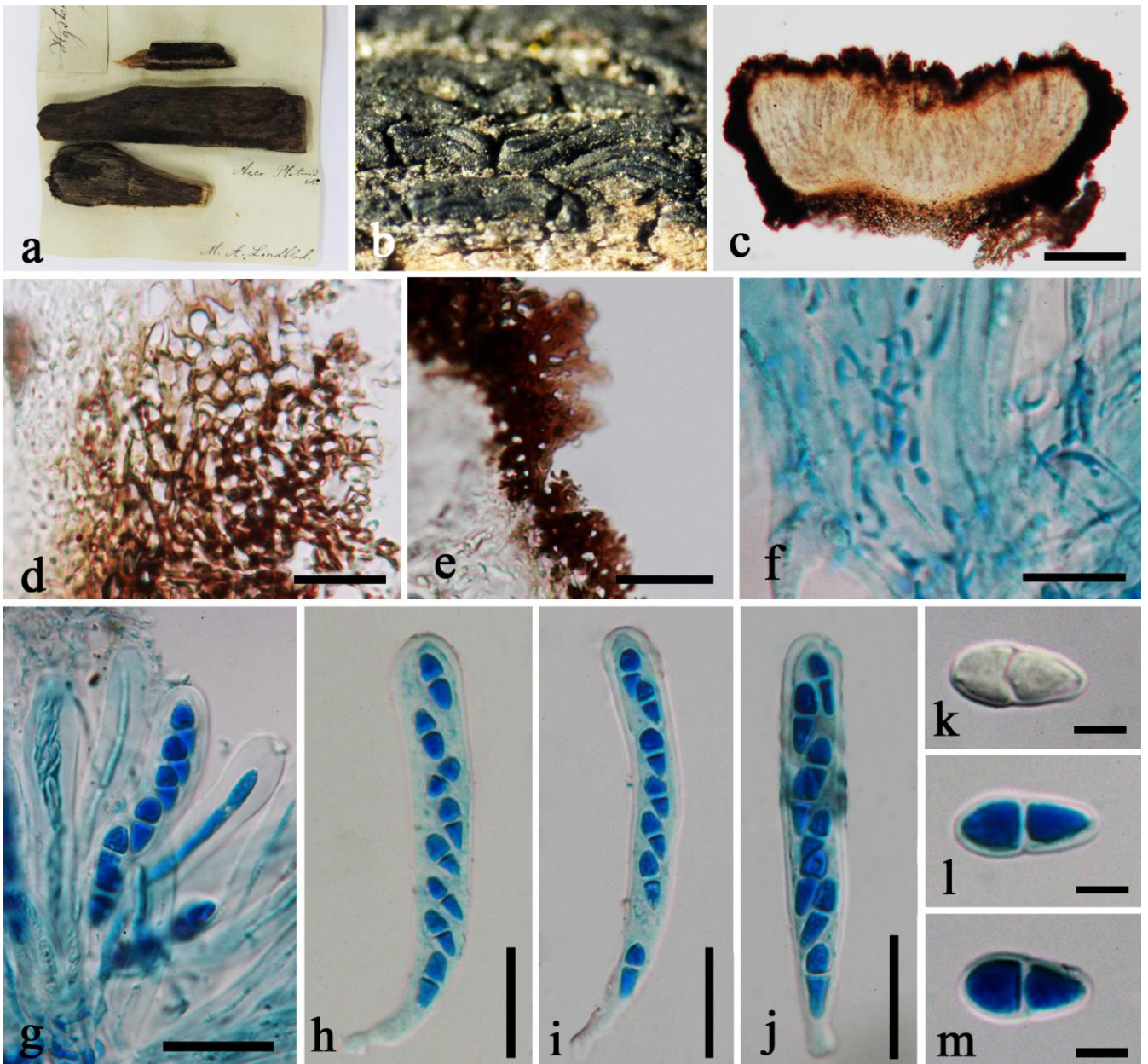


Figure 9 – *Glonium lineare* (S-F221568). a Herbarium label and specimen. b Ascomata on substrate. c Vertical section through ascoma. d, e Peridium. f Pseudoparaphyses. g Immature and mature asci. h–j Asci. k–m Ascospores. Note: f, g–j, l, m stained in lactophenol cotton blue. Scale bars: c = 100 μ m, d, e, g–j = 20 μ m, f = 10 μ m, k–m = 5 μ m.

Hysteriales Lindau, in Engler & Prantl, Nat. Pflanzenfam., Teil. I (Leipzig) 1(1): 265 (1896)

Hysteriaceae Chevall. [as '*Hysterineae*'], Fl. gén. env. Paris (Paris) 1: 432 (1826)

The family *Hysteriaceae* (*Hysteriales*) was established by Chevallier (1826). Members have a specialized ascomata termed the hysterothecium (Clements 1909). Typically, with a thick three-layered peridium, composed of small pseudoparenchymatous cells, the outer layer heavily encrusted with pigment and often longitudinally striated on the surface, the middle layer lighter in pigmentation and the inner layer distinctly thin-walled, pallid and compressed (Barr 1987b). Several authors have treated this family (Nannfeldt 1932, Gäumann 1949, Zogg 1962, von Arx & Müller 1975, Kirk et al. 2001, Eriksson 2006, Boehm 2009, Lumbsch & Huhndorf 2010). Boehm et al. (2009a, b) include the coelomycetous pycnidial states (e.g. *Aposphaeria*-like, *Hysteropycnis*) and dematiaceous hyphomycetous asexual morphs in the family (e.g. *Coniosporium*). Currently, the family *Hysteriaceae* consists of 14 genera (Wijayawardene et al. 2018).

Glioniopsis De Not., G. bot. ital. 2(7-8): 12, 23 (1847)

Saprobic on dead wood. Sexual morph: hysterothecia, carbonaceous, black, scattered, superficial, longitudinal, slit at the median, erumpent to superficial on a brown felt-like subiculum, oval or subglobose. *Peridium* charcoal-like, carbonaceous, comprising several layers of brown to dark brown. *Hamathecium* comprising hypha-like, septate pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, cylindric-clavate, with a short furcate pedicel. *Ascospores* 2-seriate, muriform, hyaline or slightly reddish in age, obovoid, slightly constricted at the transverse septa, with a gelatinous sheath. Asexual morph: Undetermined.

Type species – *Glioniopsis praelonga* (Schwein.) Underw. & Earle [as '*praelongum*']

Notes – The history of genus *Glioniopsis* was given in Boehm et al. (2009a, b). It is characterized by hyaline to yellow dictyospores, curved, in outline obovoid, ends obtuse to sub- to acuminate, multi-septate, with one or more longitudinal septa, constricted at the first-formed septum, sometimes constricted at additional septa, gelatinous sheath (dissipates with age) (Boehm et al. 2009b). De Notaris (1847) originally did not designate a type for the genus *Glioniopsis*. Therefore, Clements & Shear (1931) selected *G. decipiens* as the lectotype, following Höhnelt (1918). Zogg (1962) considered *G. decipiens* a doubtful species and proposed *G. praelonga* as the type species and designated a specimen which he regarded as a specific synonym of *G. decipiens*, due to lack of identifiable material in the original lectotype. Although the genus *Glioniopsis* shows affinities to the genus *Hysterographium*, with a specific association between *G. smilacis* and *H. mori*, and another between *G. praelonga* and *H. subrugosum*, molecular data indicated that *Glioniopsis* is polyphyletic but not as broad as *Hysterographium*, indicating perhaps that pigmentation preceded the loss of pigmentation in this group of fungi. Based on morphology and molecular phylogenetic analyses *Glioniopsis* is placed in *Hysteriaceae* (Boehm et al. 2009b, Wijayawardene et al. 2014a, Thambugala et al. 2016).

Glioniopsis praelonga (Schwein.) Underw. & Earle [as '*praelongum*'], Bull. Alabama Agricultural Experiment Station 80: 196 (1897) Fig. 10

≡ *Hysterium praelongum* Schwein., Trans. Am. phil. Soc., New Series 4(2): 244 (1832) [1834]

Index Fungorum number: IF102067; Facesoffungi number: FoF04624

Saprobic on dead wood. Sexual morph: *Ascomata* 165–240 µm high × 165–300 µm diam. (\bar{x} = 210 × 245 µm, n = 20), hysterothecia, carbonaceous, black, scattered, superficial, longitudinal slit at the center, erumpent to superficial on a brown felt-like subiculum, oval or subglobose. *Peridium* 40–80 µm thick at the sides, charcoal-like, carbonaceous, comprising several layers of brown to dark brown, pseudoparenchymatous cells. *Hamathecium* comprising 0.5–1.5 µm wide, hypha-like, septate pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 78–90 × 14–18 µm (\bar{x} = 83 × 16 µm, n = 15), 8-spored, bitunicate, cylindric-clavate, with a short furcate pedicel. *Ascospores* 16–21 × 8–11.5 µm (\bar{x} = 18.5 × 9.5 µm, n = 30), 2-seriate, muriform, hyaline or slightly reddish in age, obovoid, with 5–7 transverse septa, 1–2(–4) longitudinal septa, slightly constricted at the transverse septa, with a gelatinous sheath. Asexual morph: Undetermined.

Material examined – USA, Florida, Winter Park, 12 January 1945, C.L. Shear (S-F53411).

Hysterocarina H. Zogg, Ber. schweiz. bot. Ges. 59: 42 (1949)

Saprobic on old wood of *Eucalyptus* sp. Sexual morph: *Ascomata* hysterothecial, coriaceous, hardly erumpent, dark brown to black, longitudinal to host surface, flat or slightly convex on top, gregarious, subglobose to globose, immersed to semi-immersed, with a central ostiole. *Ostiole* brown to black, periphysate. *Peridium* composed of cells of *textura angularis*. *Hamathecium* comprising numerous, filiform, hypha-like, septate pseudoparaphyses. *Asci* 8-spored, cylindrical, bitunicate, rounded apex, short to mostly long-pedicellate, arising from the ascoma base. *Ascospores* overlapping uniseriate, ellipsoidal, dark brown, muriform, smooth-walled, with mucilaginous sheath, constricted at the septa, thick-walled. Asexual morph: Undetermined.

Type species – *Hysterocarina paulistae* H. Zogg

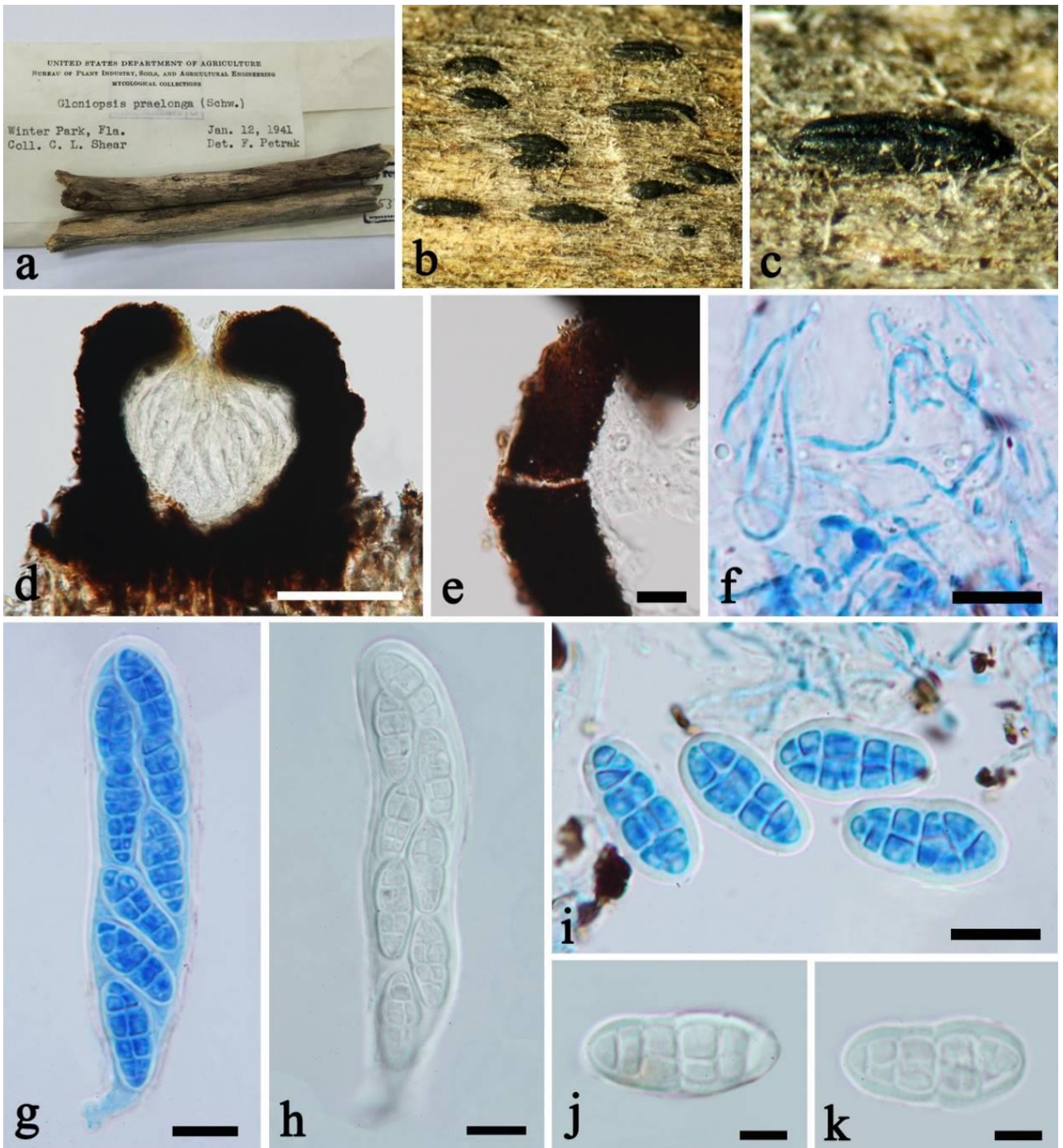


Figure 10 – *Gloniopsis praelonga* (S-F53411). a Herbarium label and specimen. b Ascomata on substrate. c Close up of ascoma on substrate. d Vertical section through ascoma. e Peridium. f Pseudoparaphyses. g–h Mature asci. i–k Ascospore. Note: f, g, i stained in lactophenol cotton blue. Scale bars: d = 100 μ m, e, i = 20 μ m, f–h = 10 μ m, j, k = 5 μ m.

Notes – Zogg (1949) introduced the genus *Hysterocarina* with *Hysterocarina paulistae* H. Zogg as the type species, which is currently the only species in this genus (Index Fungorum 2018). The type species was found on old wood of *Eucalyptus* sp. in Brazil. *Hysterocarina* was accepted in *Hysteriaceae*, *Hysteriales*, *Dothideomycetes* by Zogg (1962) and Boehm et al. (2009b) based on morphology. This placement in *Hysteriaceae* has been confirmed (Lumbsch & Huhndorf 2010, Wijayawardene et al. 2014). The description and illustration of *Hysterocarina paulistae* (ZT Myc 1492, holotype) are provided here. There is no report of an asexual morph and no sequence data are

available in NCBI database 2018 (<http://www.ncbi.nlm.nih.gov/>). Sampling of fresh specimens and molecular studies would help to confirm its placement.

Hysterocarina paulistae H. Zogg, Ber. schweiz. bot. Ges. 59: 42 (1949)

Fig. 11

Index Fungorum number: IF298858; Facesoffungi number: FoF04625

Saprobic on old wood of *Eucalyptus* sp. Sexual morph: *Ascomata* 260–340 µm high × 180–320 µm diam. (\bar{x} = 290 × 240 µm, n = 10), hysterothecial, coriaceous, dark brown to black, longitudinal to host surface, flat or slightly convex on top, gregarious, subglobose to globose, immersed to semi-immersed, with a ostiole. *Ostiole* central, brown to black, periphysate. *Peridium* 30–60 µm thick at the sides, composed of cells of *textura angularis* cells, comprising two layers, outer layer black, thick-walled, inner layer comprising 3–5 cell layers, light brown, reddish brown to hyaline, thin-walled. *Hamathecium* comprising numerous, 1.5–2.5 µm wide, filiform, hypha-like, septate, pseudoparaphyses. *Asci* 110–195 × 12–20 µm (\bar{x} = 145 × 15, n = 15), 8-spored, bitunicate, cylindrical with rounded apex, short to mostly long-pedicellate, arising from the ascoma base. *Ascospores* 19–25 × 8–11 µm (\bar{x} = 22 × 9, n = 20) without sheath, 22–28 × 10–15 µm (\bar{x} = 24 × 13, n = 20) with sheath, overlapping uniseriate, ellipsoidal, dark brown, multi-celled, smooth-walled, with 3–4 transverse and 1–3 vertical septa, constricted at the septa, thick-walled. Asexual morph: Undetermined.

Material examined – BRAZIL, Campinas, S. Paulo, Mato Dentro, on *Eucalyptus* sp. (*Myrtaceae*), 15 April 1947, H. Zogg (ZT Myc 1492, holotype).

Hysteroglonium Rehm ex Lindau, in Engler & Prantl, Nat. Pflanzenfam., Teil. I (Leipzig) 1(1): 272 (1896)

Saprobic on wood. Sexual morph: *Ascomata* hysterothecia, superficial, longitudinal to host surface, straight, flat or convex on top, black, solitary, scattered, slightly shiny, semi-immersed, becoming superficial. *Asci* 8-spored, bitunicate, subcylindrical, apically rounded. *Ascospores* ellipsoid, rounded at both sides, hyaline, guttulate, aseptate, finally becoming pseudo-triseptate. Asexual morph: Undetermined.

Type species – *Hysteroglonium ovatum* (Cooke) Lindau

Notes –The genus *Hysteroglonium* was established with *H. ovatum* as the type species. The genus comprises two species epithets (Index Fungorum 2018). Cultures and sequences are unavailable (GenBank 2018) and fresh specimens and isotypes should be designated. Cooke (1883) described *Hysterium ovatum* (type) on old oak stumps as follows: Sexual morph; *Ascomata* superficial, longitudinal, straight. *Asci* are subcylindrical. *Ascospores* 15–18 × 8 µm, sublanceolate, rounded at both sides, hyaline, guttulate, finally becoming pseudo-triseptate. We re-examined the syntype specimen K(M) 164027, but it was in poor condition. Thus, we were unable to find the hamathecium, asci or ascospores, only ascomata were present (Fig. 12). *Asci* and ascospores were redrawn in Fig. 13.

Hysteroglonium ovatum (Cooke) Lindau, in Engler & Prantl, Nat. Pflanzenfam., Teil. I (Leipzig) 1(1): 272 (1896)

Figs 12, 13

≡ *Hysterium ovatum* Cooke, Grevillea 11(no. 59): 107 (1883)

Index Fungorum number: IF431718; Facesoffungi number: FoF04626

Saprobic on wood. Sexual morph: *Ascomata* 69–157 µm high × 135–280 µm diam., (\bar{x} = 105 × 180, n = 10), hysterothecia, longitudinal to host surface, straight, flat or convex on top, black, solitary, scattered, slightly shiny, semi-immersed, becoming superficial. *Peridium* 35–65 µm thick at the sides, outer layer black, dark brown to reddish brown, inner layer hyaline, composed of *textura angularis* cells, hamathecium, asci and ascospores absent. Asexual morph: Undetermined.

Material examined – USA, South Carolina, on wood, H.W. Ravenel 2291 (ex herb. M.C. Cooke) (K(M) 164027, syntype).



Figure 11 – *Hysterocarina paulistae* (ZT Myc 1492, holotype). a Ascomata on the host surface. b Vertical section through ascoma. c Longitudinal section through ascoma. d Peridium. e, f Asci with ascospores. g–i Ascospores with sheath. Scale bars: b = 300 μm , c = 200 μm , d = 30 μm , e, f = 20 μm , g–i = 15 μm .

Ostreichnion Duby, Mém. Soc. Phys. Hist. nat. Genève 16(1): 33 (1861) [1862]

Saprobic on wood. Sexual morph: *Ascomata* hysterothecial, semi-immersed to superficial, bases attached to substrate, conchate to nearly dolabrate, black, fragile fruitbodies, not shining, rough with horizontal striation, occasionally triradiate, apex compressed along length, opening by long slit, subiculum, solitary to aggregated. *Exciple* composed of cells of *textura intricata*, charcoal-like, carbonaceous, dark brown to reddish brown. *Hamathecium* comprising numerous,

filiform, hypha-like, septate, branched and anastomosing pseudoparaphyses, in a gelatinous matrix. *Asci* 8-spored, clavate to cylindrical, bitunicate, with thickened and rounded apex, short to mostly long-pedicellate, with an ocular chamber, arising from the ascoma base. *Ascospores* uniseriate, yellowish or pale brown to dark brown, broadly cylindrical to fusiform, occasionally ellipsoidal, tapering to rounded ends, obvious septum at median, thickened and dark, slightly constricted at septum, secondary septa cutting off end cells, tertiary septa intermediate and often one or two in end cells, transverse septa, longitudinal septa, with apical plug, wall surface somewhat roughened and irregular. Asexual morph: Undetermined.

Type species – *Ostreichnion sassafras* (Schwein.) M.E. Barr

= *Ostreichnion americanum* Duby, Mém. Soc. Phys. Hist. nat. Genève 16(1): 34 (1862)

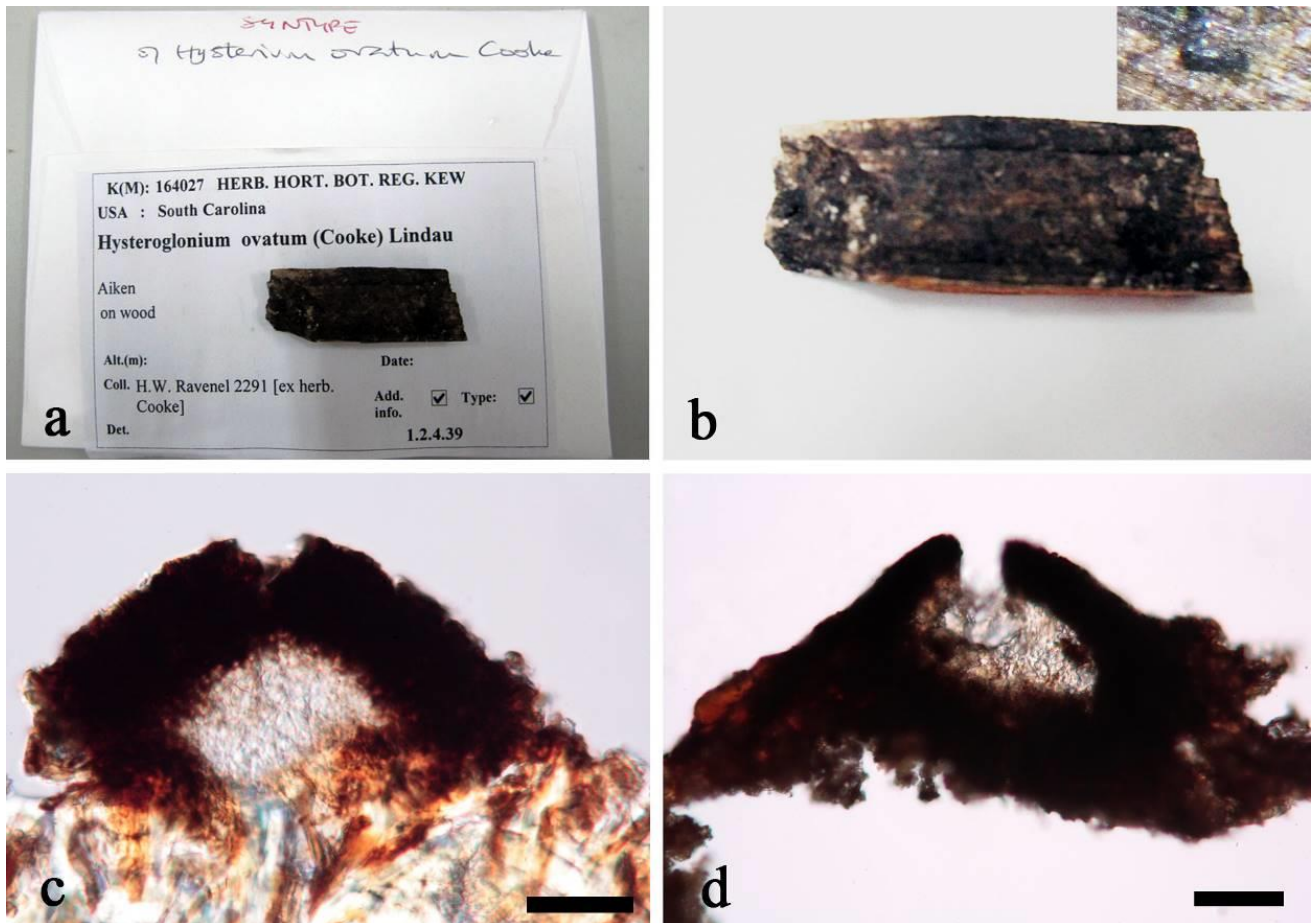


Figure 12 – *Hysteroglonium ovatum* (K(M) 164027, syntype). a Herbarium label and specimen. b Host and close up of ascoma on host. c, d Vertical sections through an ascomata. Scale bars: c, d = 50 µm.

Notes – The genus *Ostreichnion* was established by Duby (1862) for two species, *O. americanum* as type species and *O. europaeum*. *Ostreichnion* was studied by several authors (Saccardo 1883, Rehm 1886, Clements & Shear 1931, Zogg 1962), and reappraised by Barr (1975). *Ostreichnion americanum* was later consigned to the earlier name *O. sassafras* (Barr 1975). Boehm et al. (2009b) transferred the genus *Ostreichnion* from *Mytiliniaceae* (Barr 1975) to *Hysteriaceae* based on sequence data derived from *O. curtisii* (CBS 198.34) and *O. sassafras* (CBS 322.34), which were deposited by Lohman in 1934. Barr (1975) and Boehm et al. (2009b) included *O. curtisii* in the genus and provided a key to the species. Based on combined analysis of SSU, LSU, TEF1 and RPB2 by Boehm et al. (2009a, b) *Ostreichnion curtisii* was placed quite distant from *O. sassafras* and shared a subclade with *Hysterium*. Ascospores of *O. curtisii* differ from *O. sassafras* and *O. nova-caesariense* by having 1 septum below the middle while the other two species are

dictyospores (Barr 1975). We speculate that *Ostreichnion curtisii* is likely to be the species in *Hysterium* that was earlier named as *Hysterium curtisii* by Duby (1862). Jayasiri et al. (2018) proposed *Hysterium curtisii* as current name for *Ostreichnion curtisii*. Fresh samples, epitypification and molecular studies are required to re-evaluate the classification of *Ostreichnion* species.

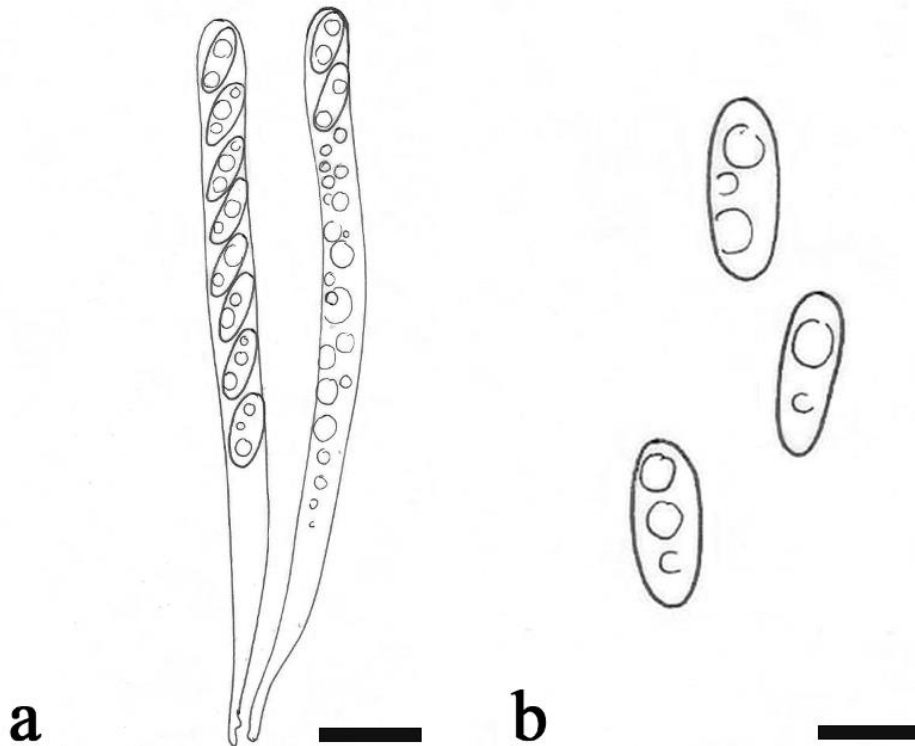


Figure 13 – *Hysteroglonium ovatum* (redrawn from picture in herbarium package (K(M) 164027, syntype). a Asci with ascospores. b Ascospores. Scale bars: a = 20 μ m, b = 10 μ m.

Ostreichnion sassafras (Schwein.) M.E. Barr, Mycotaxon 3(1): 83 (1975) Fig. 14
 \equiv *Lophium sassafras* Schwein., Trans. Am. phil. Soc., New Series 4(2): 240 (1832) [1834]
 \equiv *Mytilinidion sassafras* (Schwein.) H. Zogg [as '*Mytilidion*'], Beitr. Kryptfl. Schweiz 11(no. 3): 117 (1962)
 = *Ostreichnion americanum* Duby, Mém. Soc. Phys. Hist. nat. Genève 16(1): 34 (1861) [1862]

= *Ostreion americanum* (Duby) Sacc., Syll. fung. (Abellini) 2: 765 (1883)

Index Fungorum number: IF319047; Facesoffungi number: FoF04627

Saprobic on wood. Sexual morph: *Ascomata* 690–970 μ m high \times 835–1140 μ m diam., hysterothecial, semi-immersed to superficial, bases attached to substrate, conchate to nearly dolabrate, black, not shining, rough with striation, horizontally striate, occasionally triradiate, apex compressed along length, opening by long slit, subiculum, solitary to aggregated. *Exciple* 210–330 μ m thick at the sides, composed of *textura intricata* cells, charcoal-like, carbonaceous, dark brown to reddish brown. *Hamathecium* comprising 1.5–2.5 μ m wide, filiform, hypha-like, septate, numerous, branched and anastomosing pseudoparaphyses, in a gelatinous matrix. *Asci* 300–360 \times 37–50 μ m (\bar{x} = 325 \times 44, n = 20), 8-spored, bitunicate, clavate to cylindrical, with thickened and

rounded apex, short to mostly long-pedicellate, with an ocular chamber, arising from the ascoma base. *Ascospores* 92–175 × 28–50 μm (\bar{x} = 120 × 36, n = 30), uniseriate, yellowish or pale brown to dark brown, broadly cylindrical to fusiform, occasionally ellipsoidal, tapering to rounded ends, obvious median septum, thickened and dark, slightly constricted at septum, secondary septa cutting off end cells, tertiary septa intermediate and often one or two in end cells, 1–7 and up to 27 transverse septa, 1–5 longitudinal septa, with apical plug, wall surface somewhat roughened and irregular. Asexual morph: Undetermined.

Material examined – USA, Florida, Ocala, 1897-1898, R. Thaxter, Reliquiae Farlowianae (NY 626).

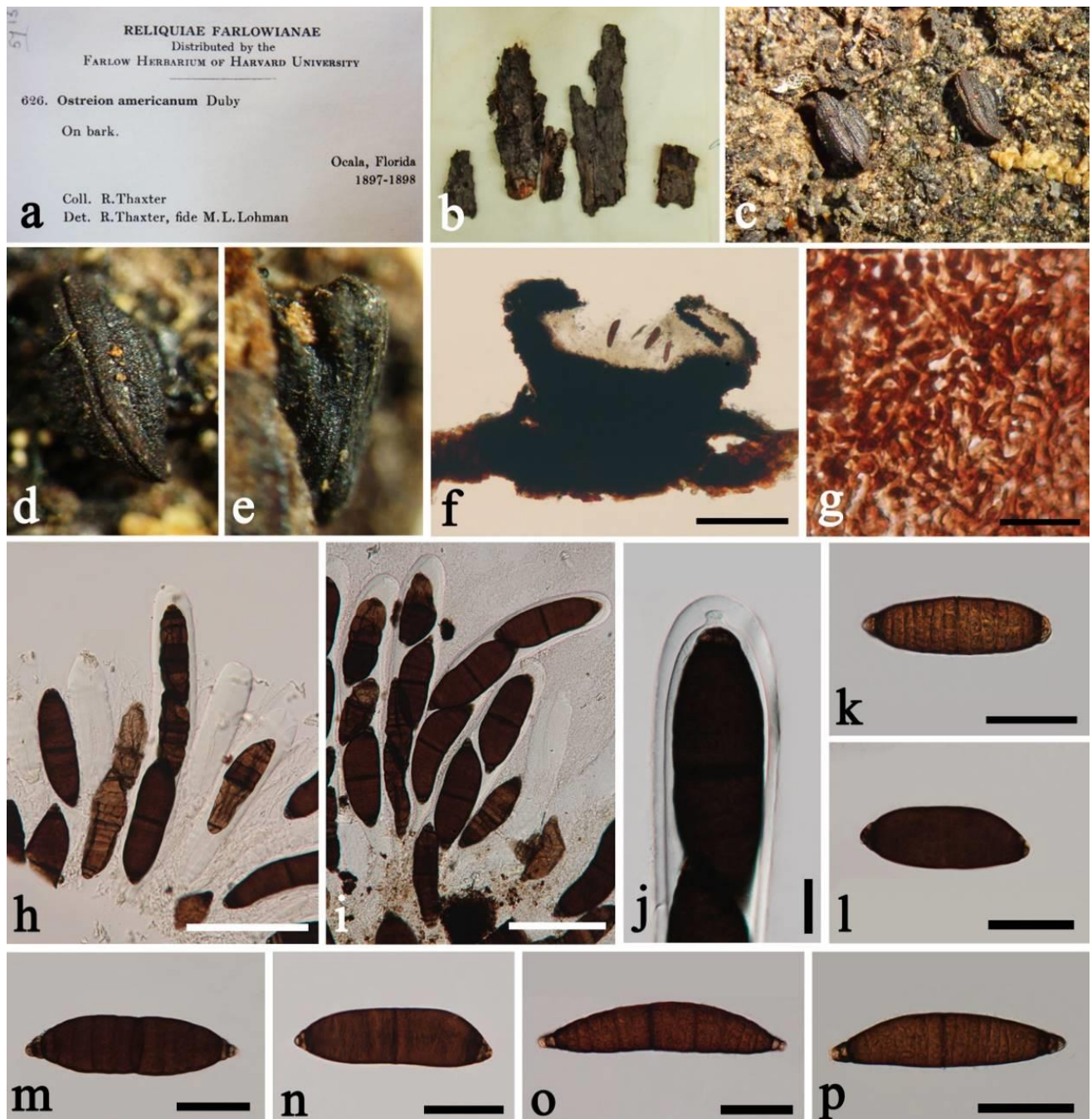


Figure 14 – *Ostreichnion sassafras* (NY 626). a Details of herbarium material. b Host substrate. c Ascomata on host (top view). d Close up of ascoma on host (top view). e Close up of ascoma on host (side view). f Vertical section through an ascoma. g Peridium. h, i Asci. j Ascus with an ocular chamber. k–p Ascospores. Scale bars: f = 300 μm, g = 20 μm, h, i = 100 μm, j = 20 μm, k–p = 50 μm.

Myriangiales, genus incertae sedis

Dictyonella Höhn. [as 'Dyctionella'], Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 369 [95 repr.] (1909)

Epiphytic or *saprobic* on leaves. Sexual morph: *Ascostromata* superficial, brown to black, rough, scattered, solitary on lower surface of leaf, hemispherical, pulvinate, surrounded by brown mycelial network forming plectenchymatous tissue, subiculum, multi-loculate each with single ascus and without obvious separating wall layer. *Asci* 8-spored, bitunicate, globose to subglobose, short pedicellate, apically rounded, with indistinct ocular chamber. *Ascospores* crowded, muriform, ellipsoid to oblong, hyaline when immature, becoming brown at maturity, obtuse at both ends, slightly constricted at middle septum, smooth-walled. Asexual morph: Undetermined.

Type species – *Dictyonella erysiphoides* (Rehm) Höhn.

Notes – *Dictyonella* was established by Höhn (1909a). The genus consists of seven species epithets (Index Fungorum 2018), with *Dictyonella erysiphoides* as the type species. *Dictyonella* has been subjected to few studies and there is no recent account. In this study we exclude *Dictyonella* from *Saccardiaceae* and place it in *Myriangiales*, genus *incertae sedis* based on morphology in which *ascostromata* are pulvinate, *asci* are irregularly arranged in one or more layers in locules and have minute pedicels and indistinct ocular chambers. Representative species, particularly the type species, need to be recollected for molecular study to clarify its natural classification.

Dictyonella erysiphoides (Rehm) Höhn. [as 'erisyphoides'], Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 369 [95 repr.] (1909) Fig. 15

≡ *Cookella erysiphoides* Rehm, Hedwigia 40: 169 (1901)

Index Fungorum number: IF163806; Facesoffungi number: FoF04628

Epiphytic on lower surface of leaves. Sexual morph: *Ascostromata* 60–145 µm high × 185–305 µm diam. (\bar{x} = 105 × 240 µm, n = 15), superficial, black, rough, sub-carbonaceous, scattered, solitary on lower surface of leaf, hemispherical, pulvinate, surrounded by brown mycelial network forming plectenchymatous tissue, subiculum, ostiole not seen. *Hamathecium* lacking paraphyses. *Asci* 35–60 × 25–45 µm (\bar{x} = 52 × 35 µm, n = 15), 8-spored, bitunicate, globose to subglobose, short pedicellate or apedicellate, apically rounded with indistinct ocular chamber. *Ascospores* 22–30 × 8–12 µm (\bar{x} = 25 × 10 µm, n = 20), crowded, muriform, ellipsoid to oblong, hyaline when immature, becoming brown at maturity, obtuse at both ends, with 3–5 transverse septa and 4–7 longitudinal septa, slightly constricted at middle septum, smooth-walled. Asexual morph: Undetermined.

Material examined – BRAZIL, Rio de Janeiro, Tijuca, on *Coccoloba* sp. (*Polygonaceae*), November 1897, E. Ule (S-F12211, holotype).

Mytilinidiales E. Boehm, C.L. Schoch & Spatafora, Mycol. Res. 113(4): 468 (2009)

Mytilinidiaceae Kirschst. [as 'Mytilidiaceae'], Verh. bot. Ver. Prov. Brandenb. 66: 28 (1924)

Possible synonyms:

Lophiaceae H. Zogg ex Arx & E. Müll., Stud. Mycol. 9:60. 1975.

Mytilinidiaceae consists of ten genera (Wijayawardene et al. 2018). They are characterized by persistent, fragile, carbonaceous ascomata, which range from globoid to obovoid to strongly laterally compressed, erect oyster- or bivalve shell-shaped (conchate), or hatchet-shaped (dolabrate) structures, in some species forming a longitudinal keel or cristate apex (Barr 1990). Mytilinidiaceous fungi possess a thin-walled, prosenchymatous peridium enclosing a hamathecium of narrow trabeculate pseudoparaphyses, borne in a gel matrix, which are often sparse to lacking at maturity (Barr 1987b, 1990, Zogg 1962). Bitunicate *asci* are borne in a basal, rarely lateral orientation within the centrum, and contain eight, rarely four, *ascospores*, overlapping 1–2-seriate, or in 1 or 2 fascicles. *Ascospores* are diverse in the *Mytilinidiaceae* and range from scolecospores to didymospores, phragmospores or dictyospores, hyaline, soon turning yellow to dark brown, and generally showing bipolar symmetry in outline (Barr 1990). The history of *Mytilinidiaceae* was discussed in Boehm et al. (2009a, b) and Hyde et al. (2013).

Actidium Fr., *Observ. mycol. (Havniae)* 1: 190 (1815)

Saprobic on dead wood. Sexual morph: *Ascomata* hysterothecia, carbonaceous, 2–4-projections, not star-shaped to star-shaped or stellate, black, superficial, solitary or gregarious, thick-walled, distinctly navicular in outline, bearing a pronounced longitudinal slit, ellipsoid to greatly elongated. *Peridium* charcoal-like, carbonaceous, black, composed of small pseudoparenchymatous cells. *Asci* 8-spored, bitunicate, overlapping 1–2-seriate. *Ascospores* 1-septate, small, thin-walled, smooth or delicately longitudinally striate, rounded at the apex. Asexual morph: Undetermined.

Type species – *Actidium hysteroioides* Fr.

Notes – *Actidium* was introduced by Fries (1815) to accommodate *A. hysteroioides* as the type species on decorticated wood of *Pinus*. The genus has 15 species epithets, but 13 species are listed under genus *Actidium* (Index Fungorum 2018). There are no sequence data of any *Actidium* species in NCBI database (2018). Re-collection, isolation and sequencing are required to define the phylogenetic placement, especially of the type species which has not been sequenced yet. The asexual morph has not been reported. We re-examined a specimen from S (F203614). However, although ascomata were present on the host surface, asci and ascospores could not be found (Fig. 16). Appearance of ascomata on host surface, asci and ascospores were redrawn in Fig. 17.

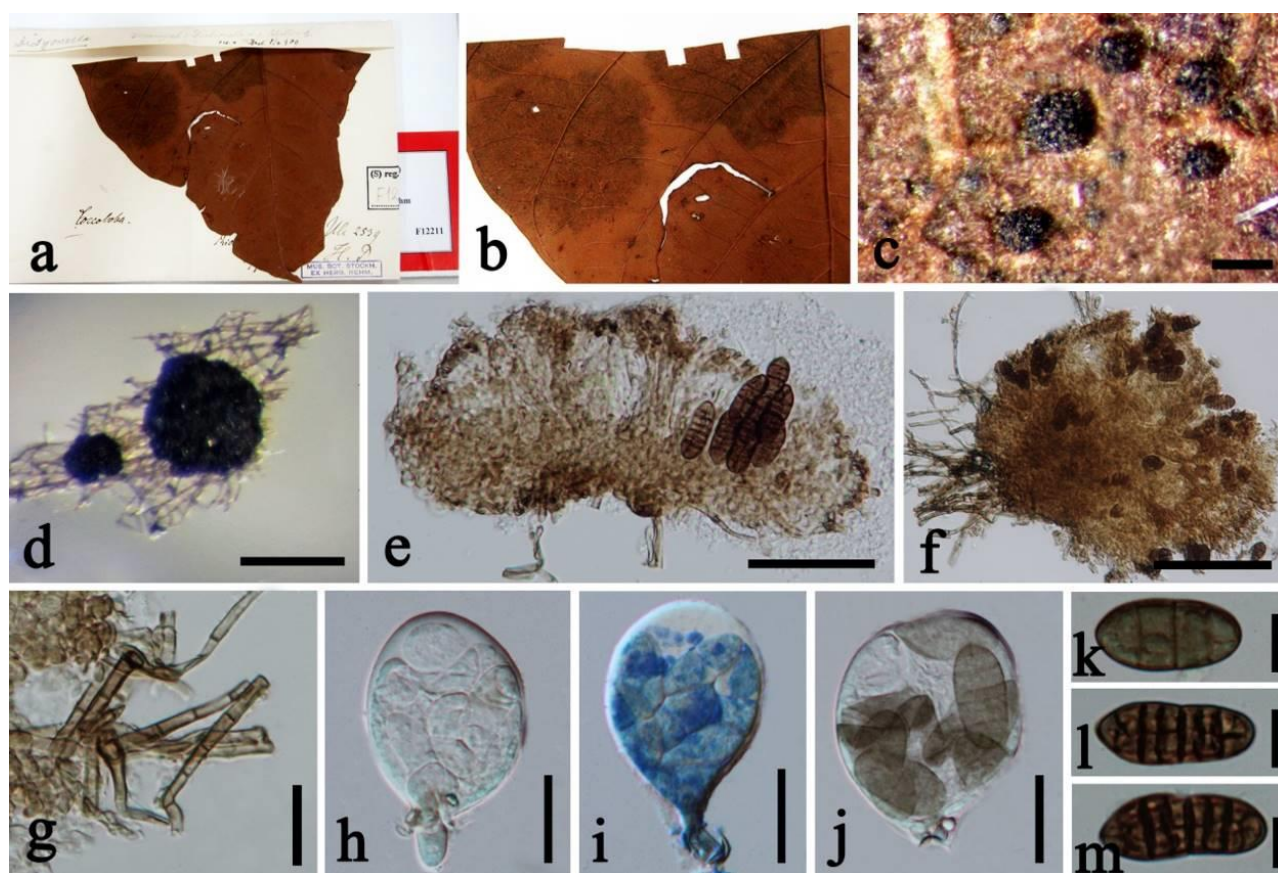


Figure 15 – *Dictyonella erysiphoides* (S-F12211, holotype). a Herbarium label and specimen. b Ascomata on host. c Close up of ascomata. d Ascomata with basal hypha. e Vertical section through ascoma. f Ascoma with hyphae. g Hyphae. h–j Asci with ascospores. Note: i stained in lactophenol cotton blue. k–m Ascospores. Scale bars: c, f = 100 μ m, d = 200 μ m, e = 50 μ m, g–m = 20 μ m.

Actidium hysteroioides Fr., *Observ. mycol. (Havniae)* 2: 353 (1818)

Figs 16, 17

Index Fungorum number: IF203642; Facesoffungi number: FoF04629

Saprobic on dead *Picea excelsa*. Sexual morph: *Ascomata* hysterothecia, carbonaceous, 2–4-projections to star-shaped or stellate, black, superficial, solitary, or gregarious, thick-walled,

distinctly navicular in outline, bearing a pronounced longitudinal slit, ellipsoid to greatly elongated. *Peridium* charcoal-like, carbonaceous, black. *Hamathecium* not observed. *Asci* 40–50(–55) × 5 μm (Zogg 1960), 8-spored, bitunicate, numerous, cylindrical, with apex rounded, overlapping 1–2-seriate. *Ascospores* are 11–14 × (1.5–)2–3 μm (Zogg 1960), 1-septate, small, light olive to reddish brown, thin-walled, smooth or delicately longitudinally striate, rounded at the apex. Asexual morph: Undetermined.

Material examined – SWEDEN, Stockholm, Södermanland, Suecia, Holmia, on *Picea excels* (L.) H. Karst. (*Pinaceae*), October 1908, J. Vleugel (S-F203614).

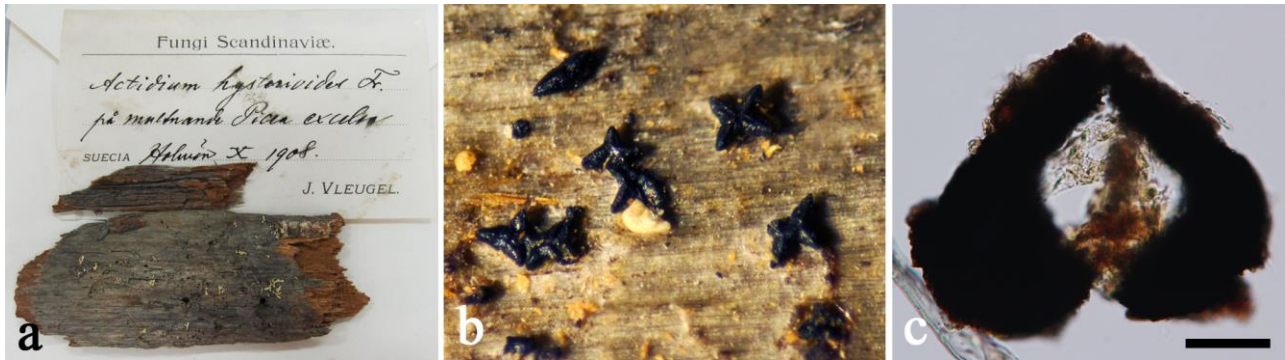


Figure 16 – *Actidium hysterioides* (S-F203614). a Herbarium label and specimen. b Ascomata on substrate. c Vertical section through ascoma with dry tissue in ascoma. Scale bars: c = 50 μm.

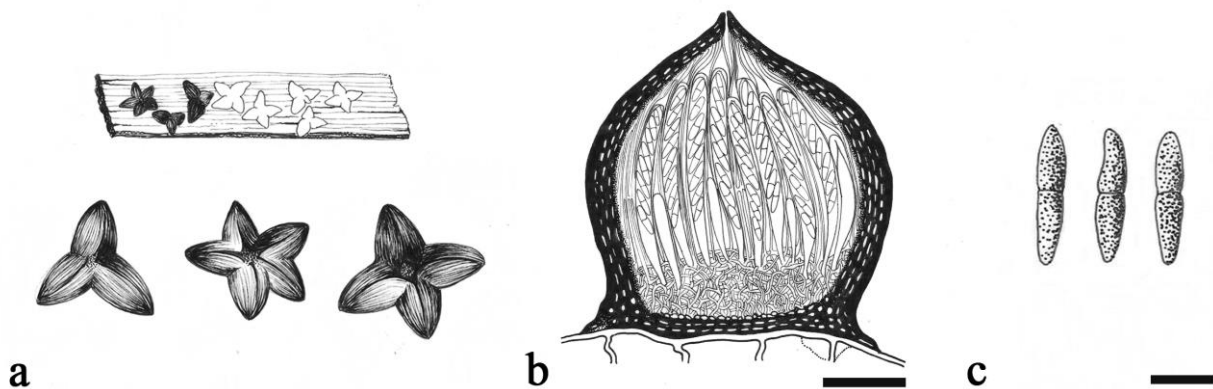


Figure 17 – *Actidium hysterioides*. a Appearance of ascomata on surface (a: redrawn from drawings of Wm. Phillips. Recd. 1906, which is the information in package of K specimen). b Ascoma with asci and ascospores. c Ascospores. (b, c: redrawn from Zogg 1960, Page 198, Fig. 2; and Page 202, Fig. 7(1), respectively). Scale bars: b = 20 μm, c = 5 μm.

Quasiconcha M.E. Barr & M. Blackw., *Mycologia* 72(6): 1224 (1981) [1980]

Saprobic on undigested seeds excreted in dung. Sexual morph: *Ascomata* superficial, carbonaceous, shiny, rough-walled, brittle, thin, bivalve shell-shaped, standing upright, elongated opening at apex, dark to reddish brown. *Pseudoparaphyses* not seen. *Asci* 8-spored, overlapping bitunicate, cylindrical and thin-walled at maturity with pedicel. *Ascospores* symmetric, septate, slightly constricted at the septum, broadly ellipsoid, with coarsely reticulate wall. Asexual morph: *Chalara*-like.

Type species – *Quasiconcha reticulata* M.E. Barr & M. Blackw.

Notes – The genus *Quasiconcha* was established by Barr & Blackwell (1980) and typified by *Q. reticulata*, and placed in *Lophiaceae* of the *Melanommatales* (Barr 1979) based on ascomata shape, thin peridium of parallel rows of cells and being saprobic on coniferous substrate. Blackwell

& Gilbertson (1985) revealed the asexual morph of *Q. reticulata* with chlamydospore and phialides forming conidia; the specimen being isolated from Arizona, USA fruiting on underground root of a dead Aleppo pine (*Pinus halapensis* Mill.) infected with the pine wood nematode and on root of a dead arbor vita (*Thuja occidentalis* L.). Boehm et al. (2009b) extracted DNA from the type, and multi genes analysis (LSU, SSU, TEF1 and RPB2) placed *Quasiconcha* in *Mytilinidiaceae*. Phylogenetic analyses show that *Quasiconcha* is closely related to *Lophium* which its fruit bodies closely resemble. However, *Lophium mytilinum*, produces filiform ascospores, while *Quasiconcha reticulata* produces reticulated didymospores.

Quasiconcha reticulata Barr & Blackwell, Mycologia 72: 1224 (1980).

Fig. 18

Index Fungorum number: IF112608; Facesoffungi number: FoF04630

Saprobic on undigested seeds of *Juniperus virginia* excreted in dung of *Bassariscus astatus* (Lichtenstein). Sexual morph: *Ascomata* superficial, carbonaceous, shiny, rough-walled, brittle, thin, bivalve shell-shaped, standing upright, elongated opening at apex, dark to reddish brown, up to 520 μm to 1 mm diameter, and 390–570 μm high (\bar{x} = 760 \times 530 μm , n = 5). *Pseudoparaphyses* not seen. *Asci* 41–47 μm \times 4.1–5.3 μm . diam. (\bar{x} = 44 \times 4.8 μm , n = 5), 8-spored, overlapping bitunicate, cylindrical and thin-walled at maturity with pedicel. *Ascospores* 5.6–7 \times 3.8–4.7 μm (\bar{x} = 6.2 \times 4.2 μm , n = 20), brown, symmetric, 1-septate, slightly constricted at the septum, broadly ellipsoid, with coarsely reticulate wall. Asexual morph: *Chalara*-like

Material examined – USA, Texas, Austin, on undigested seeds of *Juniperus virginia* excreted in dung of *Bassariscus astatus* (Lichtenstein), Meredith Blackwell, 10 February 1967, Barr & Blackwell (holotype).

Pleosporales Luttrell ex M.E. Barr, Prodr. Cl. Loculoasc. (Amherst): 67 (1987)

Astrosphaeriellaceae Phook. & K.D. Hyde, in Phookamsak et al., Fungal Diversity: 10.1007/s13225-015-0352-7, [19] (2015)

This family was introduced in Phookamsak et al. (2015) and is typified by *Astrosphaeriella* Syd. & P. Syd. with *A. fusispora* Syd. & P. Syd. as the type species. The family is characterized by large, conical, carbonaceous ascostromata, bitunicate asci with narrowly cellular pseudoparaphyses and fusiform or obclavate, septate ascospores (Liu et al. 2011, Phookamsak et al. 2015). Recently, two genera *Astrosphaeriella* and *Pteridiospora* were accommodated in this family (Phookamsak et al. 2015, Hyde et al. 2018, Wanasinghe et al. 2018, Wijayawardene et al. 2018).

Mycopepon Boise, Syst. Ascom. 6(1): 168 (1987)

Index Fungorum number: IF25196; Facesoffungi number: FoF04631

Saprobic on decorticated wood. Sexual morph: *Ascostromata* solitary to gregarious, superficial, visible as black, carbonaceous, pumpkin-like in shape on the host surface, 3–5 locules, short stalked, an eccentric papillate with central ostiole. *Locules* globose to subglobose, sharing one ostiole. *Peridium* thick-walled, brittle, compose of several heavily pigmented, carbonaceous, scleroparenchymatous cells, arranged in a *textura angularis* to *textura globulosa*. *Hamathecium* comprising numerous, anastomosing, narrow trabeculate pseudoparaphyses, embedded in mucilaginous matrix. *Asci* 8-spored, bitunicate, clavate to cylindric-clavate, short-pedicellate, apically rounded, with ocular chamber. *Ascospores* overlapping, 1–3-seriate, brown to dark brown or reddish brown, paler at the end cells, fusiform, initially aseptate, becoming 3-septate at maturity. Asexual morph: Undetermined.

Type species – *Mycopepon guianensis* Boise

Notes – Boise (1994) re-examined a specimen of *Pseudovalsa smithii* Ellis & Everh. (Smith 1893) and found that *Mycopepon guianensis* is conspecific with *P. smithii*. Therefore, Boise (1994) proposed a new combination of *P. smithii* under *Mycopepon smithii* and synonymized *M. guianensis* under *M. smithii*. *Mycopepon* was introduced as a monotypic genus by Boise (1987) to accommodate the type species *M. guianensis*, which was collected from decorticated wood in France. *Mycopepon* has an unusual character in forming a pumpkin-like, carbonaceous

ascostromata with eccentric papilla, bitunicate asci with large, dark brown, septate ascospores, which is distinct from other ascomycetous taxa (Boise 1987). Boise (1987) accommodated the genus in *Pleosporales* and this was concurred by San Martín (1996). Kirk et al. (2008) listed the genus in *Melanommataceae*. Based on its unique morphological characters and phylogenetic analyses obtained from the strain of a putative species, *M. smithii*, the genus was recently accommodated in the *Pleosporales* genera *incertae sedis* (Bhattacharya et al. 2000, Pinnoi et al. 2007, Wang et al. 2007). Lumbsch & Huhndorf (2007, 2010) and Wijayawardene et al. (2014, 2017) listed the genus in *Dothideomycetes* genera *incertae sedis*. Only four epithets are listed in Index Fungorum (2018).

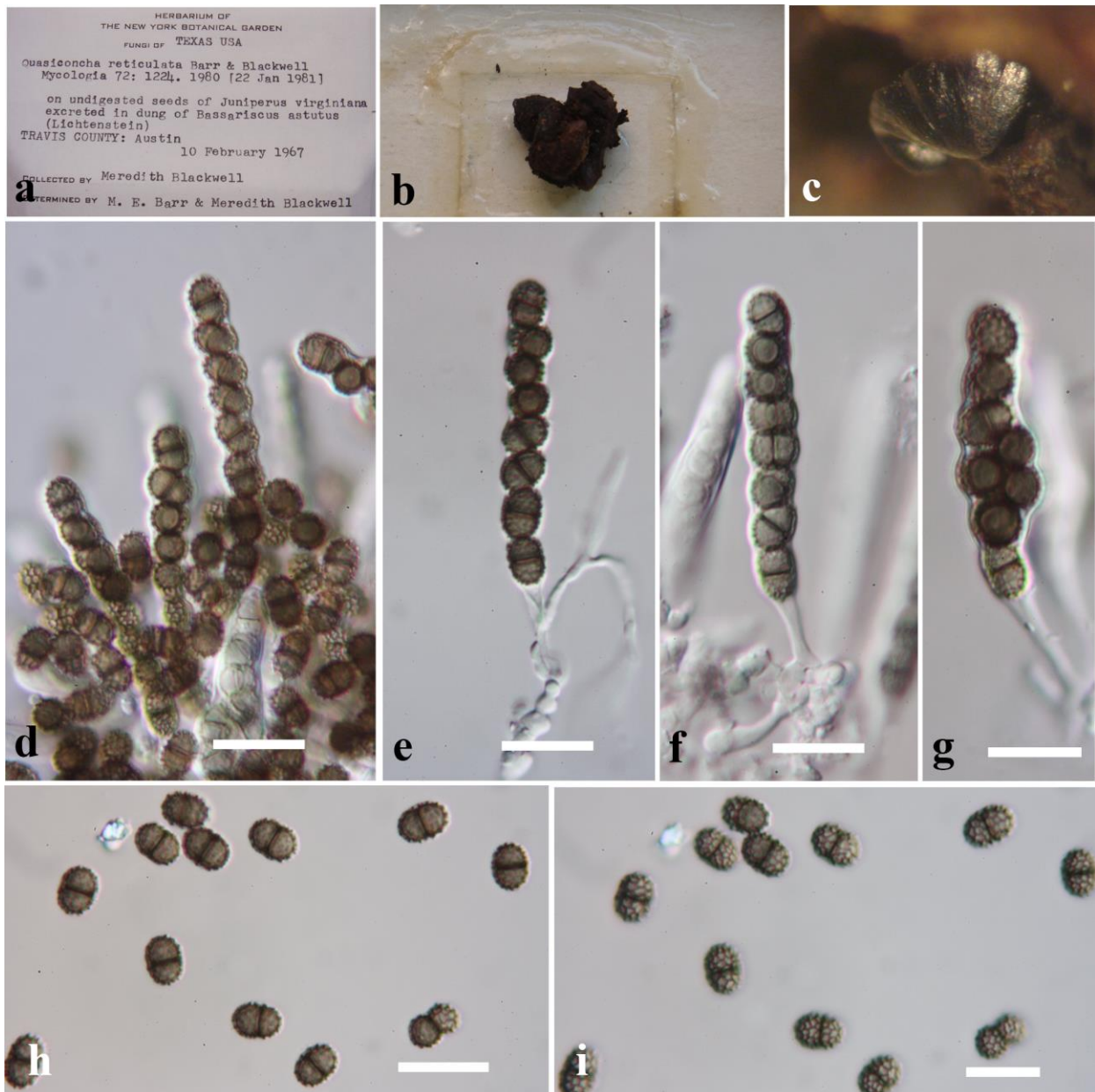


Figure 18 – *Quasiconcha reticulata* (holotype). a, b Herbarium label and specimen. c Appearance of mytilinoid ascoma on host surface. d–g Asci with ascospores. h–i Two-celled, brown, symmetric ascospores with coarsely reticulate wall. Scale bars: d–g = 10 μ m, h, i = 5 μ m.

In this study, the type specimen of *Mycopezon guianensis* was examined and illustrated and appears to be typical of *Astrosphaeriellaceae*. The asci and ascospores have the appearance of *Astrosphaeriella* species (Phookamsak et al. 2015). Although they are not important in defining

orders (Liew et al. 2000), the trabeculate pseudoparaphyses are also typical of *Astrosphaeriellaceae* and provide evidence for inclusion in this family. Phylogenetic analyses of a combined LSU, SSU and TEF1 (data not shown) show that a representative strain, *M. smithii* (= *M. guianensis*) clustered within *Astrosphaeriellaceae*. Hence, we place the genus in the family *Astrosphaeriellaceae* until the generic type is epitypified and its phylogenetic affinity in the family is confirmed.

Mycopepon guianensis Boise, Syst. Ascom. 6(1): 168 (1987)

Fig. 19

Index Fungorum number: IF132140; Facesoffungi number: FoF04632

Current name: *Mycopepon smithii* (Ellis & Everh.) Boise, Mycotaxon 52(1): 303 (1994)

Saprobic on decorticated wood. Sexual morph: *Ascstromata* 800–970 µm high, 900–1100 µm diam., solitary to gregarious, superficial, visible as black, carbonaceous, pumpkin-like in shape on the host surface, 3–5 locules, short-stalked, an eccentric papilla with central ostiole. *Locules* 360–660 µm high, 300–480 µm diam., globose to subglobose, sharing one ostiole. *Peridium* 45–70 µm wide, thick-walled, brittle, composed of several heavily pigmented, carbonaceous, scleroparenchymatous cells, arranged in a *textura angularis* to *textura globulosa*. *Hamathecium* comprising numerous, 0.8–2.7 µm wide, anastomosing, narrow trabeculate pseudoparaphyses, embedded in mucilaginous matrix. *Asci* 205–240 × 28–38 µm (\bar{x} = 225.5 × 32.4, n = 20), 8-spored, bitunicate, fissitunicate, clavate to cylindric-clavate, short-pedicellate, apically rounded with ocular chamber. *Ascospores* 58–75 × 13–17 µm (\bar{x} = 65.6 × 14.5, n = 30), overlapping, 1–3-seriate, fusiform, brown to dark brown or reddish brown, paler at the end cells, initially aseptate, becoming 3-septate at maturity, constricted at the central septum, slightly curved, rough-walled with small guttules when young, smooth-walled at maturity. Asexual morph: Undetermined.

Material examined: – FRANCE, French Guiana, ca. 15 km SW of Saül, towards Mt. Galbao, 600–650 m., on decorticated wood, 18 January 1986, G.J. Samuels & J. Boise 2991, (FH 00290591, *Mycopepon guianensis*, holotype).

Dacampiaceae Körb. [as '*Dacampieae*'], Syst. lich. germ. (Breslau): 322 (1855)

The species in *Dacampiaceae* are lichenicolous, lichenized and saprobes (Hawksworth & Diederich 1988, Lutzoni et al. 2004, Zhang et al. 2009b, Halici 2010, Hyde et al. 2013). Their characters are blackish, perithecioid ascomata, pseudoparenchymatous exciple, branched anastomosing pseudoparaphyses, bitunicate asci, and septate to muriform, usually brown ascospores (Hyde et al. 2013). *Dacampiaceae* was formerly placed in *Dothideales* (Eriksson & Hawksworth 1986). Phylogenetic insights have resolved the *Dacampiaceae* in *Pleosporales* (Ertz et al. 2015a). Hyde et al. (2013) illustrated the type genus *Dacampia* and provided a key to genera of *Dacampiaceae*. The family *Dacampiaceae* comprises six genera (Wijayawardene et al. 2018).

Eopyrenula R.C. Harris, Michigan Bot. 12(1): 19 (1973)

Facultatively lichenized, inhabiting bark. Sexual morph: *Ascomata* perithecioid, semi-immersed to superficial, visible as dark spot, solitary, scattered, globose to subglobose, dark brown to black, ostiole central, with pore-like opening. *Peridium* thick-walled, comprising several layers of small, dark brown cells, arranged in a *textura epidermoidea*. *Hamathecium* composed of dense, narrowly cellular pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, cylindrical to cylindric-clavate, short-pedicellate, apically rounded, with well-developed ocular chamber. *Ascospores* overlapping 1–2-seriate, phragmosporous, brown to dark brown, paler at the end cells, ellipsoidal to fusiform, septate, constricted at the septa, mostly larger in the middle cells, smooth to rough-walled, with minute guttules. Asexual morph: Reported as coelomycetes, pycnidial, frequently accompanied by colourless, curved, filiform, simple microconidia and brown, 1- or more septate macroconidia (Harris 1973, Hyde et al. 2013).

Type species – *Eopyrenula leucoplaca* (Wallr.) R.C. Harris

Notes – *Eopyrenula* was introduced by Harris (1973) with *E. leucoplaca* as the type species. The genus has six species epithets (Index Fungorum 2018). Taxonomic classification of *Eopyrenula* has been changed by subsequent authors (Harris 1975, 1995, Barr 1976, 1979, 1983, Aptroot 1998,

2012, Hyde et al. 2013, Jaklitsch et al. 2016, Lücking et al. 2016). The genus was treated in *Pyrenulaceae* (*Eurotiomycetes*) by Harris (1975), Aptroot (2012) and Jaklitsch et al. (2016). Subsequently, *Eopyrenula* was accepted in *Dacampiaceae* (Lumbsch & Huhndorf 2010, Hyde et al. 2013, Wijayawardene et al. 2014, Ertz et al. 2015a). Recently, *Eopyrenula* was listed in *Pezizomycotina* genera *incertae sedis* by Lücking et al. (2016) and Wijayawardene et al. (2018), as most genera in *Dacampiaceae* are lichenicolous fungi. However, we accept *Eopyrenula* in *Dacampiaceae* on the basis of their morphology defined by uni-locular, perithecioid ascomata, branched and anastomosing pseudoparaphyses, elongate-clavate to short-cylindrical asci with short-pedicellate, 1–2-seriate, phragmosporous, brown to dark brown, fusiform ascospores. Moreover, *Eopyrenula* is morphologically similar to the type genus (*Dacampia*) of *Dacampiaceae* as presented in Hyde et al. (2013) but ascospores of *Eopyrenula* are phragmospores while *Dacampia* are muriform (but transverse septa may be missing when immature). No molecular data are available for *Eopyrenula*. Thus, we illustrate a representative specimen of *E. leucoplaca*. Cultures and fresh collections along with molecular data are required to confirm placement of the genus.

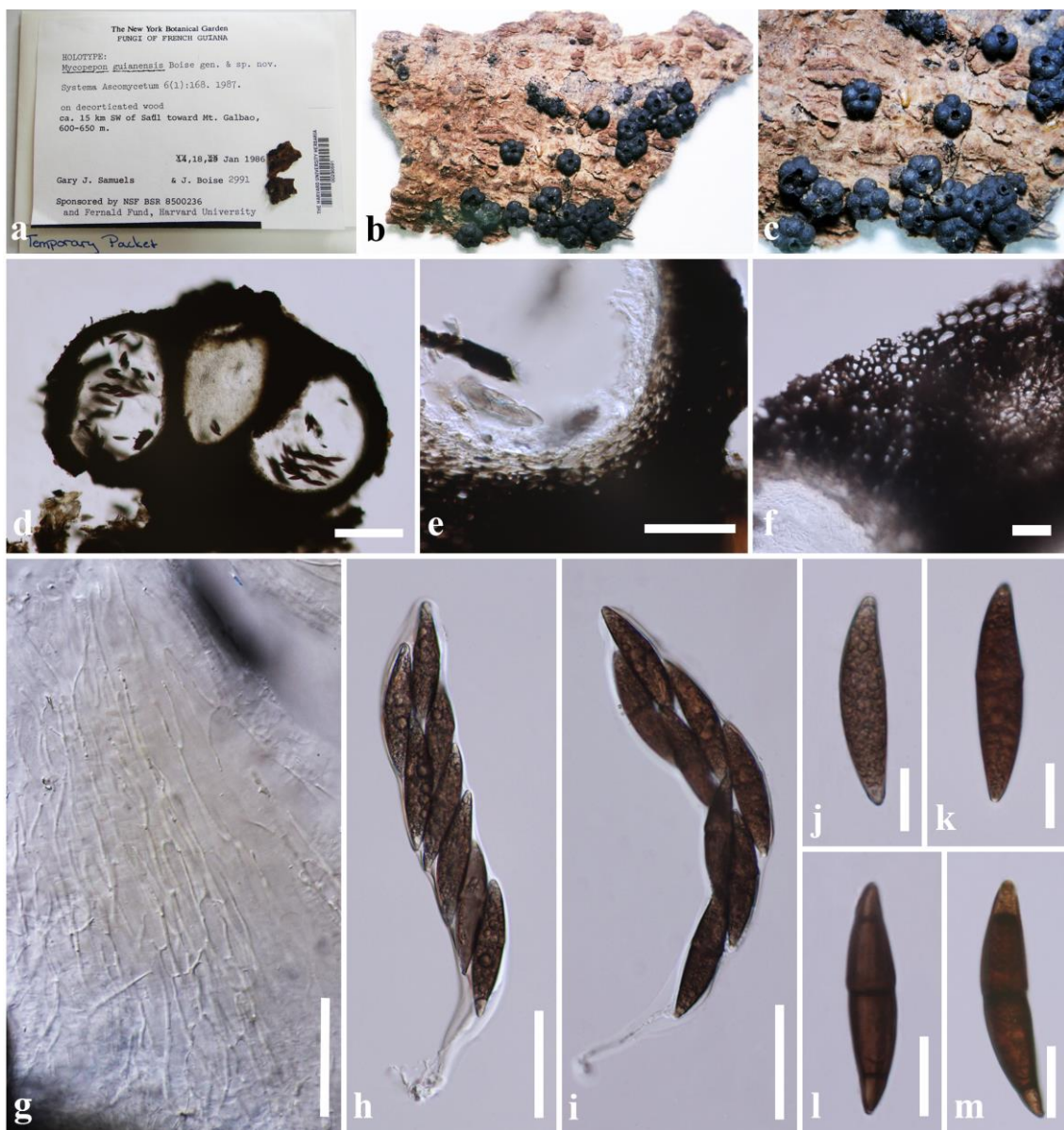


Figure 19 – *Mycopepon guianensis* (FH 00290591, holotype). a Herbarium label and specimen. b, c Appearance of ascostromata on the host substrate. d Vertical section through ascostroma. e, f Peridium. g Trabeculate pseudoparaphyses. h, i Asci. j–m Ascospores. Scale bars: d = 200 μ m, e, g–i = 50 μ m, f, j–m = 20 μ m.

The type specimen of *Eopyrenula leucoplaca* could not be located. However, Harris (1973) examined representative collections from various herbaria worldwide and provided a description and illustration of ascospores of *E. leucoplaca* when he introduced the genus *Eopyrenula*. In this study, we examined and illustrate a herbarium specimen from S (S-L16275). The species is a corticolous lichen on bark that was collected from Sweden. Based on a comparison of morphological characters provided by Harris (1973), the herbarium specimen is typical *E. leucoplaca* in having brown, paler at the end cells, ellipsoidal to fusiform, 5–6-septate ascospores. Hence, we designate this herbarium specimen as the reference specimen of *E. leucoplaca*. However, specimen S-L16275 has a slightly larger pseudothecia, asci and ascospores than the protologue.

Eopyrenula leucoplaca (Wallr.) R.C. Harris, Michigan Bot. 12(1): 19 (1973)

Fig. 20

≡ *Verrucaria leucoplaca* Wallr., Fl. crypt. Germ. (Norimbergae) 3: 299 (1831)

Index Fungorum number: IF341935; Facesoffungi number: FoF04633

Facultatively lichenized, inhabiting bark with a *Trentepohlia* photobiont (Harris 1973, Hyde et al. 2013). Sexual morph: *Ascomata* 200–300 µm high, 260–470 µm diam. [ca. 0.3 mm diam., Harris 1973], perithecioid, semi-immersed to superficial, visible as dark spot, solitary, scattered, globose to subglobose, dark brown to black, ostiole central, with pore-like opening. *Peridium* 30–55 µm wide [60–90 µm wide, Harris 1973], thick-walled, comprising several layers of small, dark brown cells, arranged in a *textura epidermoidea*. *Hamathecium* 1–1.5 µm wide [ca. 1 µm wide, Harris 1973], composed dense, anastomosed, slightly constricted at the septa, narrowly cellular pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 109–170 × 13–21.5 µm (\bar{x} = 140.6 × 13.6 µm, n = 20) [90–100 × 10–12 µm, Harris 1973], 8-spored, bitunicate, cylindrical to cylindrical-clavate, short-pedicellate, apically rounded, with well-developed ocular chamber. *Ascospores* 27–37 × 8–12 µm (\bar{x} = 33.7 × 10.2 µm, n = 30) [18–24 × 5–9 µm, Harris 1973], overlapping 1–2-seriate, brown to dark brown, paler at the end cells, ellipsoidal to fusiform, septate, constricted at the septa, mostly larger in the middle cells, smooth-walled, with minute guttules. Asexual morph: Undetermined.

Material examined – SWEDEN, Närke, Göhtlunda, Hamrarna, corticolous lichen on bark, 1864, O.G. Blomberg (L 16275, reference specimen designated here).

Pyrenidium Nyl., Flora, Regensburg 48: 210 (1865)

Lichenicolous, associated with various unrelated hosts. Sexual morph: *Ascomata* perithecioid, pseudothecia, immersed to semi-immersed on host thalli, visible as tiny and shiny black dot on the host surface, scattered, solitary or aggregated in gall-like malformations of the host thallus, dark brown to black, globose to subglobose, apapillate, ostiole central, with pore-like opening. *Peridium* thick-walled, composed of several layers of dark brown to reddish brown pseudoparenchymatous cells, arranged in *textura angularis* to *textura prismatica*. *Hamathecium* composed of dense, filiform, anastomosed, cellular pseudoparaphyses, embedded in a gelatinous matrix. *Asci* (2–)4–8-spored, bitunicate, fissitunicate, cylindrical to cylindrical-clavate, short-pedicellate, apically rounded with ocular chamber. *Ascospores* overlapping 1–2-seriate, pale brown in immature state, reddish brown to dark brown in mature state, paler at the end cells, oblong to ellipsoidal, or fusiform, rounded or obtuse at the apex, usually 3-septate, constricted at the septa, smooth-walled. Asexual morph: Reported as coelomycete, pycnidial, with hyaline, simple, short-oblong conidia (Navarro-Rosinés & Roux 2007, Knudsen & Kocourková 2010).

Type species – *Pyrenidium actinellum* Nyl.

Notes – The genus *Pyrenidium* was introduced by Nylander (1865), with *P. actinellum* as the type species. The generic type was found on *Leptogium teretiusculum sensu lato* in Kent, England by Admiral T Jones and is described as a subfruticose, cyanophilous lichen, with dark brown perithecioid ascomata, with a bluish green hue, 4-spored, subcylindrical asci and brown to dark brown, paler at the ends, ellipsoidal, 3-septate ascospores (Hawksworth 1983, Navarro-Rosinés & Roux 2007, Knudsen & Kocourková 2010). Species of *Pyrenidium* have a cosmopolitan distribution found on lichen thalli, occurring on various substrates such as bark, rocks, soil,

bryophytes or living leaves (Hawksworth 1980, 1983, Matzer 1996, Navarro-Rosinés & Roux 2007, Knudsen & Kocourková 2010, Aptroot 2014). The history of *Pyrenidium* was discussed in Hawksworth (1983).

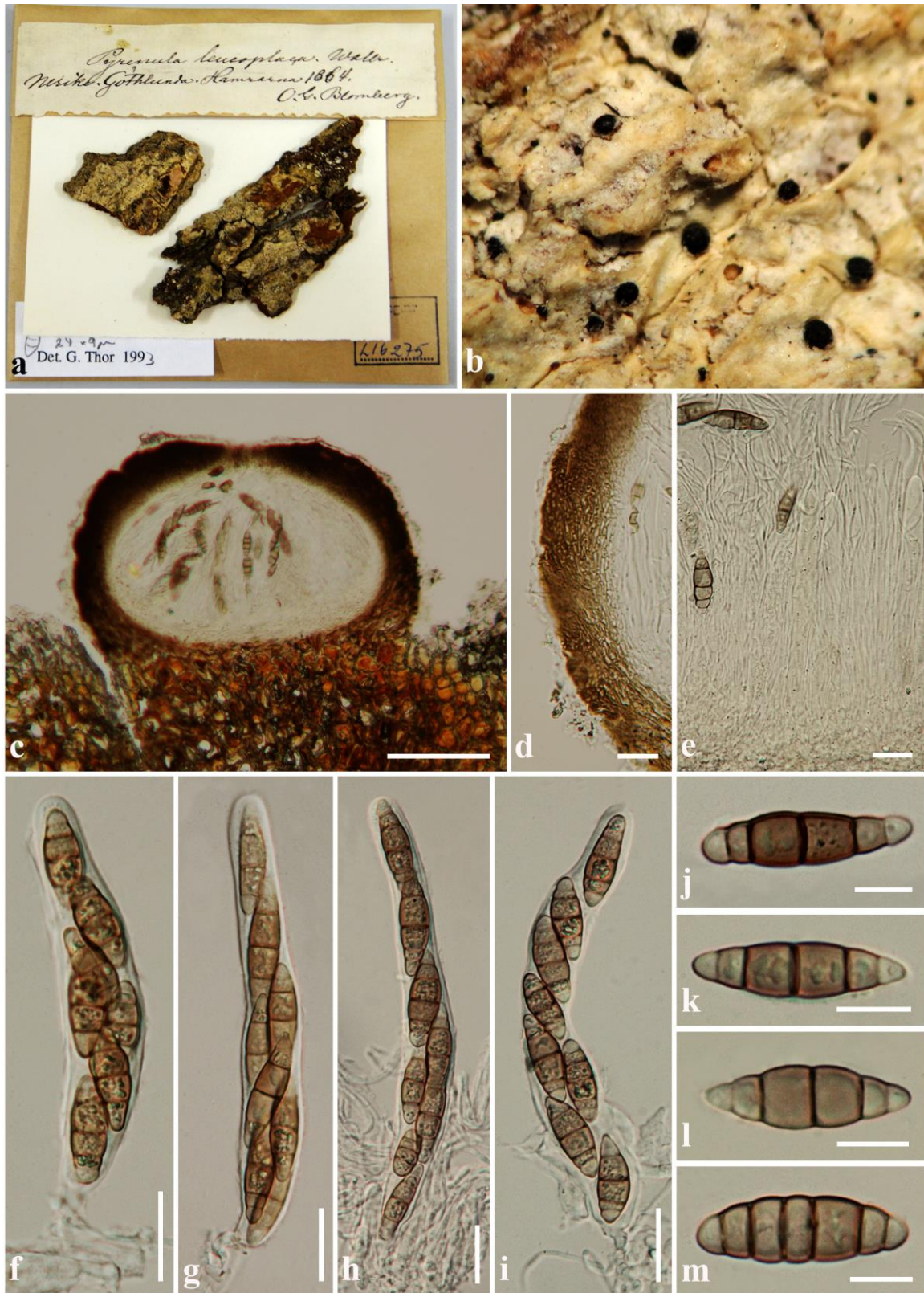


Figure 20 – *Eopyrenula leucoplaca* (L 16275, reference specimen). a Herbarium label and specimen. b Ascomata on host surface. c Vertical section through ascoma. d Peridium. e Pseudoparaphyses with ascospores. f–i Asci. j–m Ascospores. Scale bar: c = 100 μ m, d–i = 20 μ m, j–m = 10 μ m.

The genus includes eleven species (Index Fungorum 2018). Navarro-Rosinés & Roux (2007) excluded *Pyrenidium hyalosporum* Alstrup, D. Hawksw. & R. Sant. from *Pyrenidium* when they re-circumscribed this genus, as the species has hyaline ascospores. Based on morphological characters, *Pyrenidium* was accepted in the family *Dacampiaceae* (Lumbsch & Huhndorf 2010, Hyde et al. 2013, Wijayawardene et al. 2014, 2018, Jaklitsch et al. 2016, Index Fungorum 2018). There are no sequence data available in GenBank (2018). Molecular data are needed to establish the accurate placement of this genus. Thus, the description and illustration of the lectotype specimen are provided herein. *Pyrenidium* is the type of the family *Pyrenidiaceae* Zahlbr., currently a synonym of *Dacampiaceae*, but molecular data are needed to verify if this synonymy is justified.

Pyrenidium actinellum Nyl., Flora, Regensburg 48: 210 (1865)

Fig. 21

Index Fungorum number: IF403001; Facesoffungi number: FoF04634

Lichenicolous on host thallus from various taxa. Sexual morph: *Ascomata* 130–188 µm high, 150–190 µm diam. [150–200 µm diam., Navarro-Rosinés & Roux 2007], perithecioid, pseudothecia, immersed to semi-immersed on host thalli, visible as tiny and shiny black dot on the host surface, scattered, solitary or aggregated in gall-like malformations of the host thallus, dark brown to black, globose to subglobose, apiculate, ostiole central, with pore-like opening. *Peridium* 25–50 µm wide [30–40 µm wide, Navarro-Rosinés & Roux 2007], thick-walled, composed of several layers of dark brown to reddish brown pseudoparenchymatous cells, arranged in *textura angularis* to *textura prismatica*, inner layers comprising hyaline cells. *Hamathecium* 1.5–2.5 µm wide [1.5–2.5 µm wide, Navarro-Rosinés & Roux 2007], composed of dense, filiform, anastomosed, cellular pseudoparaphyses, constricted at the septa, embedded in a gelatinous matrix. *Asci* 40–88 × 11–18 µm (\bar{x} = 71.5 × 13.5 µm, n = 20) [60–90 × 12–18 µm, Navarro-Rosinés & Roux 2007], 4-spored, bitunicate, fissitunicate, subcylindrical, short-pedicellate, apically rounded with indistinct ocular chamber. *Ascospores* 19–27 × 7–9 µm (\bar{x} = 23.1 × 8.3 µm, n = 30) [20–25(–30) × 7–10 µm, Navarro-Rosinés & Roux 2007], overlapping 1–2-seriate, pale brown in immature state, reddish brown to dark brown in mature state, paler at the end cells, oblong to ellipsoidal, or fusiform, rounded or obtuse at the apex, usually 3-septate, constricted at the septa, smooth-walled. Asexual morph: Undetermined.

Material examined – UNITED KINGDOM, England, Kent, Maidstone, Boxley Hill, on *Leptogium teretiusculum* (*Collema*), 1865, T. Jones (H-NYL 41028, lectotype).

Pseudonitschkia Coppins & S.Y. Kondr., Arch. Protistenk. 52(2): 232 (1995)

Lichenicolous, commensal on thallus of *Parmotrema tinctorum*. Sexual morph: *Ascomata* superficial, visible as black dots on host surface, globose to subglobose, cupulate when dry, dark brown to black, scattered, solitary, surface rough, cracked and rugulose, indistinct ostiolate. *Peridium* thick-walled, composed of several layers of dark brown to black, pseudoparenchymatous cells, with thickened cell walls, arranged in a *textura angularis* and *textura epidermoidea*. *Hamathecium* composed of dense, filamentous, branched, anastomosed, narrowly cellular pseudoparaphyses, constricted at the septa, embedded in a gelatinous matrix. *Asci* (4–)5–6–(8)-spored, bitunicate, fissitunicate, broadly clavate to ampulliform with sessile to short-pedicellate, apically rounded with indistinct ocular chamber, thick-walled at the apex. *Ascospores* overlapping 2–3-seriate, fusiform, initially hyaline, becoming yellowish brown to olivaceous at maturity, mostly 1-septate, becoming 2(–3)-septate at maturity, the upper cell shorter and larger than the lower cell, not constricted at the septa, smooth-walled, with thin, distinctive mucilaginous sheath surrounding ascospores in immature state. Asexual morph: Undetermined.

Type species – *Pseudonitschkia parmotrematis* Coppins & S.Y. Kondr.

Notes – *Pseudonitschkia* was introduced as a monotypic genus by Coppins & Kondratyuk (1995) and is typified by *P. parmotrematis*. The genus was reported as a commensal lichenicolous fungus occurring mainly on *Parmotrema tinctorum* (Delise ex Nyl.) Hale in South America (Paraguay, Venezuela), South Africa, Malawi and Nepal (Coppins & Kondratyuk 1995).

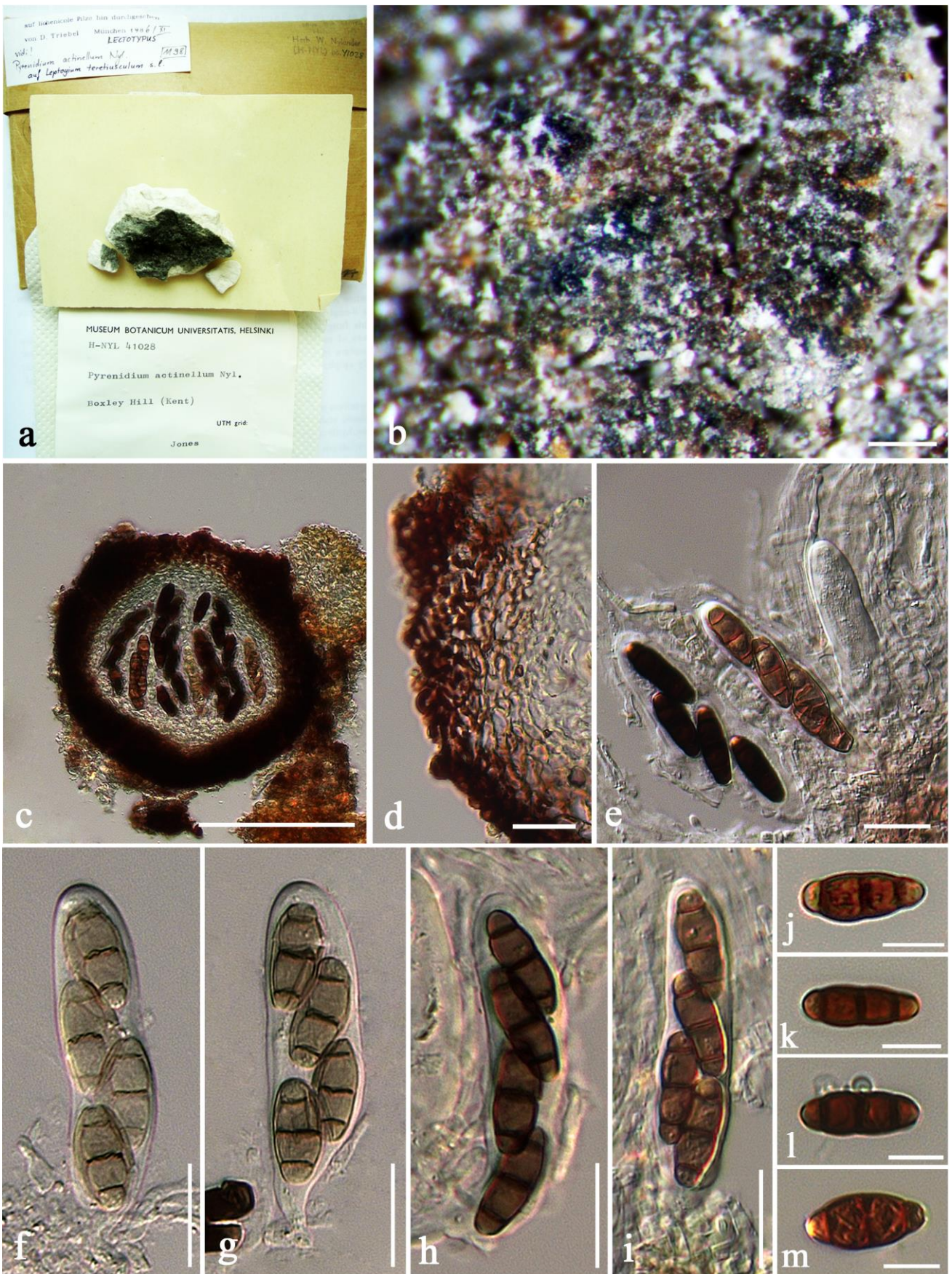


Figure 21 – *Pyrenidium actinellum* (H-NYL 41028, lectotype). a Herbarium label and specimen. b Ascomata on substrate. c Vertical section through ascoma. d Peridium. e Asci with pseudoparaphyses. f–i Asci. j–m Ascospores. Scale bars: b = 1000 μm, c = 100 μm, d–i = 20 μm, j–m = 10 μm.

The genus was uniquely characterized by having rough-walled, blackish ascomata, with indistinct ostiolate, clavate to ampulliform asci and fusiform, hyaline to pale brown, 1-septate ascospores, with upper cell often wider than the lower cell (Coppins & Kondratyuk 1995). Based on its distinctive morphological characters, Coppins & Kondratyuk (1995) treated the genus in the *Dothideales*. Kirk et al. (2001) listed the genus in *Dacampiaceae* and this was accepted by subsequent authors (Hyde et al. 2013, Wijayawardene et al. 2014, 2017, 2018, Jaklitsch et al. 2016).

In this study, the type specimen of *Pseudonitschkia parmotremitis* was examined, described and illustrated. *Pseudonitschkia* is morphological distinct from other genera in *Dacampiaceae* in having colourless ascospores but resembles the genus *Leptocucurthis* (Aptroot & van Iperen 1998). However, these two genera are different in many morphological aspects. There is no molecular data for *P. parmotremitis* in GenBank. Hence, we tentatively place *Pseudonitschkia* in *Dacampiaceae* until the generic type is re-collected and molecular data is available to clarify its phylogenetic affinity.

Pseudonitschkia parmotremitis Coppins & S.Y. Kondr., Edinb. J. Bot. 52(2): 232 (1995) Fig. 22
Index Fungorum number: IF413981; Facesoffungi number: FoF04635

Lichenicolous, commensal on thallus of *Parmotrema tinctorum*. Sexual morph: *Ascomata* 210–280 µm high, 220–270 µm diam. [(160–)200–340 µm diam., Coppins & Kondratyuk 1995], superficial, visible as black dots on host surface, globose to subglobose, cupulate when dry, dark brown to black, scattered, solitary, surface rough, cracked and rugulose, indistinct ostiolate. *Peridium* 20–40 µm wide [19–34 µm wide, Coppins & Kondratyuk 1995], composed of several layers of dark brown to black pseudoparenchymatous cells, with thickened walls, arranged in a *textura angularis* and *textura epidermoidea*. *Hamathecium* 1–2 µm wide [ca.0.7–1 µm wide, Coppins & Kondratyuk 1995], composed of dense, filamentous, branched, anastomosed, narrowly cellular pseudoparaphyses, constricted at the septa, embedded in a gelatinous matrix. *Asci* 68–112 × 20–29.5 µm (\bar{x} = 86.3 × 23.6 µm, n = 20) [95–100 × 21.5–29 µm, Coppins & Kondratyuk 1995], 4–8-spored, bitunicate, fissitunicate, broadly clavate to ampulliform with sessile to short-pedicellate, apically rounded with indistinct ocular chamber, thick-walled at the apex. *Ascospores* 36–59 × 7–9 µm (\bar{x} = 46.5 × 7.8 µm, n = 20) [(33.4–)40–49(–63.3) × 6.7–7.2(–8) µm, Coppins & Kondratyuk 1995], overlapping 2–3-seriate, fusiform, initially hyaline, becoming yellowish brown to olivaceous at maturity, mostly 1-septate, becoming 2(–3)-septate at maturity, the upper cell shorter and larger than the lower cell, not constricted at the septa, smooth-walled, with thin, distinctive mucilaginous sheath surrounding ascospores at immature state. Asexual morph: Undetermined.

Material examined –VENEZUELA, Guamitas, Parque Nacional, alt. 760 m, on rock, on *Parmotrema tinctorum*, 29 December 1938, A.H.G. Alston 5836 (BM 000500107, holotype).

Didymellaceae Gruyter, Aveskamp & Verkley, Mycol. Res. 113(4): 516 (2009)

The family *Didymellaceae* was introduced by De Gruyter et al. (2009) to accommodate *Didymella exigua* (Niessl) Sacc., together with some *Phoma* sections and related asexual morph genera that grouped together in the family. Several genera were added to the family based on morphological characteristics and phylogenetic relationships (De Gruyter et al. 2009, Aveskamp et al. 2010, Chen et al. 2015, Ariyawansa et al. 2015, Wijayawardene et al. 2016, Thambugala et al. 2017, Jayasiri et al. 2017). In this study we include *Allophoma*, *Ascochyta*, *Boeremia*, *Briansuttonomyces*, *Calophoma*, *Didymella*, *Epicoccum*, *Heterophoma*, *Leptosphaerulina*, *Macroventuria*, *Monascostroma*, *Neascochyta*, *Neodidymelliopsis*, *Neomicrosphaeropsis*, *Nothophoma*, *Paraboeremia*, *Phoma*, *Phomatodes*, *Stagonosporopsis*, *Xenodidymella* in *Didymellaceae* following Hyde et al. (2013), Wijayawardene et al. (2017) and based on their morphology. The genus *Didymellocamarosporium* was discussed in Chen et al. (2017). *Heracleicola* was synonymized under *Ascochyta* (Chen et al. 2017). Several genera still need to be clarified with phylogenetic analysis (Chen et al. 2017).

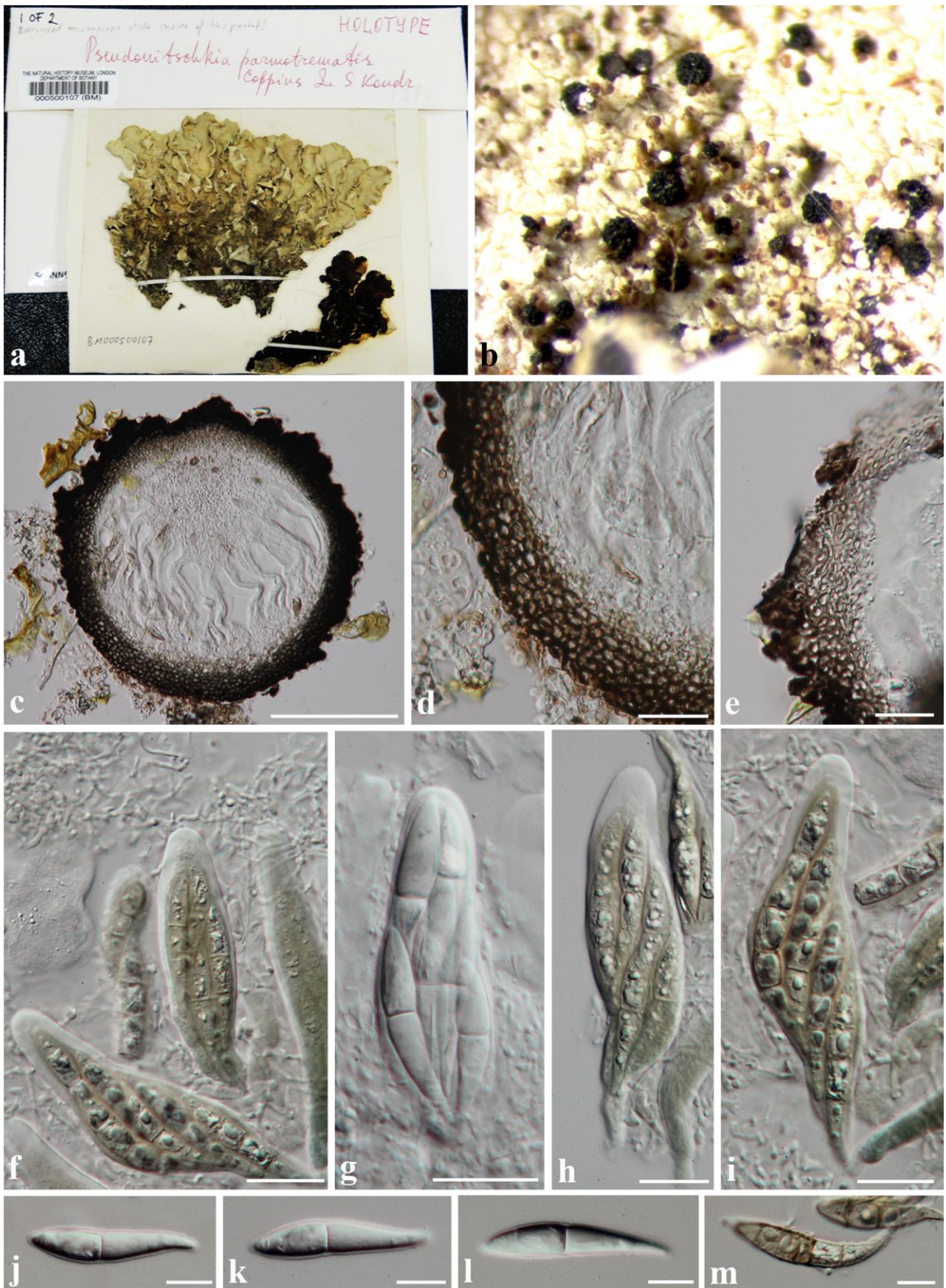


Figure 22 – *Pseudonitschkia parmotrematis* (BM 000500107, holotype). a Herbarium label and specimen. b Ascomata on host surface. c Vertical section through ascoma. d, e Peridium. f Asci with pseudoparaphyses. g Immature ascus. h, i Mature asci. j–l Immature ascospores. m. Mature ascospores. Scale bars: c = 100 μ m, d–i = 20 μ m, j–m = 10 μ m.

Macroventuria Aa, Persoonia 6(3): 359 (1971)

Saprobic on dead leaves and decayed canvas. Sexual morph: perithecia, immersed to semi-immersed, dark to black, globose to subglobose, with pale brown setae on the top of ascomata, *Ostiole* cylindrical, central opening, with setae, pore-like, periphysate. *Setae* septate, pale brown to hyaline, superficial, simple, erect, straight to slightly flexuous, tapering towards rounded apex. *Peridium* composed several layers of pale brown to reddish brown cells of *textura angularis*, inner layers of wall with light-coloured cells. *Hamathecium* not observed. *Asci* 8-spored, bitunicate, clavate, short-pedicellate. *Ascospores* 2–3-seriate, hyaline, ovoid to ellipsoidal, 1-septate, asymmetrical, constricted at the septum, apical cell wider and shorter than the slightly tapering basal cell, smooth-walled. Asexual morph: Undetermined.

Type species – *Macroventuria anomochaeta* Aa

Notes – *Macroventuria* was introduced by Van der Aa (1971) with *Macroventuria anomochaeta* as the type species and with an additional species, *Macroventuria wentii*. *Macroventuria* resembles *Venturia* by its setose pycnidia, but differs in the restricted number of relatively large asci, the ascospore morphology being highly comparable to that of *Didymella* (Van der Aa 1971). The traditional placement of *Macroventuria* was in *Venturiaceae*, as ascospores are two-celled, nearly hyaline, somewhat large, differing from *Leptosphaerulina* (Van der Aa 1971). Subsequently, *Macroventuria* was accommodated in *Pseudosphaeriaceae* by Barr (1982) and then in *Pleosporaceae* by Eriksson & Hawksworth (1986) and Kodsueb et al. (2006a). Aveskamp et al. (2010) circumscribed the boundaries of

Didymellaceae, and confirmed that two strains of *Macroventuria anomochaeta* (CBS 525.71; type and CBS 502.72; isolate in this study) were best placed in *Didymellaceae* using phylogenetic studies. We examined specimen (CBS H-14194) which is not the type but it appears to be collected by the same person who collected the type.

Macroventuria anomochaeta Aa, Persoonia 6(3): 362 (1971)

Fig. 23

Index Fungorum number: IF317111; Facesoffungi number: FoF04636

Saprobic on decayed canvas and *Medicago sativa*. Sexual morph: *Ascomata* 70–150 µm high × 75–130 µm diam. (\bar{x} = 105 × 108 µm, n = 15), perithecia, immersed to semi-immersed, dark to black, subglobose, with pale brown setae on the top, ostiolate. *Ostiole* up to 50 µm long, 30–40 µm wide, cylindrical, central opening, with setae, pore-like, periphysate. *Setae* up to 60 µm long, 2–4 µm wide, septate, pale brown to hyaline, superficial, simple, erect, straight to slightly flexuous, tapering towards rounded apex. *Peridium* 30–50 µm thick at the sides, composed several layers of pale brown to reddish brown cells of *textura angularis*, inner 2–3 layers of wall with light-coloured cells. *Hamathecium* not observed. *Asci* 59–85 × 20–27 µm (\bar{x} = 73 × 24 µm, n = 20), 8-spored, bitunicate, clavate, short-pedicellate. *Ascospores* 21–26 × 7–11 µm (\bar{x} = 23 × 9 µm, n = 30), 2–3-seriate, hyaline, ovoid to ellipsoidal, 1-septate, asymmetrical, constricted at the septum, apical cell wider and shorter than the slightly tapering basal cell, smooth-walled. Asexual morph: Undetermined.

Material examined – SOUTH AFRICA, on *Medicago sativa* L. (*Leguminosae*), 1 June 1972, H. Van der Aa (CBS H-14194).

Monascostroma Höhn., Annls mycol. 16(1/2): 160 (1918)

Saprobic on dead stem and bark. Sexual morph: *Ascomata* solitary to aggregated, scattered, black, immersed, globose or subglobose, papillate, apex with papilla and with a pore-like, central ostiole. *Peridium* thick, composed of cells of *textura angularis*, thin-walled. *Hamathecium* comprising septate, hypha-like pseudoparaphyses. *Asci* 8-spored, bitunicate, fissionate, oblong to ellipsoidal, without pedicel, apically rounded with an indistinct ocular chamber. *Ascospores* irregular arranged in ascus or crowded, fusoid with narrowly rounded ends, 1-septate, initially hyaline, becoming pale brown at maturity, deeply constricted at the median septum, upper cell often broader than lower one, with numerous small guttules, surrounded with sheath, verruculose. Asexual morph: Undetermined.

Type species – *Monascostroma innumerosum* (Desm.) Höhn.

Notes – *Monascostroma* was introduced by Höhnelt (1918) for a single species *M. innumerosum* (= *Hendersonia innumerosa* Desm.). The genus was classified in *Pleosporaceae* (Eriksson & Hawksworth 1998, Kodsueb et al. 2006a). Subsequently, it was accepted in *Didymellaceae* based on a putative strain of *Monascostroma innumerosum* (CBS 345.50), which formed a robust clade in family *Didymellaceae* (Zhang et al. 2009a, 2012, Schoch et al. 2009, Hyde et al. 2013, Knapp et al. 2015). Chen et al. (2017) revisited *Didymellaceae* and did not recognize *Monascostroma* in the family *Didymellaceae*. The placement of this genus still needs to be clarified with molecular data. In this study, we accept the genus *Monascostroma* in the *Didymellaceae*, based on smaller ascomata, lack of periphyses, a thin-walled peridium and 2-celled ascospores.

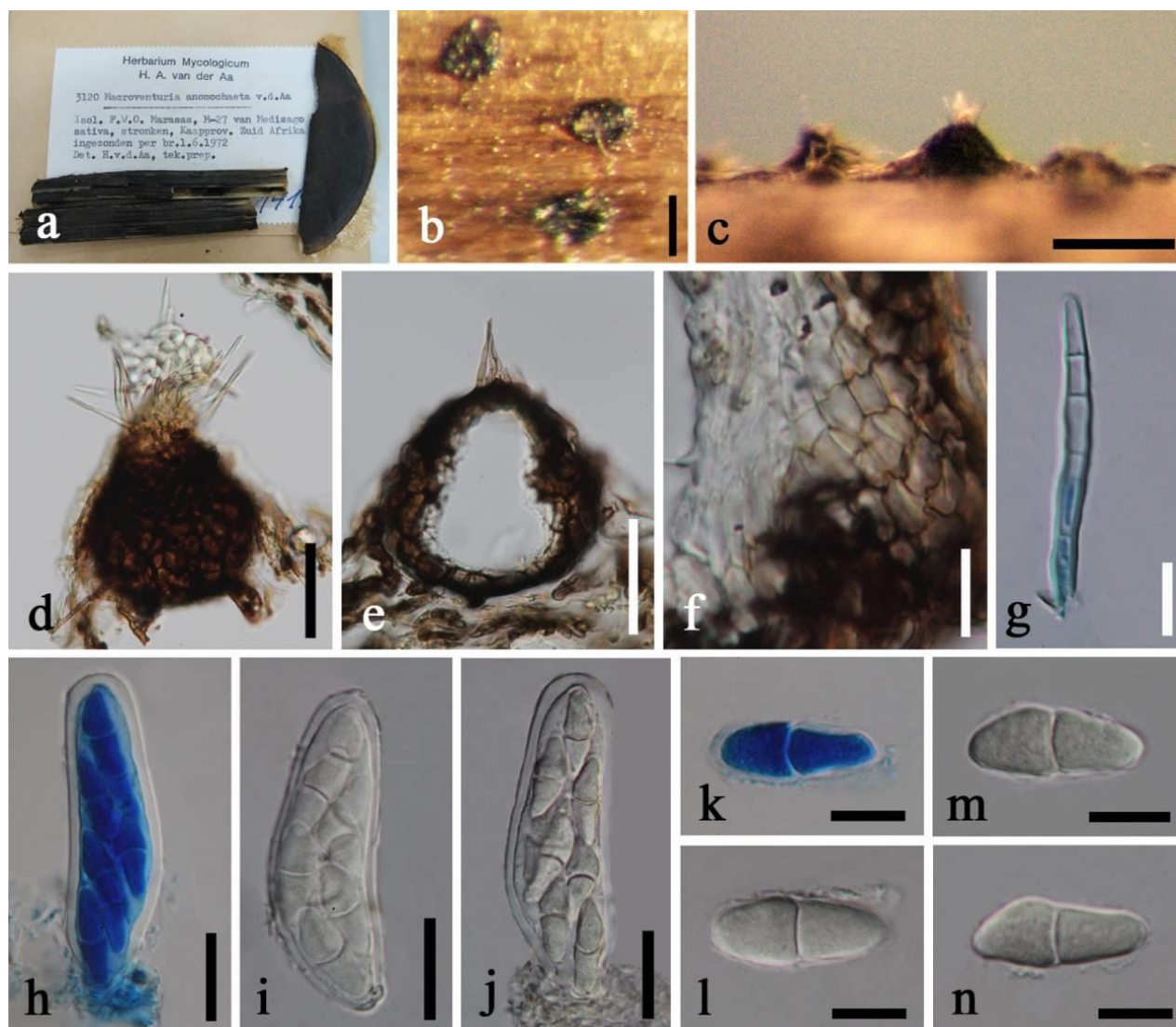


Figure 23 – *Macroventuria anomochaeta* (CBS H-14194). a Herbarium label and specimen. b Ascomata on host (top view). c Ascomata on host (side view). d Exterior ascoma with seta and oozing ascospores. e Section through ascoma with seta. f Peridium. g Setae. h–i Asci. k–n Ascospores. Note: g, h, k stained in lactophenol cotton blue. Scale bars: b = 100 μ m, c = 200 μ m, d, e = 50 μ m, f, g, k–n = 10 μ m, h–j = 20 μ m.

Monascostroma innumerosum (Desm.) Höhn. [as '*innumerosa*'], *Annls mycol.* 16(1/2): 160 (1918) Fig. 24

≡ *Hendersonia innumerosa* Desm., *Annls Sci. Nat., Bot., sér. 3* 16: 10 [repr.] (1851)
Index Fungorum number: IF144501; Facesoffungi number: FoF04637

Saprobic on dead stem. Sexual morph: *Ascomata* 50–85 µm high × 60–105 µm diam. (\bar{x} = 68 × 90 µm, n = 15), solitary to aggregated, scattered, black, immersed, globose or subglobose, papillate, apex with papilla and with a pore-like, central ostiole. *Peridium* 13–20 µm thick, composed of cells of *textura angularis* cells, comprising two layers, outer layer; dark brown to reddish brown, thick-walled, inner layer comprising 3–5 cell layers, pale brown to hyaline, thin-walled. *Hamathecium* comprising 1.5–3 µm wide, septate, hypha-like pseudoparaphyses. *Asci* 40–70 µm × 23–34 µm (\bar{x} = 52 × 28 µm, n = 20), 8-spored, bitunicate, fissitunicate, oblong to ellipsoidal, without pedicel, apically rounded with an indistinct ocular chamber. *Ascospores* 20–30 µm × 7–11 µm (\bar{x} = 25 × 9 µm, n = 30), irregularly arranged in the ascus or crowded, fusoid with narrowly rounded ends, 1-septate, initially hyaline, becoming pale brown at maturity, deeply constricted at the median septum, upper cell often broader than lower one, with numerous small guttules, surrounded with gelatinous sheath, verruculose. Asexual morph: Undetermined.

Material examined – NETHERLANDS, Utrecht, Niederlande, Bilthoven, on *Juncus conglomeratus* (*Juncaceae*), 12 April 1950, J.A. von Arx (S-F234926).

Didymosphaeriaceae Munk, Dansk bot. Ark. 15(no. 2): 128 (1953)

Didymosphaeriaceae was introduced by Munk (1953) with *Didymosphaeria* as the generic type. They are characterized by brown, thick-walled, 1-septate ascospores, trabeculate pseudoparaphyses, which anastomose mostly above the asci in a gelatinous matrix (Aptroot 1995a, Hyde et al. 2013, Ariyawansa et al. 2014a, b, Wanasinghe et al. 2018). The species in this family are saprobes, endophytes and pathogens associated with numerous plant substrates (Hyde et al. 2013, Ariyawansa et al. 2014a, b, Liu et al. 2015, Tennakoon et al. 2016, Wanasinghe et al. 2016b). Ariyawansa et al. (2014b) revised the family and synonymized *Montagnulaceae* to *Didymosphaeriaceae*, which is the oldest name and has priority. Currently 26 genera are accepted in *Didymosphaeriaceae* (Wanasinghe et al. 2018, Wijayawardene et al. 2018).

Montagnula Berl., Icon. fung. (Abellini) 2: 68. 1896.

Saprobic on various flowering plants. Sexual morph: *Ascostromata* forming clypeus, visible and raised, solitary, large, black, longitudinal dome-shaped on the host surface. *Ascomata* immersed in the clypeus, uni- to bi-loculate, globose to subglobose, dark brown to black, clustered, ostiole central, with minute papillate. *Peridium* thick-walled, with unequal thickness, slightly thin at the base, thickest towards the apex, composed of several layers of dark brown to black, isodiametric, pseudoparenchymatous cells, integrated with host tissue, arranged in a *textura angularis* to *textura prismatica*. *Hamathecium* composed of dense, filamentous, broadly cellular pseudoparaphyses, indistinctly septate, anastomosing above the asci, embedded in a hyaline gelatinous matrix. *Asci* 8-spored, bitunicate, fissitunicate, cylindric-clavate, long-pedicellate, apically rounded with an ocular chamber. *Ascospores* overlapping, 1–2-seriate, hyaline to light brown when young, reddish brown to deep brown when mature, fusiform, 1-septate, constricted at the septum, mostly upper cell shorter and larger than lower cell, smooth-walled, with guttules, minutely echinulate. Asexual morph: Reported as hyphomycetes, irregularly branched conidiophores, bearing intercalary phialides, with simple, elongate conidia (Aptroot 1995b).

Type species – *Montagnula infernalis* (Niessl) Berl.

Notes –The genus *Munkovalsaria* was introduced by Aptroot (1995b) with two species *Munkovalsaria rubra* and *M. donacina* as the type species. Morphology of *M. donacina* differs from *M. rubra* by the simple ascocarp, black culture and no cresol production while *M. rubra* has a compound ascocarp, red culture, producing m-cresol (Aptroot 1995b). Aptroot (1995a, b) treated many species of *Didymosphaeria* as synonyms of *Munkovalsaria*. Later, *M. appendiculata* was introduced with 1-septate ascospores bearing long hyaline appendages (Aptroot 2004). Pitt et al. (2014) provided sequence data for *M. donacina*, which was collected from grapevines and desert ash in Australia. *Munkovalsaria* was subsequently treated as a synonym of *Montagnula* based on morphology and phylogenetic analysis of combined LSU, SSU and ITS sequence data of *M. donacina* HVVV01 and *M. appendiculata* CBS 109027 (type) which allied to the genus

Montagnula (Wanasinghe et al. 2016b). Previously, three species of *Munkovalsaria* were introduced but recently these species have been synonymized (Index Fungorum 2018). *Munkovalsaria donacina* was listed under *Montagnula donacina* (Niessl) Wanas., E.B.G. Jones & K.D. Hyde (Wanasinghe et al. 2016b). *Munkovalsaria rubra* was synonymized as *Myrmaecium rubrum* (Aptroot, Aa & Petrini) Jaklitsch & Voglmayr (2015). *Munkovalsaria appendiculata* was transferred to *Montagnula appendiculata* (Aptroot) Wanas., E.B.G. Jones & K.D. Hyde (Wanasinghe et al. 2016b).

In this study, we examined the herbarium specimen from BPI, which was collected on *Pseudosasa japonica* from France and the specimen was determined by Aptroot (1995b) as *Munkovalsaria donacina*. Based on morphological identification, this specimen (BPI 749298) is typical *Montagnula donacina*. Hence, this specimen is verified herein as *M. donacina* following Wanasinghe et al. (2016b).

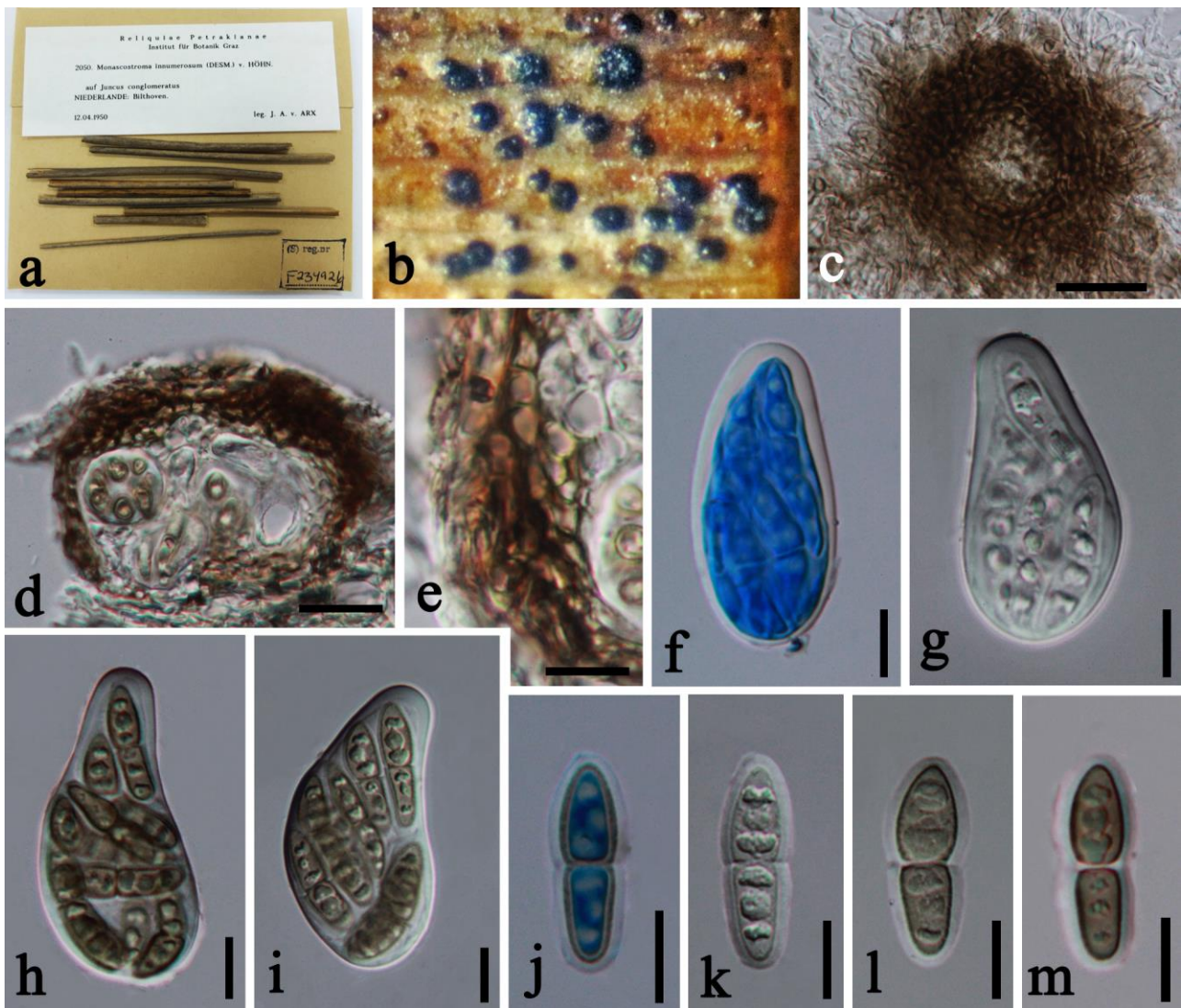


Figure 24 – *Monascostroma innumerosum* (S-F234926). a Herbarium label and specimen. b Ascomata on host (top view). c Squash mount of ascoma. d Vertical section through an ascoma. e Peridium. f–i Asci. j–m Ascospores. Note: f, j stained in lactophenol cotton blue. Scale bars: c = 30 μ m, d = 20 μ m, e–m = 10 μ m.

Montagnula donacina (Niessl) Wanas., E.B.G. Jones & K.D. Hyde, in Wanasinghe, Gareth Jones, Camporesi, Dissanayake, Kamolhan, Mortimer, Xu, Elsalam & Hyde, Index Fungorum 319: 1 (2017) Fig. 25

≡ *Microthelia donacina* Niessl, in Thümen, Inst. Coimbra 28: no. 536 (1879)

- ≡ *Munkovalsaria donacina* (Niessl) Aptroot, Nova Hedwigia 60: 346 (1995)
≡ *Didymosphaeria donacina* (Niessl) Sacc., Syll. fung. (Abellini) 1: 715 (1882)
≡ *Didymosphaerella donacina* (Niessl) Cooke, Grevillea 18: 29 (1889)
Index Fungorum number: IF552762; Facesoffungi number: FoF04638

Saprobic on various flowering plants. Sexual morph: *Ascostromata* 1000–1800 µm diam., forming clypeus, visible and raised, solitary, large, black, longitudinal dome-shaped on the host surface. *Ascomata* 260–530 µm high, 400–570 µm diam., immersed in the clypeus, uni- to bi-loculate, globose to subglobose, dark brown to black, clustered, ostiole central, with minute papilla. *Peridium* 10–30 µm wide, thick-walled, with unequal thickness, slightly thinner at base, thicker towards apex, composed of several layers of dark brown to black, isodiametric, pseudoparenchymatous cells, integrated with host tissue, arranged in a *textura angularis* to *textura prismatica*. *Hamathecium* 1.5–2.5 µm wide, composed of dense, filamentous, broadly cellular pseudoparaphyses, indistinctly septate, anastomosing above the asci, embedded in a hyaline gelatinous matrix. *Asci* (87–)90–130(–150) × 11–12(–13)(–14)(–15) µm (\bar{x} = 112.3 × 12.3 µm, n = 20), 8-spored, bitunicate, fissitunicate, cylindric-clavate, long-pedicellate, apically rounded with an ocular chamber. *Ascospores* 13–20 × 5–7.5 µm (\bar{x} = 16.5 × 6 µm, n = 20), overlapping, 1–2-seriate, hyaline to light brown when young, reddish brown to deep brown when mature, fusiform, 1-septate, constricted at the septum, upper cell usually shorter and larger than lower cell, smooth-walled, with guttules, minutely echinulate. Asexual morph: Reported as hyphomycetes, irregularly branched conidiophores, bearing intercalary phialides, with simple, elongate conidia (Aptroot 1995b).

Material examined – FRANCE, Lac de Leon 40180 Landes, on *Pseudosasa japonica* (Steud.) Makino (*Poaceae*), 6 February 1994, F. Candoussau 5396-1 (BPI 749298).

Leptosphaeriaceae M.E. Barr, Mycotaxon 29: 503 (1987)

The family *Leptosphaeriaceae* was established by Barr (1987a) and is typified by *Leptosphaeria* having conical or globose ascomata, narrow asci and coelomycetous asexual morphs in the order *Pleosporales*. *Leptosphaeriaceae* is similar to *Phaeosphaeriaceae* but differs by its peridium structure, hosts and asexual morphs (Câmara et al. 2002, Kirk et al. 2008, Zhang et al. 2012, Hyde et al. 2013, Phookamsak et al. 2014, Dayarathne et al. 2015). The family has a cosmopolitan distribution but is particularly prominent in temperate regions (Cannon & Kirk 2007). Species in this family are endophytes, saprobes or grow as necrotrophs on the stems or leaves of various host plants and include economically important plant pathogens (Rouxel & Balesdent 2005, De Gruyter et al. 2013, Hyde et al. 2013). Comprehensive descriptions and illustrations for members in *Leptosphaeriaceae* including a well-resolved backbone tree were provided in Ariyawansa et al. (2015). Additional new taxa in this family have been introduced by Ariyawansa et al. (2015), Dayarathne et al. (2015), Hyde et al. (2016), and Wanasinghe et al. (2016a).

Chaetoplea (Sacc.) Clem., in Clements & Shear, Gen. fung., Edn 2 (Minneapolis): 275 (1931)

- ≡ *Pyrenophora* subgen. *Chaetoplea* Sacc., Syll. fung. (Abellini) 2: 279 (1883)

Saprobic on dead leaves. Sexual morph: *Chaetoplea dasyliirii* (see Ramaley 1995). Asexual morph: *Parahendersonia dasyliirii*; *Conidiomata* solitary or scattered, black, convex to flattened on the top, immersed to erumpent through the outer layer of the host tissue to near superficial, conidiomata open via a slit, with a small papilla, narrow clypeus. *Conidiomata walls* comprising several layers with cells of *textura angularis*, the outer layers composed of brown to black, thick-walled cells, lighter towards the inner layers of hyaline cells, brown hyphae emerge from the wall into substrate. *Conidiogenous cells* proliferation enteroblastic, phialidic, cylindrical, terminal, with slight tapering towards apex. *Macroconidia* not observed. *Microconidia* fusoid to ellipsoidal, hyaline, smooth-walled, thin-walled, aseptate, rounded apex.

Type species – *Chaetoplea calvescens* (Fr. ex Desm.) Clem.

Notes – We examined the holotype specimen of *Parahendersonia dasyliirii*, which was reported as the coelomycete asexual morph of *Chaetoplea dasyliirionis* (Ramaley 1995).

Parahendersonia was introduced by Ramaley (1995) with *Parahendersonia dasyilirii* as the type species. The genus comprises two species epithets (Index Fungorum 2018). Ramaley (1995) accommodated *P. dasyilirii* as the coelomycete asexual morph of *Chaetoplea dasyilirionis* based on conidiomata and ascomata that were co-occurring on the host. Moreover, colonies in cultures from either conidia or asci had identical appearance and those from both sources produced *Parahendersonia* conidia. *Parahendersonia* was tentatively accommodated in *Phaeosphaeriaceae* (Barr 1987a, Hyde et al. 2011, 2013). Recently, the genus was placed in *Leptosphaeriaceae* (Wijayawardene et al. 2018).



Figure 25 – *Montagnula donacina* (BPI 749298). a Herbarium label and specimen. b Ascostroma on the host surface. c Vertical section through ascostroma. d Peridium. e, f Asci. g Asci embedded in pseudoparaphyses. h Immature ascospore. i–k Ascospores. Scale bar: b = 500 μ m, c = 200 μ m, d–g = 20 μ m, h–k = 10 μ m.

Chaetoplea dasyilirii A.W. Ramaley [as '*dasyilirionis*'], Aliso 14(2): 151 (1995)
Index Fungorum number: IF414790; Facesoffungi number: FoF04639

Fig. 26

Saprobic on dead leaves. Sexual morph: *Chaetoplea dasyliirii* (see Ramaley 1995). Asexual morph: *Parahendersonia dasyliirii*; *Conidiomata* 320–360 μm high \times 350–400 μm diam., solitary or scattered, black, convex to flattened on the top, immersed to erumpent through the outer layer of the host tissue to near superficial, conidiomata open via a slit, with a small papilla, narrow clypeus. *Conidiomata walls* comprising several layers with cells of *textura angularis*, the outer layers composed of brown to black, thick-walled cells, lighter towards the inner layers of hyaline cells, brown hyphae emerge from the wall into substrate. *Conidiogenous cells* proliferation enteroblastic, phialidic, cylindrical, terminal, with slight tapering towards apex. *Macroconidia* not observed. *Microconidia* 4–8 \times 2–3 μm (\bar{x} = 6 \times 2.5, n = 30), fusoid to ellipsoidal, hyaline, smooth-walled, thin-walled, aseptate, rounded apex.

Material examined – USA, Texas, Big Ben National Park, Brewster Co., on dead leaves of *Dasyliirion leiophyllum* Engelm. ex Trel. (*Asparagaceae*), 9 May 1994, A. Ramaley (BPI 802795, holotype of *Parahendersonia dasyliirii*).

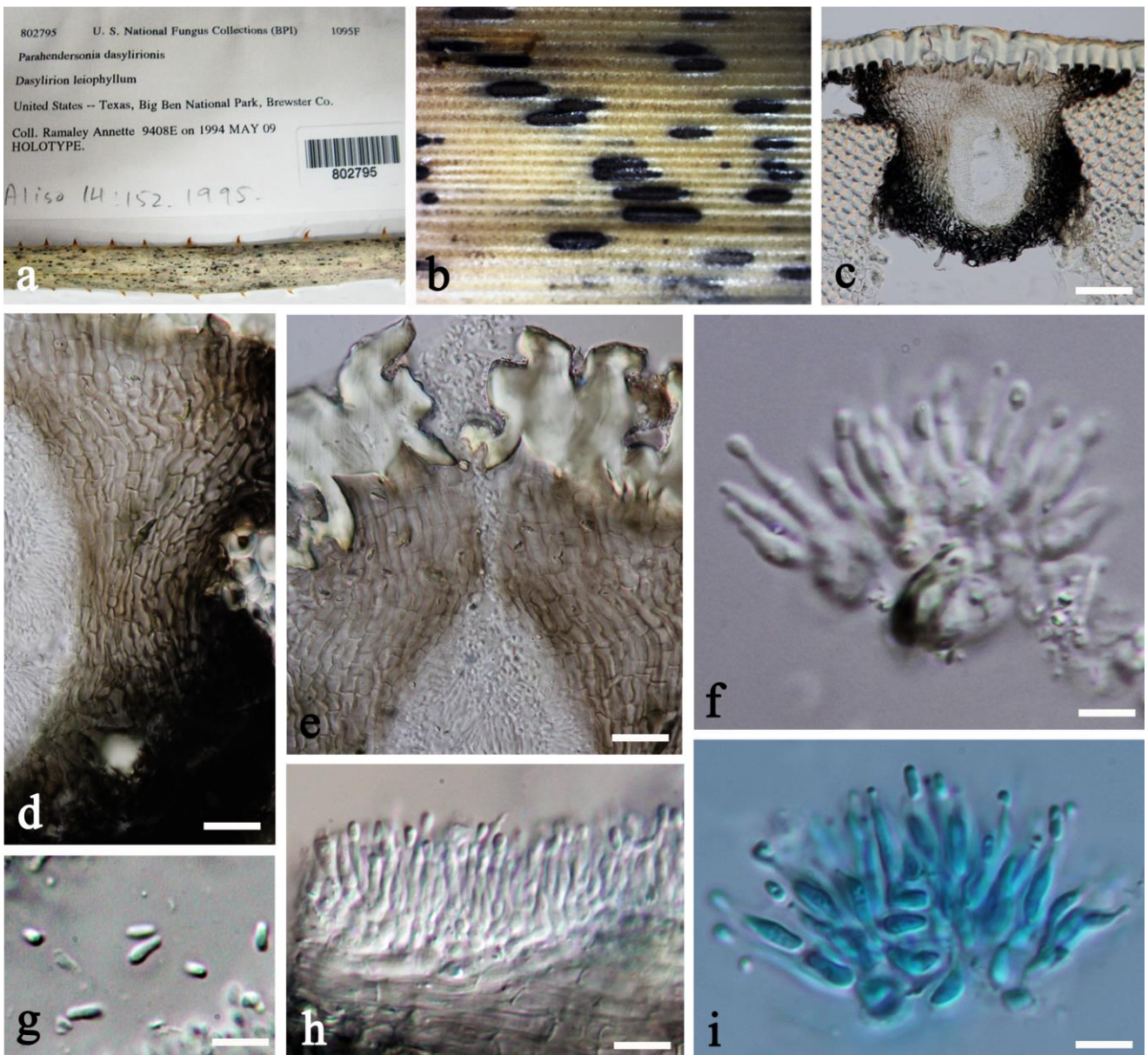


Figure 26 – *Chaetoplea dasyliirii* (BPI 802795, holotype of *Parahendersonia dasyliirii*). a Herbarium material. b Conidiomata on host substrate. c Vertical section of conidioma. d Conidiomata wall. e Close up of ostiole. f, h, i Conidiogenous cells with conidia. g Conidia. Scale bars: c = 100 μm , d, e = 50 μm , f, h, i = 10 μm , g = 5 μm .

Lindgomycetaceae K. Hiray., Kaz. Tanaka & Shearer, in Hirayama, Tanaka, Raja, Miller & Shearer, *Mycologia* 102(3): 733 (2010)

Lindgomycetaceae is a freshwater ascomycete family that belongs in *Pleosporales*, *Dothideomycetes*. Species have been isolated from decaying or decorticated stems or twigs of submerged woody plants in freshwater habitats, such as lakes, ponds, rivers, and irrigation canals, and associated with IgG4-related sclerosing disease of a human foot (Hyde 1993, Shearer et al. 2009, Abdel-Aziz & Abdel-Wahab 2010, Hirayama et al. 2010, Raja et al. 2011, 2013, Tsang et al. 2014). The family is characterized by subglobose to globose ascomata, fissitunicate, cylindrical to clavate asci, fusiform to cylindrical, uni- to multiseptate, hyaline to brown ascospores, usually covered with an entire sheath and/or bipolar mucilaginous appendages (Hirayama et al. 2010). *Lindgomyces* was proposed as type genus on the basis of morphological and molecular data (Hirayama et al. 2010). The family currently includes five genera, *Arundellina* Wanas. et al., *Clohesyomyces* K.D. Hyde, *Hongkongmyces* Tsang et al., *Lindgomyces* K. Hiray. et al., and *Lolia* Abdel-Aziz & Abdel-Wahab (Wijayawardene et al. 2018).

Lindgomyces K. Hiray., Kaz. Tanaka & Shearer, in Hirayama, Tanaka, Raja, Miller & Shearer, *Mycologia* 102(3): 733 (2010)

Saprobic on submerged, decorticated woody debris. Sexual morph: *Ascomata* solitary, scattered, immersed to erumpent, black, subglobose, thick-walled, ostiolate, papillate. *Beak* conspicuous, central, with periphyses. *Peridium* outer layer composed of thick-walled, dark brown to brown, small cells, forming clypeus-like structure, inner layer composed of thin-walled, hyaline, large cells of *textura angularis*. *Asci* 8-spored, bitunicate, fissitunicate, cylindrical to clavate, slightly curved or straight, rounded at the apex, short-pedicellate, smooth, thick-walled, with an ocular chamber. *Ascospores* fusiform, hyaline becoming brown, pointed at both ends, straight to slightly curved, septate, not constricted at the septa, smooth-walled, guttulate, with a thick gelatinous sheath. Asexual morph: Undetermined.

Type species – *Lindgomyces ingoldianus* (Shearer & K.D. Hyde) K. Hiray., Kaz. Tanaka & Shearer

Notes – *Lindgomyces ingoldianus* is the type species of genus *Lindgomyces* (Shearer et al. 2009) Shearer & Hyde (1997) originally described this species based on a submerged specimen, and placed it in *Massarina*, but Shearer et al. (2009) placed the species in *Lindgomycetaceae* Hirayama et al. (2010) formally introduced a new family *Lindgomycetaceae* and new genus *Lindgomyces* based on the morphological data and phylogenetic analysis. *Lindgomyces ingoldianus* is morphologically similar to *L. rotundatus* but differs from the latter by the large ascospores with pointed ends (Hirayama et al. 2010).

Lindgomyces ingoldianus (Shearer & K.D. Hyde) K. Hirayama, Kaz. Tanaka & Shearer Fig. 27
≡ *Massarina ingoldiana* Shearer & K.D. Hyde, *Mycologia* 89(1): 114 (1997)

Index Fungorum number: IF515189; Facesoffungi number: FoF04640

Saprobic on submerged, decorticated woody debris. Sexual morph: *Ascomata* 200–300 µm high, 200–450 µm diam., solitary, scattered, immersed to erumpent, black, subglobose, thick-walled, ostiolate, papillate. *Beak* conspicuous, central, 60–80 µm long, 90–120 µm wide, with periphyses. *Peridium* 20–45 µm wide, outer layer composed of thick-walled, dark brown to brown, small cells, forming clypeus-like structure, inner layer composed of thin-walled, hyaline, large cells of *textura angularis*, 10–15 × 3–5 µm. *Asci* 100–200 × 20–35 µm (\bar{x} = 190 × 28.6, n = 20), 8-spored, bitunicate, fissitunicate, cylindrical to clavate, slightly curved or straight, rounded at the apex, short-pedicellate, smooth, thick-walled, with an ocular chamber. *Ascospores* 40–65 × 9–15 µm (\bar{x} = 54.6 × 10.4, n = 20), 2–4-seriate, fusiform, hyaline becoming brown, pointed at both ends, straight to slightly curved, 1–3-septate, not constricted at the septa, smooth-walled, guttulate, with a thick gelatinous sheath. Asexual morph: Undetermined.

Material examined – USA, Wisconsin, Adams County, Lemonweir River, on submerged, decorticated woody debris, 31 July 1992, C.A. Shearer & J.L. Crane A-39-1 (ILLS 52289, holotype).

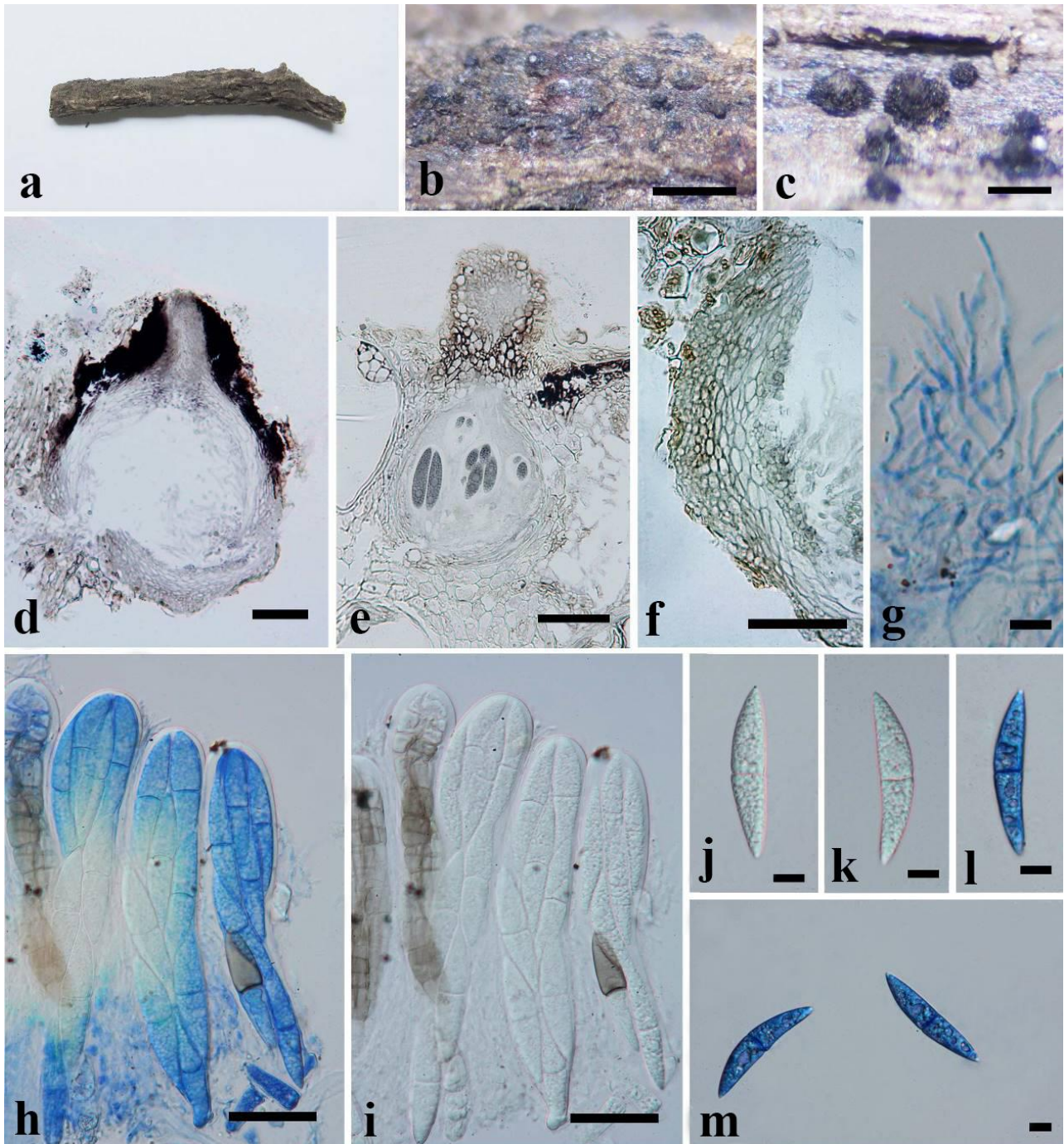


Figure 27 – *Lindgomyces ingoldianus* (ILLS 52289, holotype). a Herbarium specimen. b, c Appearance of black ascomata on host surface. d, e Vertical sections of ascomata. f Peridium. g Pseudoparaphyses. h, i Asci. j–m Ascospores. Note: g, h, l, m stained in lactophenol cotton blue. Scale bars: b = 1 mm, c = 500 μ m, d, e = 100 μ m, f, g = 50 μ m, h, i = 30 μ m, j–m = 10 μ m.

Lophiostomataceae Sacc. [as '*Lophiostomaceae*'], Syll. fung. (Abellini) 2: 672 (1883)

The family *Lophiostomataceae* is characterized by immersed to erumpent, carbonaceous to coriaceous ascomata, with rounded or slit-like ostiolar opening on a laterally compressed papilla, crest-like apex, cylindrical to clavate asci and hyaline to dark brown, 1-multi-septate, or muriform

ascospores (Hyde et al. 2013, Thambugala et al. 2015). The species of *Lophiostomataceae* are saprobic on twigs or bark of numerous woody and herbaceous plants in terrestrial and aquatic environments (Hyde et al. 2002, Tanaka & Harada 2003, Crous et al. 2013, Ariyawansa et al. 2015, Lui et al. 2015, Tibpromma et al. 2017). The family was revised by Thambugala et al. (2015) with a backbone tree to the family. Eighteen genera were accepted by Wijayawardene et al. (2018). In this study we transfer *Thyridium concinnum* (*Thyridiaceae*, *Sordariomycetes*) to *Platystomum concinnum* (*Lophiostomataceae*, *Dothideomycetes*) based on morphology.

Platystomum Trevis., Bull. Soc. R. Bot. Belg. 16: 16 (1877)

Type species – *Platystomum compressum* (Pers.) Trevis.

Saprobic on dead stem. Sexual morph: *Ascomata* black, solitary, gregarious or confluent, immersed to semi-immersed, globose to ellipsoidal or pyriform, unilocular, glabrous, papillate, ostiolate. *Ostirole* well-developed long neck, usually with widely porate, crest-like papilla, gradually narrowed upward, obtuse apex, brown to black, thick-walled. *Peridium* composed of brown to hyaline, thick-walled cells of *textura angularis*. *Hamathecium* comprising cellular, septate, unbranched, interlaced pseudoparaphyses. *Asci* bitunicate, fissitunicate, cylindrical to clavate, rounded above, narrow below, pedicellate, straight or slightly curved, with an ocular chamber. *Ascospores* light yellow when young, brown to dark olive when mature, fusiform to oblong, elongated ellipsoidal, oblong ovate, muriform, constricted at all septa, smooth-walled, rounded at both ends, thick-walled. Asexual morph: undetermined.

Notes – *Platystomum* was introduced by Trevisan (1877) to accommodate six species; *P. angustatum*, *P. compressum* (the generic type), *P. fraudulentum*, *P. gregarium*, *P. hygrophilum* and *P. ramorum*. The genus is characterized by coriaceous to carbonaceous, dark brown to black ascomata, slit or slot-like ostiole, with or without a crest, cellular pseudoparaphyses, fissitunicate, cylindric-clavate asci, with an ocular chamber, ellipsoidal to fusiform, muriform ascospores (Hyde et al. 2013, Thambugala et al. 2015). *Platystomum* morphologically resembles *Lophiostoma* but it has muriform ascospores, while *Lophiostoma* has phragmospores (Tanaka & Harada 2003). Several studies have discussed their relationship (Holm & Holm 1988, Barr 1990, Mugambi & Huhndorf 2009, Hyde et al. 2013, Thambugala et al. 2015). In this study we observed the isotype specimen (GZU 000301526) of *Thyridium concinnum*. Its morphology is most similar to *Platystomum*, differing from *Thyridium* by ascomata with a crest-like ostiole and fissitunicate asci with an ocular chamber features lacking in *Thyridium*. Thus, we provide a new combination for *Platystomum concinnum* based on morphological comparison.

Platystomum concinnum (Petr.), Doilom & K.D. Hyde, comb. nov.

Fig. 28

≡ *Thyridium concinnum* Petr., Sydowia 3(1-6): 303 (1949)

Index Fungorum number: IF554796; Facesoffungi number: FoF04641

Saprobic on dead stem of *Polygonum* sp. (*Polygonaceae*). Sexual morph: *Ascomata* 222 × 500 µm diam., 306–706 µm high, black, solitary, gregarious or confluent, immersed to semi-immersed, globose to ellipsoidal or pyriform, unilocular, glabrous, papillate, ostiolate. *Ostirole* 139–145 µm long, 60–139 µm wide, with well-developed long neck, usually with widely porate, crest-like papilla, gradually narrowed upward, obtuse apex, brown to black, thick-walled. *Peridium* 15–28 µm wide, composed of brown to hyaline, thick-walled cells of *textura angularis*. *Hamathecium* comprising 1–3 µm wide, cellular, dense, septate, unbranched, interlaced pseudoparaphyses. *Asci* 88–182 × 11–18 µm (\bar{x} = 129 × 14, n = 20), 2–8-spored, bitunicate, fissitunicate, cylindrical to clavate, rounded above, narrow below, mostly long-pedicellate, straight or slightly curved, with an ocular chamber. *Ascospores* 16.7–39 × 5.8–12.6 µm (\bar{x} = 23.6 × 8.6, n = 20), uniseriate or overlapping seriate, light yellow when young, brown to dark olive when mature, fusiform to oblong, elongated ellipsoidal, oblong ovate, 7–10 transverse and several longitudinal to oblique septa, constricted at all septa, smooth, rounded at both ends, thick-walled. Asexual morph: undetermined.

Material examined – IRAN, Shahrud-Bustan, mons Shahvar, Nokarman, 36 °32 'N/ 54 °22 ' E, 3300 m, on dead stem of *Polygonum* sp. (*Polygonaceae*), 23–24 July 1948, K.H. Rechinger (GZU 000301526, isotype of *Thyridium concinnum*).

Roussoellaceae Jian K. Liu, Phook., D.Q. Dai & K.D. Hyde, in Liu et al., *Phytotaxa* 181(1): 7 (2014)

The family *Roussoellaceae* was introduced by Liu et al. (2014) and is typified by *Roussoella* Sacc. with *R. nitidula* Sacc. & Paol. as the type species (Wijayawardene et al. 2017a). The family is characterized by semi-immersed to immersed, solitary or gregarious, clypeate ascostromata, long cylindrical to clavate bitunicate asci with or without obvious fissitunicate dehiscence, and brown, 2-celled ornamented ascospores (Liu et al. 2014). The asexual morphs of *Roussoellaceae* are linked to *Cytoplea*, *Melanconiopsis* and *Neomelanconium* (Liu et al. 2014). Seven genera are accommodated in this family (Wijayawardene et al. 2018). *Roussoellaceae* was treated as a synonym of *Thyridariaceae* (Jaklitsch & Voglmayr 2016). However, Tibpromma et al. (2017) accepted *Roussoellaceae* as a well resolved family in *Pleosporales* and this is followed in Liu et al. (2017) and Wijayawardene et al. (2018).

Immotthia M.E. Barr, *Mycotaxon* 29: 504 (1987)

Hyperparasitic on stromata of *Hypoxylon* sp. on *Fraxinus*, *Salix*, *Acer*, other hardwoods, and on apothecia of *Pestalopezia rhododendri* on leaves of *Rhododendron maximum*. Sexual morph: *Ascostromata* effuse, dark, numerous, superficial ascomata. *Ascomata* black, densely aggregated in large groups or loosely scattered, superficial subglobose to obpyriform, or inequilateral, uniloculate, glabrous, slightly rough, ostiole, central, with pore-like opening. *Peridium* comprising hyaline to pale brown cells, arranged in a *textura prismatica* to *textura angularis*. *Hamathecium* comprising trabeculate cellular pseudoparaphyses, distinctly septate, embedded in a hyaline gelatinous matrix. *Asci* 8-spored, bitunicate, fissitunicate, cylindrical, short-pedicellate, furcate pedicel, apically rounded. *Ascospores* overlapping 1-seriate, ellipsoidal to fusiform, brown to reddish brown, 1-septate, slightly constricted at the septum, round ends, rough-walled, echinulate. Asexual morph: coelomycetous asexual morphs with 1- or 2-celled conidia, like *Chaetophoma*, *Coniothyrium* and *Pyrenochaeta* (Jaklitsch et al. 2002, Akulov & Hayova 2016, Hyde et al. 2017).

Type species – *Immotthia hypoxylon* (Ellis & Everh.) M.E. Barr

Notes – Barr (1987c) assigned the genus *Immotthia*, which is typified by *Immotthia hypoxylon* (Ellis & Everh.) M.E. Barr (\equiv *Amphisphaeria hypoxylon* Ellis & Everh.), to *Dacampiaceae* (*Dacampieae*). Species are characterized by obpyriform to globose ascomata, usually gregarious on hypostroma, trabeculate pseudoparaphyses (*sensu* Liew et al. 2000), bitunicate asci, and fusoid, pigmented, 1-septate ascospores. Jaklitsch et al. (2002) synonymized *I. hypoxylon* under *I. atrograna* based on priority. Hyde et al. (2017) examined the type species of *Immotthia hypoxylon* (type of *Amphisphaeria hypoxylon*) and tentatively placed it in *Roussoellaceae*, based on the similar morphology of *Immotthia* and *Roussoella*. Both genera have brown, fusiform to ellipsoidal, 2-celled ascospores, cylindrical asci and a coelomycetous asexual morph with brown conidia, although *Immotthia* differs as its ascomata are borne on a basal ascostromata.

Barr (2002) published a new combination, *Immotthia atroseptata* (Piroz.) M.E. Barr, based on the description and illustration of *Didymosphaeria atroseptata* by Pirozynski (1973), and placed it in the *Teichosporaceae*. We re-examined the holotype specimen of *Immotthia atroseptata* (\equiv *Didymosphaeria atroseptata*) and place it in *Roussoellaceae* following Hyde et al. (2017). Type specimens of *Immotthia* species including fresh collections have been examined and placed in various families viz. *Dacampiaceae*, *Teichosporaceae* and *Roussoellaceae* (Jaklitsch et al. 2002, Zhang et al. 2012, Akulov & Hayova 2016, Hyde et al. 2017). Molecular data is needed to clarify the natural placement of *Immotthia*.

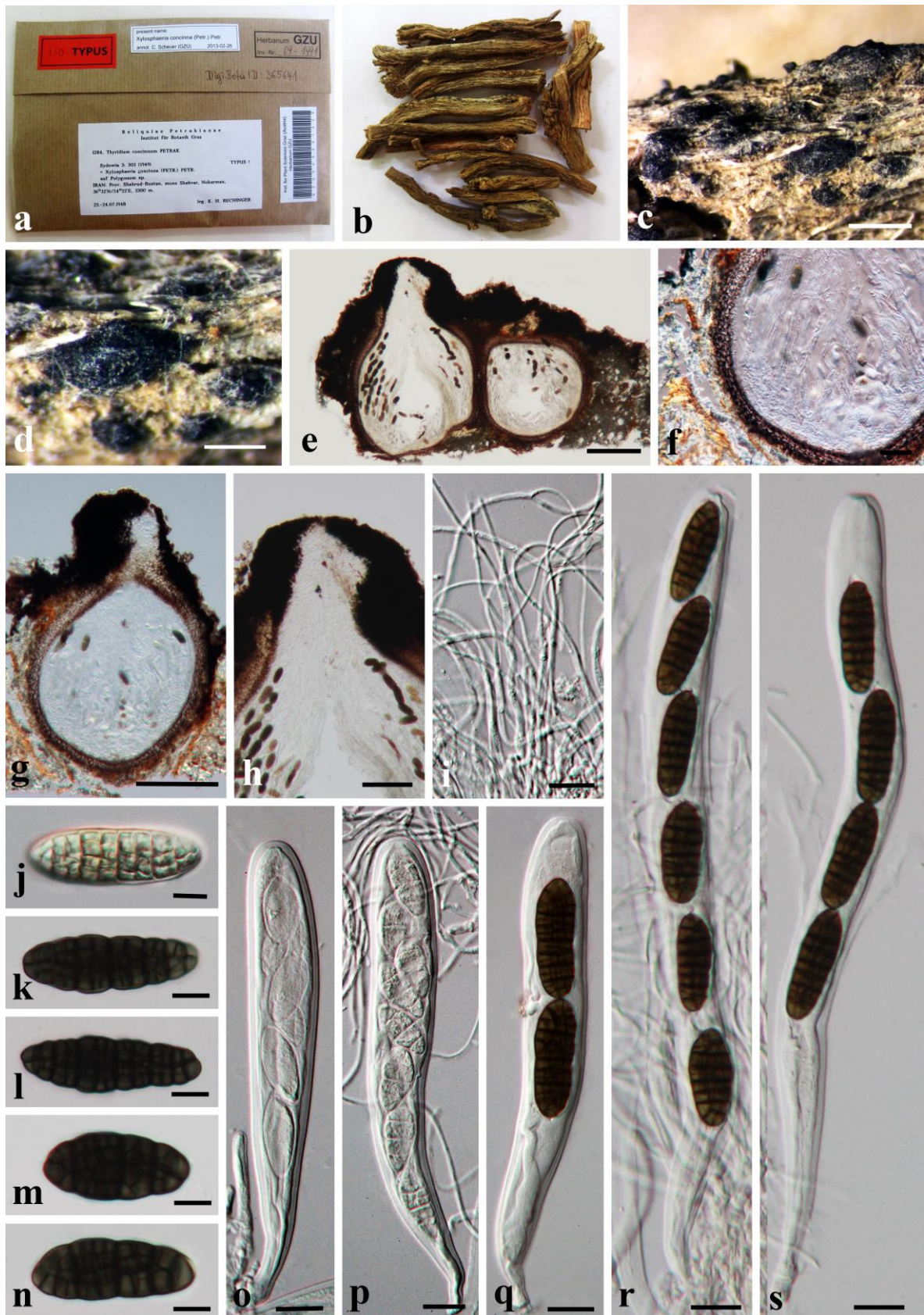


Figure 28 – *Platystomum concinnum* (GZU 000301526, isotype of *Thyridium concinnum*). a Herbarium label. b Herbarium specimen. c, d Appearance of black ascomata on the host. e, g Vertical sections of ascomata with asci inside. f Peridium. h Ostiole. i Pseudoparaphyses. j–n Ascospores. o–s Asci. Scale bars: c = 1000 μ m, d = 500 μ m, e, g = 100 μ m, f = 20 μ m, h = 50 μ m, i, o–s = 10 μ m, j–n = 5 μ m.

Immotthia atroseptata (Piroz.) M.E. Barr, Mycotaxon 82: 383 (2002)

Fig. 29

≡ *Didymosphaeria atroseptata* Piroz., Mycologia 65(4): 761 (1973)

Index Fungorum number: IF375054; Facesoffungi number: FoF04642

Hyperparasitic on apothecia of *Pestalopezia rhododendri* on fallen leaves of *Rhododendron maximum*. Sexual morph: *Ascomata* 190–350 µm high × 170–250 µm diam. (\bar{x} = 240 × 195 µm, n = 10), a pseudothecium, black, simple or aggregated, immersed to erumpent or superficial, globose to obpyriform, with inconspicuous ostiole. *Peridium* 35–50 µm thick at the sides, composed of cells of *textura angularis*, comprising two layers, outer layer reddish brown to pale brown, thick-walled, inner layer comprising 3–5 cell layers, light brown to hyaline, thin-walled. *Hamathecium* comprising trabeculate, hypha-like pseudoparaphyses. *Asci* 62–95 × 8–11 µm (\bar{x} = 70 × 10 µm, n = 15), 8-spored, bitunicate, hyaline, cylindrical, apically rounded with an ocular chamber, with a short furcate pedicel. *Ascospores* 13–17.5 × 4.5–6 µm (\bar{x} = 15 × 5 µm, n = 25), overlapping 1–2-seriate, ellipsoid to fusiform, brown to reddish brown, 1-septate with conspicuous brown median septum, constricted at the septum, asymmetrical with upper cell slightly wider than lower cell, apiculate, smooth-walled. Asexual morph: Undetermined.

Material examined – USA, North Carolina, behind N. C. Dept. Agr. Nursery Inspection Station, one mile west of Linville, Avery Co., on apothecia of *Pestalopezia rhododendri* on leaves of *Rhododendron maximum* L. (*Ericaceae*), 21 March 1972, Neli Lapp (DAOM 139001, holotype of *Didymosphaeria atroseptata*).

Testudinaceae Arx, Persoonia 6(3): 366 (1971)

The family *Testudinaceae* was introduced by von Arx (1971) and formerly comprised *Argynna*, *Lepidosphaeria*, *Neotestudina*, *Pseudophaeotrichum* and *Testudina* (type genus). Their characteristics are “astomatous ascomata with a dark peridium, which is often made up of plates, with bitunicate asci, and dark 2-celled ascospores, about 10 µm long” (von Arx 1971). Hawksworth (1979) accepted nine genera and provided a key to the genera. *Ulospora* was later introduced in *Testudinaceae* (Hawksworth 1979). *Argynna* was transferred to the family *Argynnaceae* by Shearer & Crane (1980). Lumbsch & Huhndorf (2010) listed four genera in the family. Hyde et al. (2013) accepted five genera in a key to genera of this family. *Angustospora* was subsequently established in *Testudinaceae* (Li et al. 2016). Wijayawardene et al. (2018) accept seven genera. The results of DNA sequence-based phylogenies of some genera in *Testudinaceae* were presented in Kruys et al. (2006), Schoch et al. (2009), Suetrong et al. (2009), Zhang et al. (2009b), but they were based on mostly unverified cultures. A synopsis of genera in *Testudinaceae* was provided in Wanasinghe et al. (2017). The taxonomic placement should be confirmed with verified cultures.

Lepidosphaeria Parg.-Leduc, C. r. hebd. Séanc. Acad. Sci., Paris, Sér. D 270: 2786 (1970)

Saprobic isolated from soil. Sexual morph: *Ascomata* cleistothecial, black, simple or aggregated, immersed to erumpent or superficial, globose to subglobose. *Hamathecium* comprising numerous branched, filiform, hypha-like, septate, pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, hyaline, elongate-clavate, with a long pedicel, thick-walled, apically rounded, lacking an evident ocular chamber. *Ascospores* overlapping 2–3-seriate, ornamented, finely echinulate, oblong, tuberculate, 2-celled, brown to pale brown, septate, darker near the septum, constricted at the septum, minute granules, verrucose, guttulate, with obtuse to rounded ends. Asexual morph: Undetermined.

Type species – *Lepidosphaeria nicotiae* Parg.-Leduc

Notes – The monotypic *Lepidosphaeria* was established by Parguey-Leduc (1970) with *Lepidosphaeria nicotiae* as the type species. *Lepidosphaeria nicotiae* is and known only from sand (Hawksworth 1979). Characteristics are small ascospores that lack furrows, darker near the septum, and have minute granulate ornamentation (Hawksworth 1979). The genus was accommodated in *Testudinaceae* following DNA sequence-based phylogenies by Schoch et al. (2009), Zhang et al. (2009b) and Wanasinghe et al. (2017).

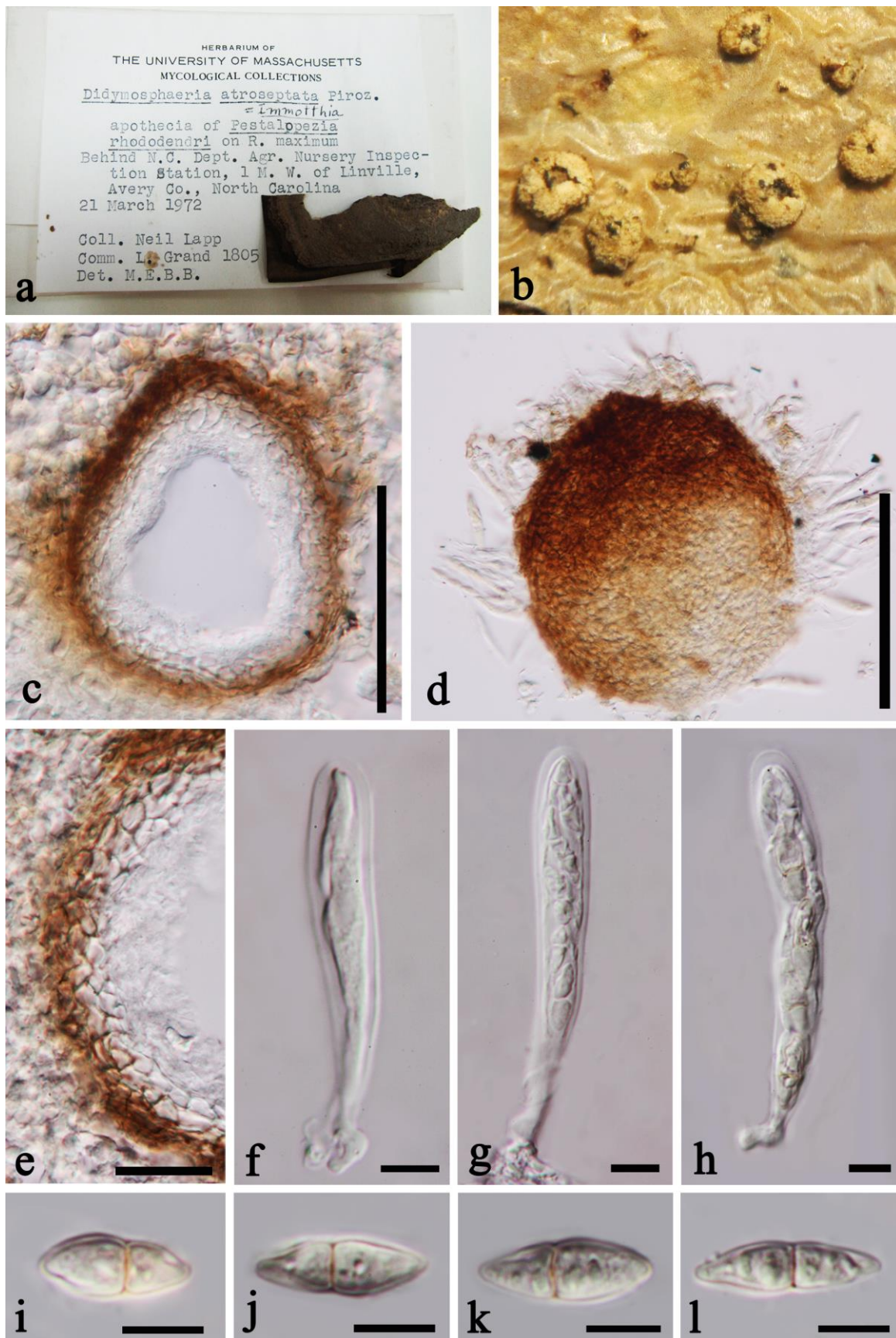


Figure 29 – *Immotthia atroseptata* (DAOM 139001, holotype of *Didymosphaeria atroseptata*). a Herbarium label and specimen. b Ascomata on apothecia of *Pestalopezia rhododendri*. c Vertical section through ascoma. d Exterior of ascoma with asci. e Peridium. f Immature ascus. g, h Asci. i–l Ascospores. Scale bars: c, d = 50 μ m, e = 20 μ m, f–l = 5 μ m.

Lepidosphaeria nicotiae Parg.-Leduc, Publ. Staz. Zool. Napoli, I 270: 2786 (1970)

Fig. 30

Index Fungorum number: IF316487; Facesoffungi number: FoF04643

Saprobic isolated from soil. Sexual morph: *Ascomata* 345–490 μm high \times 375–613 μm diam. (\bar{x} = 385 \times 505 μm , n = 10), cleistothecial, black, simple or aggregated, immersed to erumpent or superficial, globose to subglobose. *Peridium* dark, subdivided into plates. *Hamathecium* comprising numerous 1.5–3.5 μm diam., branched, filiform, hyphal-like, septate pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 50–79 \times 9.5–15 μm (\bar{x} = 63 \times 12 μm , n = 20), 8-spored, bitunicate, hyaline, elongate-clavate, apically rounded, pedicellate, with a long stalk, thick-walled, lacking an evident ocular chamber. *Ascospores* 8–10 \times 4.5–7 μm (\bar{x} = 9 \times 6 μm , n = 30), 2–3-seriate, ornamented, finely echinulate, oblong, tuberculate, brown to pale brown, 1-septate, darker near the septum, constricted at the septum, minute granules, verrucose, guttulate, with obtuse to rounded ends. Asexual morph: Undetermined.

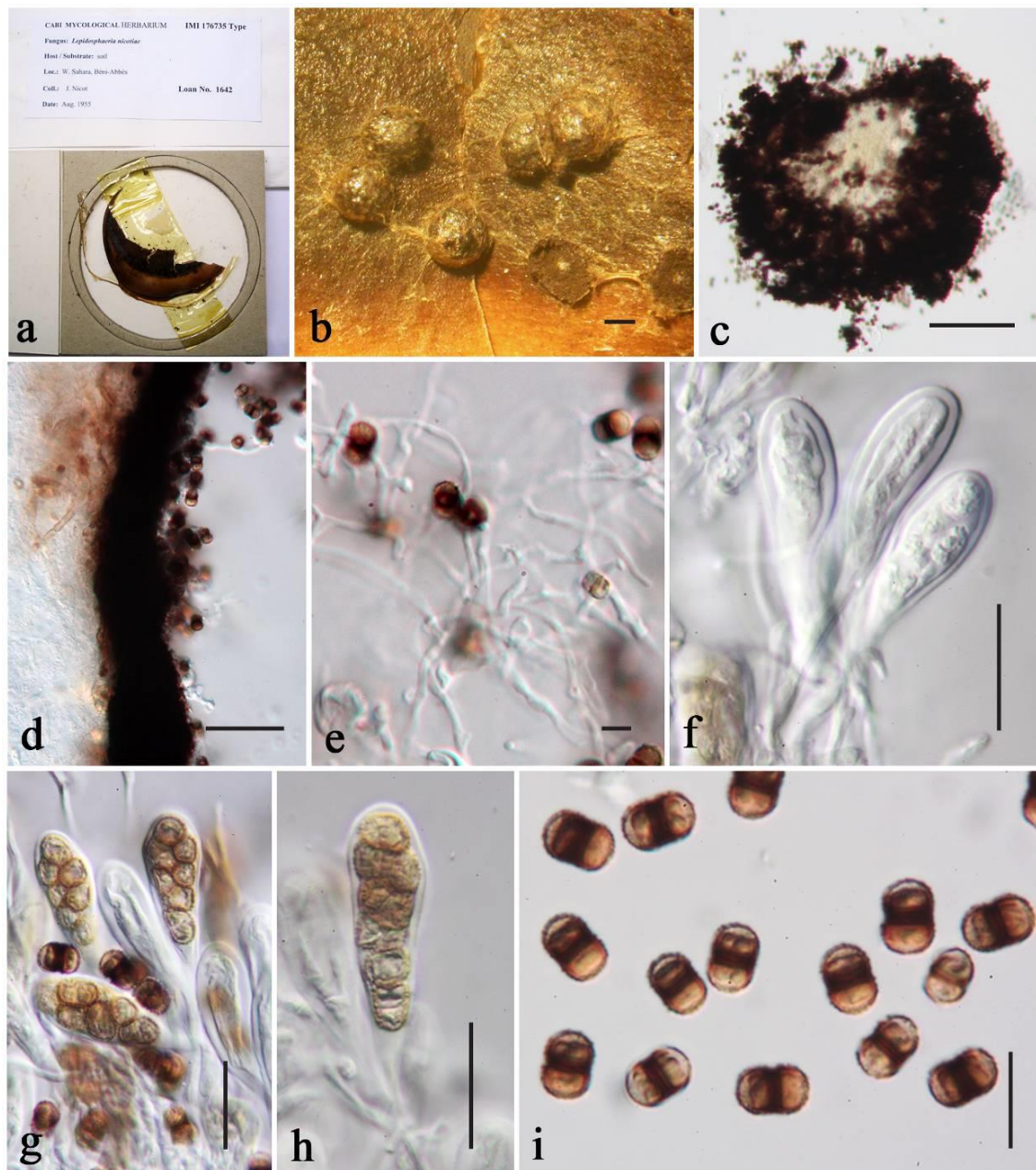


Figure 30 – *Lepidosphaeria nicotiae* (IMI 176735, holotype). a Herbarium label and habit on dry culture. b Appearance of ascomata on dry culture. c Vertical section of ascoma. d Peridium. e Pseudoparaphyses and ascospores. f Immature asci. g, h Mature asci. i Ascospores. Scale bars: b, c = 200 μm , d = 50 μm , e = 5 μm , f–h = 20 μm , i = 10 μm .

Material examined – AFRICA, Northern Africa, Western Sahara, Béni-Abbés, from sandy soil, August 1955, J. Nicot (IMI 176735, holotype).

Neotestudina Segretain & Drestombes, C. r. hebd. Séanc. Acad. Sci. Paris 253: 2579 (1961)

Saprobic isolated from soil. Sexual morph: *Ascomata* cleistothecial, black, simple or aggregated, scattered, immersed to erumpent or superficial, globose to subglobose. *Hamathecium* comprising numerous, branched, filiform, hyaline, hyphal-like, septate pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, obovate or nearly sphaerical, apically rounded, pedicellate, thick-walled. *Ascospores* 1-seriate or crowded, ornamented, glabrous, ellipsoid, brown to pale brown, 1-septate, not darker near the septum, with rounded ends, smooth-walled. Asexual morph: Undetermined.

Type species – *Neotestudina rosatii* Segretain & Destombes

Notes – Segretain & Destombes (1961) introduced the genus *Neotestudina* based on *Neotestudina rosatii* as the type species. *Neotestudina* is characterized by ascomata that are superficial, cleistothecioid, black 100 to 200 µm diam. and globose, which split from an opening. The peridium is smooth, multilayered, and pseudoparenchymatous. *Asci* are 4- or 8-spored, bitunicate, broadly ellipsoidal, and cylindrical or oblong, forming laterally on ascogenous hyphae. Pseudoparaphyses are sparse and trabeculate. *Ascospores* are dark brown, ellipsoid, 1-septate, with a small germ pore at each end, uniseriate or crowded in the *asci* (Howard 1983, 2002, Hawksworth 1979, Barr 1990, Hyde et al. 2013). However, we could not clearly see a germ pore at each end of *ascospores* from the type specimen. The genus has three species epithets (Index Fungorum 2018). *Neotestudina rosatii* has a wide distribution in many countries including Australia, Cameroun, Guinea, India and Nigeria (Hawksworth 1979). It is recorded as a human pathogen (Hawksworth et al. 1988, Pilsczek & Augenbraun 2007, Taylor 2015). A DNA based phylogeny showed that *Neotestudina rosatii* (CBS 690.82) resides in *Testudinaceae* (Kruys et al. 2006, Suetrong et al. 2009, Wanasinghe et al. 2017).

Neotestudina rosatii Segretain & Drestombes, C. r. hebd. Séane. Acad. Sci. Paris 253: 2579 (1961)

Figs 31, 32

≡ *Zopfia rosatii* (Segretain & Destombes) D. Hawksw. & C. Booth, Mycol. Pap. 135: 27 (1974)

= *Pseudodelitschia coriandri* J.N. Kapoor, Bahl & S.P. Lal [as '*corianderi*'], Kavaka 3: 127 (1976)

= *Pseudophaeotrichum sudanense* Arx, E. Müll. & C. Stoll, Nova Hedwigia 17: 84 (1969)

Index Fungorum number: IF335143; Facesoffungi number: FoF04644

Pathogenic and *saprobic* on humans and soil, respectively. Sexual morph: *Ascomata* cleistothecial, black, simple or aggregated, scattered, immersed to erumpent or superficial, globose. *Peridium* outer layers thick-walled, black to reddish, composed of *textura angularis* cells, inner layers thin-walled, pale brown to hyaline, composed of *prismatica* cells. *Ascospores* 9–12 × 6–9 µm (\bar{x} = 10.5 × 7 µm, n = 30), 1-seriate or crowded, glabrous, ellipsoid, brown, 1-septate, with rounded to obtuse ends, smooth-walled. Asexual morph: Undetermined.

Material examined – SUDAN, Wad Madani, from soil, 14 November 1966, A. Riggenschach (IMI 173129, holotype = ex-isotype of *Pseudophaeotrichum sudanense*).

Ulospora D. Hawksw., Malloch & Sivan., in Hawksworth, Can. J. Bot. 57(2): 96 (1979)

Saprobic on dead leaves. Sexual morph: *Ascomata* cleistothecial, black, simple, scattered, erumpent to superficial, globose to subglobose, carbonaceous, pseudoparenchymatous, without ostiole. *Peridium* composed of *textura angularis* cells comprising two layers, outer layer comprising black, thick-walled cells, inner layer comprising hyaline, thin-walled cells. *Hamathecium* numerous branched, filiform, hyphal-like, septate pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, hyaline, ovoid to pyriform, apically rounded, pedicellate, thick-walled. *Ascospores* glabrous, ellipsoid, brown to dark brown, septate, 1-septate,

constricted at the septum, with rounded ends, guttulate, with germ-slits, smooth-walled. Asexual morph: Undetermined.

Type species – *Ulospora bilgramii* (D. Hawksw., C. Booth & Morgan-Jones) D. Hawksw., Malloch & Sivan.

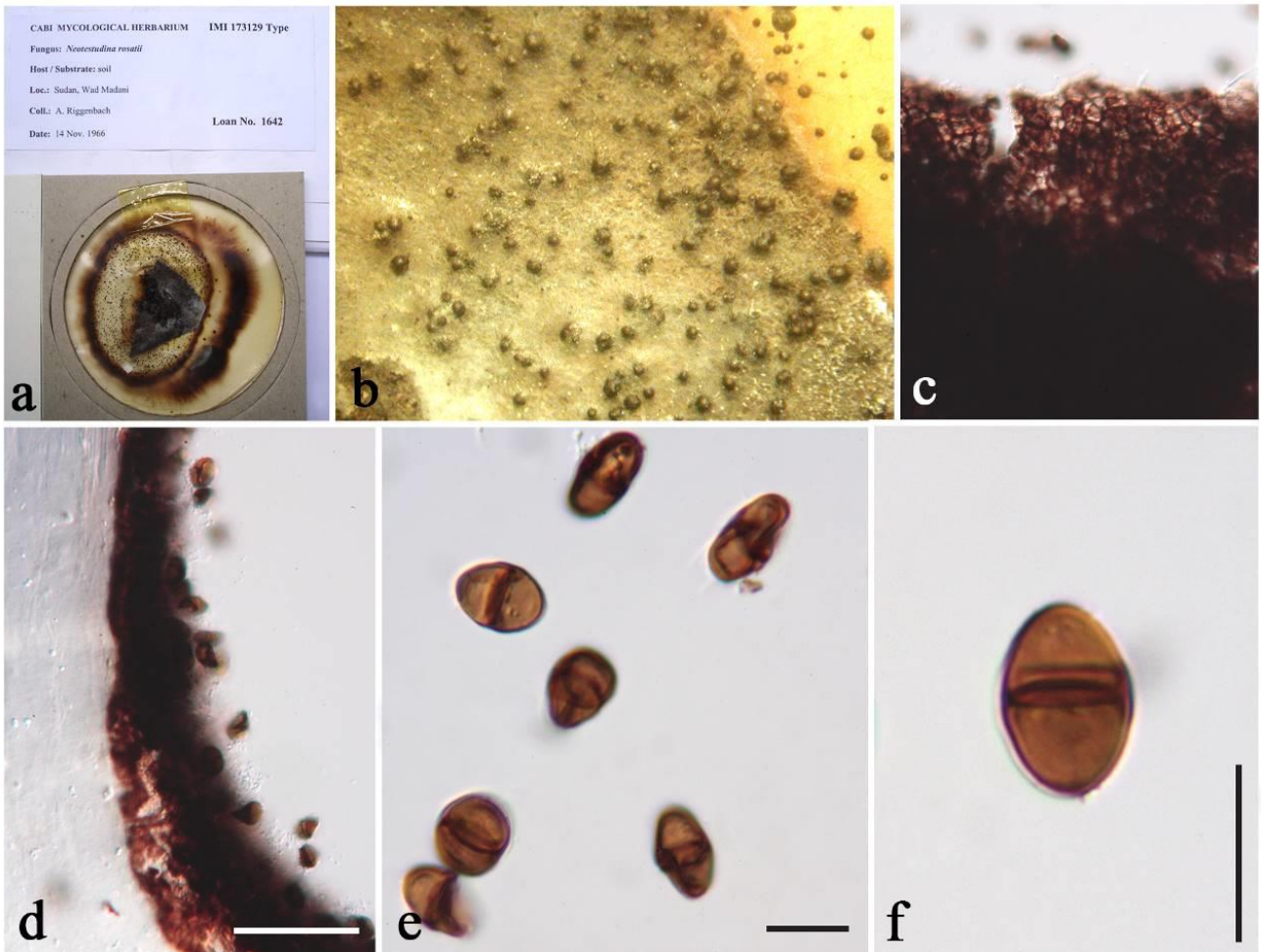


Figure 31 – *Neotestudina rosatii* (IMI 173129, holotype). a Herbarium label and habit on dry culture. b Appearance of ascomata on dry culture. c, d Peridium. e, f Ascospores. Scale bars: d = 40 μ m, e, f = 10 μ m.

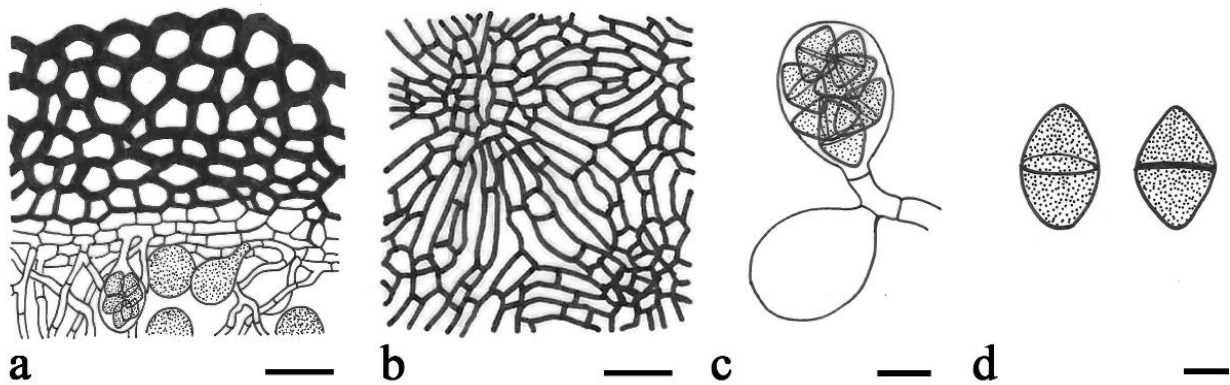


Figure 32 – *Neotestudina rosatii* (redrawn from Howard 2002, Page 460, Fig. 109). a Cortical, subcortical, and ascogenous tissues. b Surface view of the peridium. c Asci with ascospores. d Ascospores. Scale bars: a = 30 μ m, b = 40 μ m, c = 10 μ m, d = 5 μ m.

Notes – *Ulospora* was introduced with *Ulospora bilgramii* (\equiv *Zopfia bilgramii* D. Hawksw., C. Booth & Morgan-Jones) as the type species in *Testudinaceae* by Hawksworth (1979). The type species was originally described from *Cassia simea*. It is characterized by ascomata that are subglobose, black, non-ostiolate, carbonaceous, and pseudoparenchymatous. Asci are ovoid to pyriform, bitunicate, evanescent, and irregularly arranged. Ascospores are 1-septate, brown, smooth-walled, with three to six (most commonly five) longitudinal fissures (Hawksworth 1979). Mugambi & Huhndorf (2009), Suetrong et al. (2009), Hyde et al. (2003) and Wanasinghe et al. (2017) grouped an unverified culture of *U. bilgramii* (CBS 101364) in *Testudinaceae* based on phylogenetic analysis. Lumbsch & Huhndorf (2007, 2010) and Wijayawardene et al. (2018) listed *Ulospora* in *Testudinaceae*.

Ulospora bilgramii (D. Hawksw., C. Booth & Morgan-Jones) D. Hawksw., Malloch & Sivan., Can. J. Bot. 57(2): 96 (1979) Fig. 33

\equiv *Zopfia bilgramii* D. Hawksw., C. Booth & Morgan-Jones, Mycol. Pap. 135: 10 (1974)

Index Fungorum number: IF325237; Facesoffungi number: FoF04645

Saprobic on dead leaves of *Cassia simea*. Sexual morph: *Ascomata* 120–175 μm high \times 135–230 μm diam. (\bar{x} = 145 \times 175 μm , n = 10), cleistothecial, black, simple, scattered, erumpent to superficial, globose to subglobose, carbonaceous, pseudoparenchymatous, without ostiole. *Peridium* 25–50 μm thick, composed of *textura angularis* cells comprising two layers, outer layer comprising black, thick-walled cells, inner layer comprising hyaline, thin-walled cells. *Hamathecium* comprising numerous, branched, filiform, hypha-like, septate pseudoparaphyses, embedded in a gelatinous matrix. *Ascospores* 11–16 \times 5–9 μm (\bar{x} = 13.5 \times 7 μm , n = 30), glabrous, ellipsoid, brown to dark brown, 1-septate, constricted at the septum, with rounded ends, guttulate, with germ-slits, smooth-walled. Asexual morph: Undetermined.

Material examined – INDIA, Jodhpur, on *Cassia simea* Oliv. (*Leguminosae*), 27 September 1966, K.S. Bilgrami (IMI 120811, holotype).

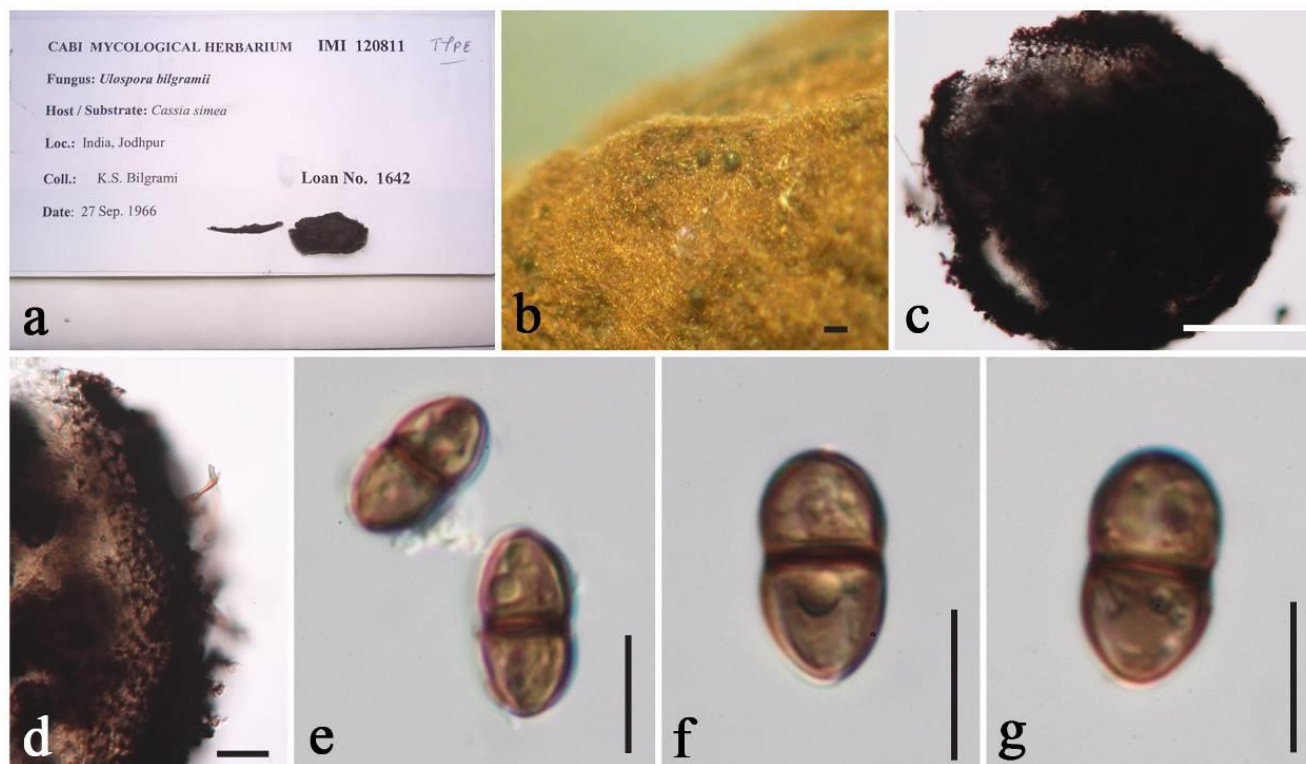


Figure 33 – *Ulospora bilgramii* (IMI 120811, holotype). a Herbarium label and specimen. b Appearance of ascomata on host surface. c Vertical section of ascoma. d Peridium. e–g Ascospores. Scale bars: b = 200 μm , c = 100 μm , d = 20 μm , e–g = 20 μm .

Pleosporales, genus incertae sedis

Homostegia Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 223 (1870) [1869-70]

Lichenicolous. Sexual morph: *Ascomata* perithecial, carbonaceous, fragile, black, solitary, scattered, or in small groups, grey inside, orbicular to irregular. *Ostioles* on the stroma surface minute, papillate. *Asci* 8-spored, oblong to clavate, pedicellate. *Ascospores* 1–3-septate to multiseptate, sometimes muriform, septa, obovoid to ellipsoid, blunt or curved at the ends. Asexual morph: Undetermined.

Type species – *Homostegia adusta* Fuckel, \equiv *H. piggottii* (Berk. & Broome) P. Karst.

Notes – Fuckel (1870) introduced *Homostegia* with *H. adusta* as type species. The genus was classified in *Dothideomycetes*, genera *incertae sedis* (Wijayawardene et al. 2018). Unfortunately, we did not study type specimen of *Homostegia adusta*, a species now considered, because of priority as a synonym of *H. piggottii*. *Homostegia piggottii* (lectotype) is described herein. We classify *Homostegia* in *Pleosporales*, genera *incertae sedis* and its family placement remains undetermined. Fresh collections, particular of the type species are required to confirm their natural classification.

Homostegia piggottii (Berk. & Broome) P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 222 (1873)

Fig. 34

\equiv *Dothidea piggottii* Berk. & Broome, Ann. Mag. nat. Hist., Ser. 2 9: 385 (1852)

Index Fungorum number: IF150886; Facesoffungi number: FoF04649

Lichenicolous on thallus of *Parmelia* spp. Sexual morph: *Ascomata* black, solitary, scattered, or in small groups, discoid, irregular to rounded, easily removed from the substrate, multiloculate, wall black to brownish red, roughened, dehiscence via an irregular slit appearing on upper part of the wall. *Locules* globose to subglobose, forming a single layer within ascostromata. *Peridium* one layered, composed of highly pigmented cells of *textura angularis*, reddish brown. *Hamathecium* dense with cellular, hyaline, septate pseudoparaphyses. *Asci* 55–64 \times 16–20 μm (\bar{x} = 61 \times 17, n = 20), 8-spored, bitunicate, fissitunicate dehiscence not observed, obovoid to broadly cylindrical, with short, broad, hamate-shaped pedicel. *Ascospores* 18–22 \times 7–10 μm (\bar{x} = 20 \times 9, n = 20), partially overlapping, fusiform to ellipsoid to broadly ellipsoid, brown to reddish brown, 3 transverse septa, constricted at septa, slightly curved, smooth-walled. Asexual morph: Undetermined.

Material examined – UK, Caernarvonshire, on thallus of *Parmelia omphalodes* (L.) Ach. (*Parmeliaceae*), 1849, anon. (ex herb. H. Piggot) (K(M) 176033, lectotype of *Dothidea piggottii*).

Venturiales Y. Zhang et al., C.L. Schoch & K.D. Hyde, in Zhang, Crous, Schoch, Bahkali, Guo & Hyde, Fungal Diversity 51(1): 251 (2011)

Venturiaceae E. Müll. & Arx ex M.E. Barr, Mycologia 71(5): 947 (1979)

Venturiaceae has been formerly placed in the order *Pleosporales* based on its “*Pleospora* type of centrum and bitunicate asci” (Barr 1968, 1979). However, phylogenetic studies did not support *Venturiaceae* in *Pleosporales* (Kodsueb et al. 2006b, Krüys et al. 2006, Winton et al. 2007). Zhang et al. (2011) introduced *Venturiales* which also includes the family *Sympoventuriaceae*. The members of *Venturiaceae* are saprobes, parasites and pathogens on living or dead plants (Scholtysik et al. 2013, Ibrahim 2014, Ibrahim et al. 2016, Zhang et al. 2016). Twelve genera are accommodated in the *Venturiaceae* (Wijayawardene et al. 2018).

Venturia E. Müll. & Arx ex M.E. Barr 1979, Mycologia 71: 947 (1979)

Parasitic or saprobic on dicotyledonous leaves. Sexual morph: *Ascomata* pseudothecia, black, solitary, scattered, small, initially immersed, becoming erumpent, globose, with setae on top, ostiole papillate. *Setae* arising from the top of ascomata, black to dark brown, erect to flexuous, unbranched, septate, swollen at the base, smooth. *Peridium* composed of cells of *textura angularis*, comprising two layers, outer layer; dark brown, thick-walled cells, inner layer comprising 2–3 cell layers, light brown to hyaline. *Hamathecium* of hyaline, septate, hyphae-like pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, oblong to obclavate, thick-walled, knob-like pedicel or

pedicel lacking, apically rounded with indistinct ocular chamber. *Ascospores* ellipsoid, olivaceous, thin-walled, 1-septate, initially hyaline, becoming pale brown, upper cell shorter and wider than lower cell, slightly constricted at septum, smooth-walled, verrucose. Asexual morph: hyphomycetous (Wijayawardene et al. 2017a, Shen et al. 2016).

Type species – *Venturia inaequalis* (Cooke) G. Winter
 ≡ *Sphaerella inaequalis* Cooke 1866

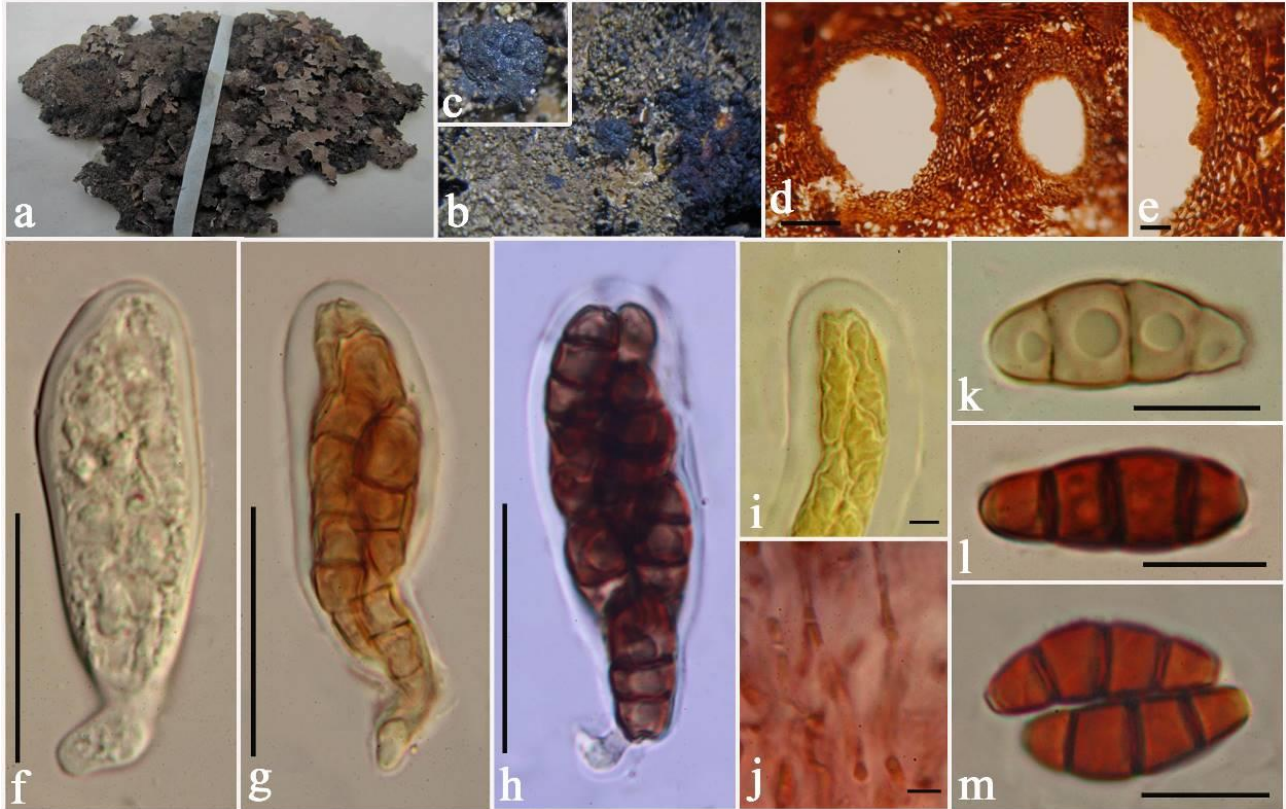


Figure 34 – *Homostegia piggotii* (K(M) 176033, lectotype of *Dothidea piggotii*). a Host substrate. b Ascomata on host substrate. c Close up of ascoma. d Section of ascomata. e Close up of the peridium. f–h Asci. i Asci stained in Melzer's reagent. j Pseudoparaphyses stained in Congo red. k–m Ascospores with 3-septa. Scale bars: d = 100 μ m, e = 30 μ m, f–h = 30 μ m, i = 10 μ m, j = 5, k–m = 10 μ m.

Notes – *Venturia* was described by De Notaris (1844) to accommodate *V. rosea* and *V. dianthi* but no type species was designated. Later, many species of *Venturia* were introduced. Saccardo (1882) amended the description of *Venturia*, and excluded both *V. rosea* and *V. dianthi*, and designated *V. inaequalis* (Cooke) G. Winter as the neotype species. Species of *Venturia* are widely distributed in various plant families such as *Caprifoliaceae* and *Oleaceae* (Ibrahim et al. 2016, Zhang et al. 2016). They can be saprobes, parasites, endophytes or pathogens (Scholtysik et al. 2013, Ibrahim 2014). *Venturia inaequalis* causes apple scab (Vaillancourt & Hartman 2000, Ward 2012), while *V. pyrina* causes pear scab (Sokolova et al. 2014). The sexual morph of *Venturia* is commonly formed on overwintered litter, while the asexual morph can appear soon after leaf fall, or in the case of pathogens have already formed in leaf spots during the vegetation period (Ibrahim et al. 2016). The sexual morph are pseudothecia immersed in the host tissue and becoming erumpent. Many species have setae around the ostiole (Sivanesan 1977, 1984).

Venturia chlorospora (Ces.) P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 189 (1873)
 ≡ *Sphaeria chlorospora* Ces., Erb. critt. Ital., Ser. 1, fasc. 2: no. 296 (1859)
 Index Fungorum number: IF199040; Facesoffungi number: FoF04646

Fig. 35

Parasitic or saprobic on dicotyledonous leaves. Sexual morph: *Ascomata* 60–115 µm high × 65–105 µm diam. (\bar{x} = 90 × 97 µm, n = 15), pseudothecia, black, solitary, scattered, initially immersed, becoming erumpent, globose, with setae on top, ostiole papillate. *Setae* up to 120 µm long, 5–11 µm wide at the base, 0.4–2 µm wide at the apex, arising from the top of ascomata, black to dark brown, erect to flexuous, unbranched, septate, swollen at the base, smooth. *Peridium* composed of *textura angularis* cells, comprising two layers, outer layer dark brown, thick-walled cells, inner layer; comprising 2–3 cell layers, light brown to hyaline. *Hamathecium* of 1–2.5 µm wide, hyaline, septate, hyphae-like pseudoparaphyses. *Asci* 42–66 × 12–16 µm (\bar{x} = 54 × 14 µm, n = 20), 8-spored, bitunicate, fissitunicate, oblong to obclavate, thick-walled, knob-like pedicel or pedicel lacking, apically rounded with indistinct ocular chamber. *Ascospores* 12–16 × 5–7 µm (\bar{x} = 13 × 6, n = 20), ellipsoid, olivaceous, thin-walled, 1-septate, initially hyaline, becoming pale brown, upper cell shorter and wider than lower cell, slightly constricted at septum, smooth-walled, verrucose. Asexual morph: Undetermined.

Material examined – GERMANY, on leaves of *Salix* sp., 25 May 2011, René Jarling.

Trypetheliales Lücking, Aptroot & Sipman, in Aptroot, Lücking, Sipman, Umaña & Chaves, *Bibliotheca Lichenol.* 97: 13 (2008)

Polycoccaceae Ertz, Hafellner & Diederich, in Ertz, Diederich, Lawrey, Berger, Freebury, Coppins, Gardiennet & Hafellner, *Fungal Diversity* 74: 82 (2015)

Ertz et al. (2015a) introduced the family *Polycoccaceae* to accommodate two genera, *Clypeococcum* and *Polycoccum* in *Trypetheliales* based upon morphological and molecular data. *Polycoccum* is designated as the type genus (Ertz et al. 2015a). *Clypeococcum* and *Polycoccum* were previously listed in *Dacampiaceae* (Lumbsch & Huhndorf 2010, Hyde et al. 2013, Wijayawardene et al. 2014). *Polycoccaceae* species are lichenicolous fungi (Hafellner 2015, Ertz et al. 2015a). They are characterized by “ascomata perithecioid, subglobose to obpyriform, solitary or in group, united by a clypeus or enclosed in galls, immersed, dark brown to black, ostiolate, with pore-like opening, thick peridial walls, arranged in a *textura angularis*; hamathecium anastomosed, hyphal filaments, trabeculate pseudoparaphyses with hymenial gel I+ blue to violet or unchanged; asci 2–8-spored, bitunicate, fissitunicate, cylindrical to subclavate and ascospores brown to dark brown, ellipsoid, 1-septate, smooth or delicately verruculose” (Ertz et al. 2015a). Phylogenetic analyses of LSU sequence data showed that *Polycoccaceae* formed a sister lineage with *Trypetheliaceae* in *Trypetheliales*, *Dothideomycetes* but other members of *Polycoccum* s. lat. were placed outside *Polycoccaceae* and allied together in the *Pleosporales* (Ertz et al. 2015a).

Clypeococcum D. Hawksw., *J. Linn. Soc., Bot.* 75: 196 (1977)

Lichenicolous. Sexual morph: *Pseudothecia* immersed to semi-immersed under a black clypeus, visible as rounded or patch-like spots on the lichen thallus, clustered, rarely scattered, globose to subglobose, or ovoid, dark brown to black, ostiole central, discrete to gaping, with pore-like opening. *Peridium* thin-walled, composed of 1–3 layers of brown to dark brown, pseudoparenchymatous cells, arranged in a *textura angularis*. *Hamathecium* composed of dense, filiform, branched, distinct septate, anastomosed, pseudoparaphyses, embedded in a hyaline gelatinous matrix. *Asci* 8-spored, bitunicate, ovoid to subcylindrical, usually short-pedicellate, apically rounded and thickened, with rounded ocular chamber. *Ascospores* overlapping 1–3-seriate, hyaline when young, becoming brown to dark brown when mature, ellipsoidal to fusiform, with rounded apex, 1-septate, constricted at septum, rough-walled, minutely verruculose. Asexual morph: Undetermined.

Type species – *Clypeococcum cladonema* (Wedd.) D. Hawksw.

Notes – *Clypeococcum* was introduced as a monotypic genus by Hawksworth (1977) to accommodate *Lecidea cladonema* Wedd., which was reported as a parasite on *Parmelia delisei* (Duby) Nyl. by Weddell (1874). There are 13 epithets listed in this genus (Index Fungorum 2018). *Clypeococcum* can be distinguished from *Polycoccum* Saut. ex Körb. based on its pseudothecial walls comprising *textura intricata* which are thickened around the ostiole and its pseudothecia

forming as groups united by a common clypeus (Hawksworth 1977, Hawksworth & Diederich 1988, Ertz et al. 2015a, Etayo 2017). *Polycoccum* forms clearly pseudothecial walls and its pseudothecia often forms on the host thallus, with a tendency to induce galls (Hawksworth 1977, Hawksworth & Diederich 1988, Ertz et al. 2015a, Etayo 2017). Based on morphological characters, the genus was placed in the *Pleosporaceae* (*Pleosporales*) by Hawksworth (1977). However, it has been transferred to *Dacampiaceae* and accepted by subsequent authors (Lumbsch & Huhndorf 2010, Hyde et al. 2013, Wijayawardene et al. 2014, 2018, Pirogov 2015, Jaklitsch et al. 2016). Ertz et al. (2015a) sequenced two representative species *Clypeococcum placopsiophilum* and *C. psoromatis* and treated *Clypeococcum* in a new family *Polycoccaceae* (*Trypetheliales*, *Dothideomycetes*) based on molecular phylogeny using nuLSU sequences. However, phylogenetic affinity of *Clypeococcum* still needs to be confirmed by the sequencing of its type species (Ertz et al. 2015a).

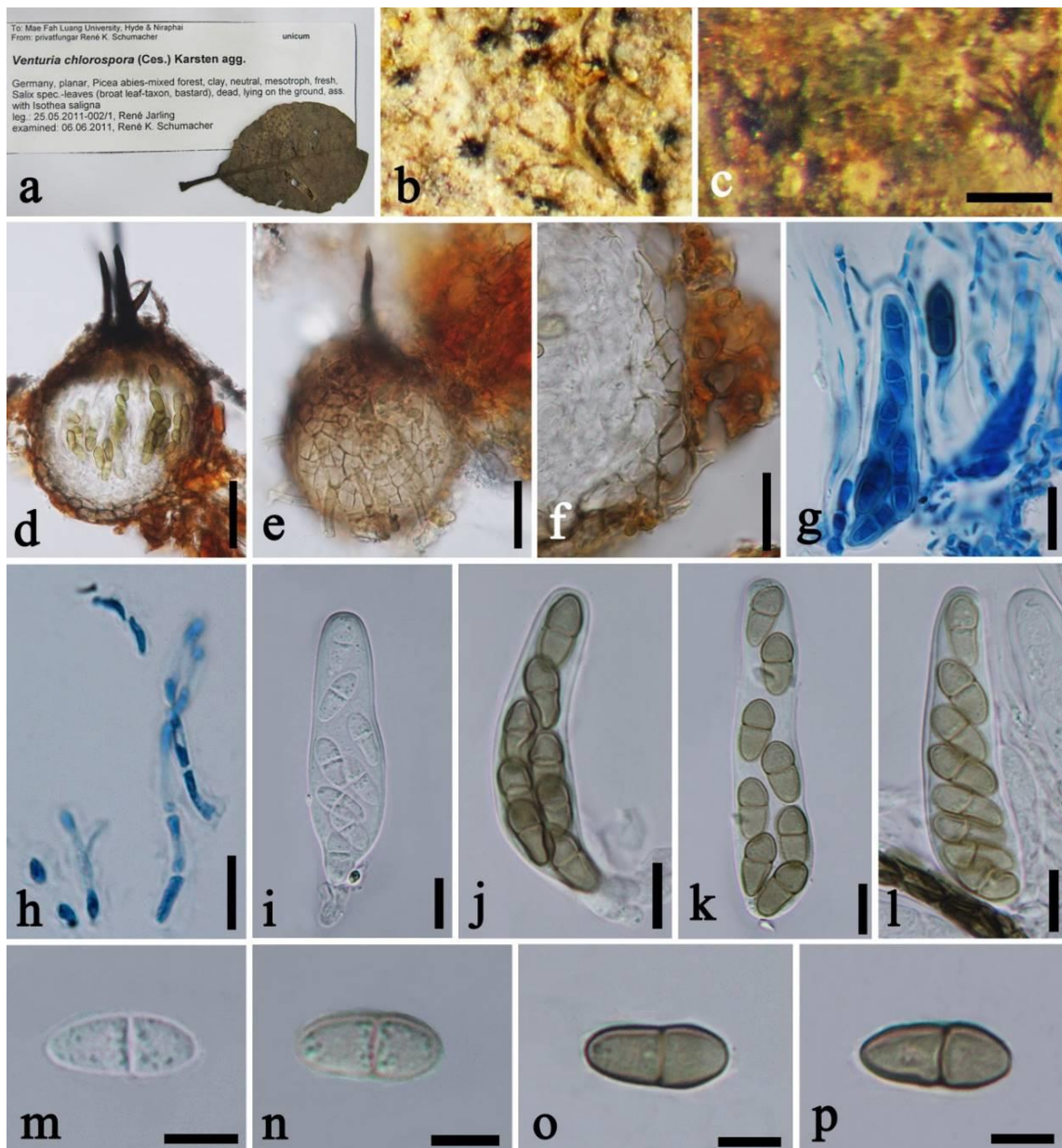


Figure 35 – *Venturia chlorospora*. a Material label and specimen. b Ascomata on substrate. c Close up of ascomata on substrate. d Vertical section through ascoma with seta. e Exterior of ascoma with setae. f Peridium. g Asci with pseudoparaphyses. h Pseudoparaphyses. i Immature ascus. j–l Mature asci. m Immature ascospore. n–p Ascospores. Note: g, h stained in lactophenol cotton blue. Scale bars: c = 100 μ m, d, e = 30 μ m, f = 10 μ m, g–l = 10 μ m, m–p = 5 μ m.

The type species, *Clypeococcum cladonema* can be distinguished from other *Clypeococcum* species by having smaller ascospores, 8-spored asci and forming pseudothecia immersed in patch-like clypeus. The species was reported as a parasite causing little damage on the thallus of *Parmelia delisei*, *Cetrelia olivetorum* (Ach.) Culb. & C. Culb and *Xanthoparmelia pulla* (Ach.) O. Blanco et al. (Hawksworth 1977, Pirogov 2015, Etayo 2017). Hawksworth (1977) examined the type specimen of *C. cladonema* from PC and mentioned that the species has hyphal-like pseudothecial walls (*textura intricata*) but becoming pseudoparenchymatous at maturity, with subcylindrical, short-pedicellate asci. However, we examined the isotype of *C. cladonema* from S and found that the species forms pseudothecial walls in a *textura angularis*, pseudoparenchymatous cells, with subcylindrical to ovoid asci.

Clypeococcum cladonema (Wedd.) D. Hawksw., Bot. J. Linn. Soc. 75(2): 197 (1977) Fig. 36

≡ *Lecidea cladonema* Wedd., Bull. Soc. bot. Fr. 21: 345 (1874)

Index Fungorum number: IF311399; Facesoffungi number: FoF04647

Lichenicolous on *Parmelia delisei*. Sexual morph: *Pseudothecia* 80–120 µm high, 80–120 µm diam. [60–150 µm diam., Hawksworth 1977], immersed under the clypeus [1.5 mm diam., Hawksworth 1977], visible as rounded or patch-like black spots on the lichen thallus, clustered, rarely scattered, globose to subglobose, or ovoid, dark brown to black, ostiole central, discrete to gaping, with pore-like opening. *Peridium* 8–25 µm wide [15–25 µm wide, Hawksworth 1977], thin-walled, composed of 1–3 layers of brown to dark brown, pseudoparenchymatous cells, arranged in a *textura angularis*. *Hamathecium* 1–2 µm wide [2.5–3.5 µm wide, Hawksworth 1977], composed of dense, filiform, branched, distinctly septate, anastomosed pseudoparaphyses, embedded in a hyaline gelatinous matrix. *Asci* 30–40 × 8–16 µm [60–70 × 10–14, Hawksworth 1977], 8-spored, bitunicate, ovoid to subcylindrical, usually short-pedicellate, apically rounded and thickened, with rounded ocular chamber. *Ascospores* (12–)15–17 × (4–)6–8 µm (\bar{x} = 15.2 × 6.8, n = 10) [(13.5–)14–16(–18) × (5.5–)6–7(–7.5) µm, Hawksworth 1977], overlapping 1–3-seriate, hyaline when young, becoming brown to dark brown when mature, ellipsoidal to fusiform, with rounded apex, 1-septate, constricted at septum, rough-walled, minutely verruculose. Asexual morph: Undetermined.

Material examined – FRANCE, Languedoc-Rousillon, Hérault, Rochers volcanique Agde, parasite on *Parmelia delisei*, 1907 (S-F9606, isotype of *Lecidea cladonema*).

Polycoccum Saut. ex Körb., Parerga lichenol. (Breslau) 5: 470 (1865)

Lichenicolous on various hosts. Sexual morph: *Ascomata* perithecioid, immersed to semi-immersed, visible as raised, black, shiny spot, enclosed in galls on host thallus, globose to subglobose, dark brown to black, scattered, gregarious in a gall. *Ostiole* apapillate. *Peridium* thin- to thick-walled, composed of several layers of small to large polyhedral, dark brown to black, pseudoparenchymatous cells, arranged in *textura angularis* to *textura epidermoidea*. *Hamathecium* composed of dense, curly filamentous, richly branched, anastomosed, cellular pseudoparaphyses. *Asci* 8-spored, bitunicate, subcylindrical to cylindrical-clavate, short-pedicellate, apically rounded, with ocular chamber. *Ascospores* 1–2-seriate, brown to dark brown, obovoid, 1-septate, constricted at septum, mostly upper cell larger than lower cell, smooth-walled. Asexual morph: Reported as coelomycete, forming pycnidia, with simple, oblong to elliptic, smooth-walled conidia (Zhurbenko 2010, Ertz et al. 2015a).

Type species – *Polycoccum tryptethelioides* (Th. Fr.) R. Sant.

Notes – The genus *Polycoccum* was introduced by Körber (1865) for the single species, *P. sauteri* Körber as the type species (now a synonym of *P. tryptethelioides*). The genus was regarded as a synonym of *Didymosphaeria* Fuckel by Saccardo (1882). However, *Polycoccum* is differentiated from *Didymosphaeria* by ascomatal structure and the generic name of *Polycoccum* was reinstated by Santesson (1960) and (Hawksworth & Diederich 1988). *Polycoccum* includes lichenicolous fungi on diverse hosts (Ertz et al. 2015a). Vězda (1969) provided a key to 10 *Polycoccum* species. Subsequently, Hawksworth & Diederich (1988) provided a key to *Polycoccum*

with 23 accepted species, while 29 epithets were excluded. Additional keys were also provided by Atienza et al. (2003) and Gardiennet (2012). Lawrey & Diederich (2015) accepted 57 species. New species were introduced regularly in the last decade (Brackel & Berger 2010, Zhurbenko & Dillman 2010, Halici et al. 2013, Hafellner 2015). *Polycoccum* was referred to *Pleosporaceae* by Eriksson & Hawksworth (1986). Subsequently, the genus was referred to *Dacampiaceae* based on morphology (Hawksworth & Diederich 1988). Ertz et al. (2015a) placed *Polycoccum* in *Polycoccaceae* on the basis of morphological and molecular data. *Polycoccum* is polyphyletic based on nuLSU sequence data in Ertz et al. (2015a). Their result showed that the members of *Polycoccum s. lat.* were included in the *Pleosporales* and closely related to lichenicolous Phoma-like species in family *Phaeosphaeriaceae*, while five isolates of *Polycoccum s. str.* nested together with *Clypeococcum* in *Polycoccaceae*. Thus, we give the descriptions and illustrations of type species herein as the foundation to facilitate identification. Our morphological observations were in accordance with the original description.

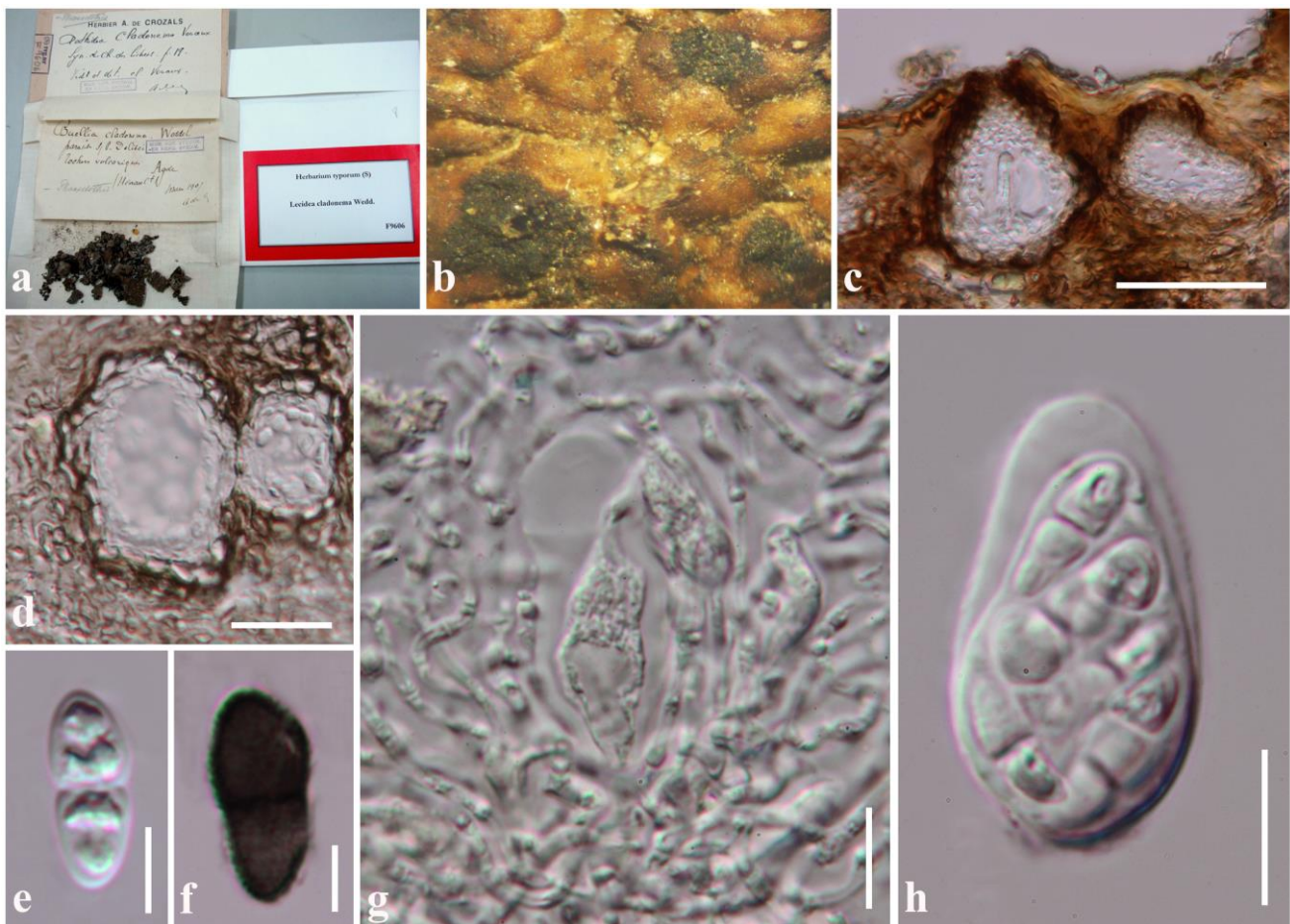


Figure 36 – *Clypeococcum cladonema* (S-F9606, isotype of *Lecidea cladonema*). a Herbarium label and specimen. b Dark clypeus visible as patch-like on the thallus surface. c Vertical section through ascoma immersed in the clypeus. d Section through peridium. e Immature ascospore. f Mature ascospore. g Immature ascus embedded in pseudoparaphyses. h Ascus. Scale bars: c = 50 μ m, d = 20 μ m, e, f = 5 μ m, g, h = 10 μ m.

Polycoccum tryptethelioides (Th. Fr.) R. Sant., Svensk bot. Tidskr. 54(4): 505 (1960) Fig. 37
 ≡ *Diatrype tryptethelioides* Th. Fr., Nova Acta R. Soc. Scient. upsal., Ser. 3 2(1): 317 (1858)
 ≡ *Polycoccum sauteri* Körb., Parerga lichenol. (Breslau) 5: 470 (1865)
 Index Fungorum number: IF207058; Facesoffungi number: FoF04648

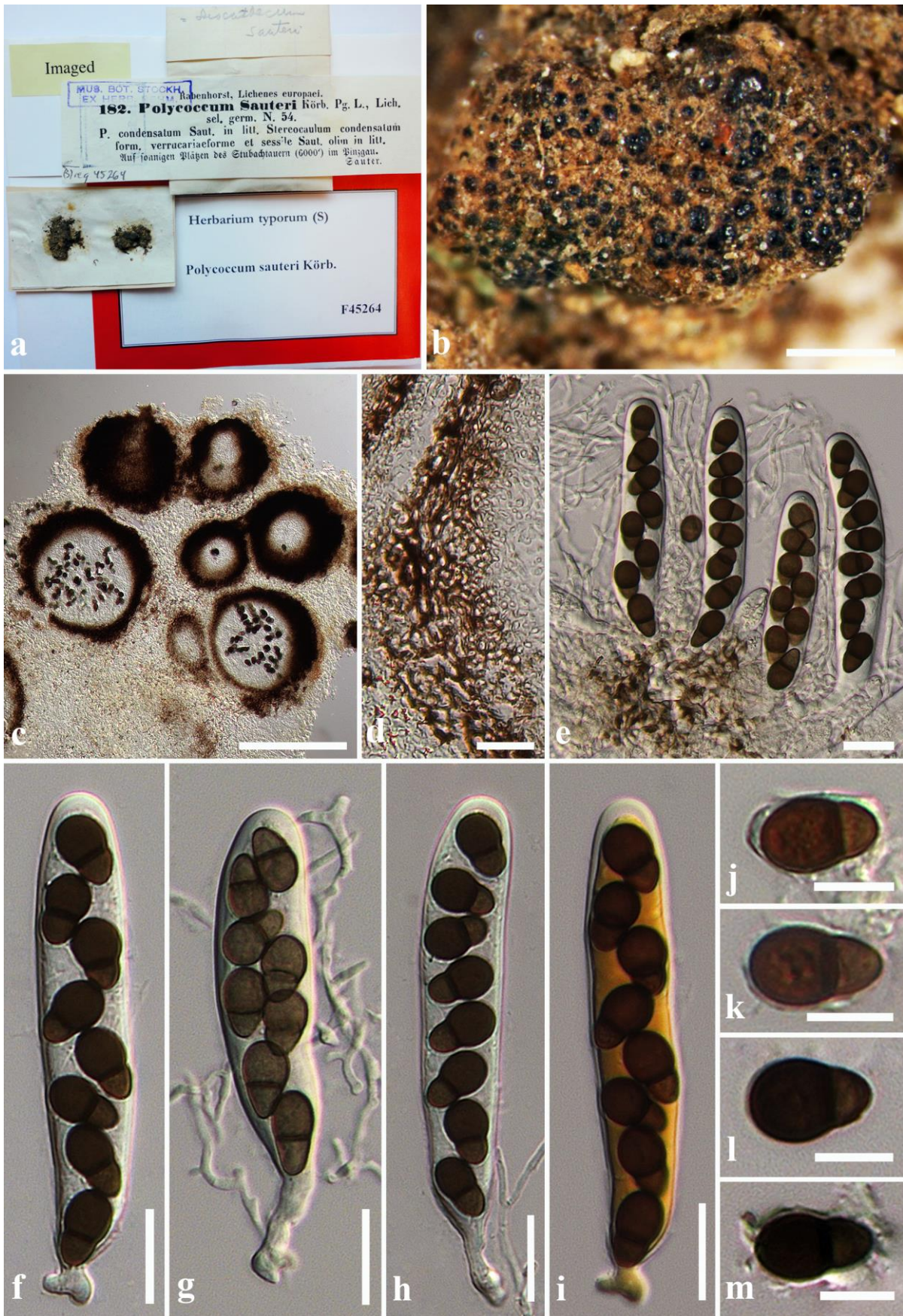


Figure 37 – *Polycoccum tryptethelioides* (S-F45264, holotype of *Polycoccum sauteri*). a Herbarium label and specimen. b Ascomata immersed in the host thallus. c Section through ascomata. d Peridium. e Asci with pseudoparaphyses. f–h Asci. i Ascus stained in Melzer’s reagent. j–m Ascospores. Scale bars: b = 1000 μ m, c = 200 μ m, d–i = 20 μ m, j–m = 10 μ m.

Lichenicolous fungi, occurring on *Stereocaulon condensatum* Hoffm. Sexual morph: *Ascomata* 150–280 µm high, 140–250 µm diam., perithecioid, immersed to semi-immersed, visible as raised, black, shiny spot, enclosed in galls on host thallus, globose to subglobose, dark brown to black, scattered, gregarious in galls, ostiolate, apapillate. *Peridium* 8–35 µm wide, thin- to thick-walled, composed of several layers of pseudoparenchymatous cells, inner layers comprising several cell layers of small, dark brown, thick-walled, polyhedral cells, arranged in a *textura angularis*, outer layers comprising several cell layers of flattened, dark brown, thick-walled cells, arranged in a *textura angularis* to *textura epidermoidea*. *Hamathecium* 1–3 µm wide, composed of dense, filamentous, richly branched, anastomosed, pseudoparaphyses. *Asci* 87–140 × 17–26 µm (\bar{x} = 110 × 19.4, n = 20), 8-spored, bitunicate, subcylindrical to cylindrical-clavate, short-pedicellate, apically rounded, with indistinct ocular chamber. *Ascospores* 13–17 × 7–10 µm (\bar{x} = 14.7 × 9.1, n = 30), overlapping 1–2-seriate, brown to dark brown, obovoid, 1-septate, constricted at septum, mostly upper cell usually larger than lower cell, smooth-walled. Asexual morph: Undetermined.

Material examined – AUSTRIA, Salzburg, on sunny slopes of the Stubachauern (6000') in Binzgau, on *Stereocaulon condensatum*, Sauter no. 182 (S-F45264, holotype of *Polycoccum sauteri*).

Dothideomycetes, families incertae sedis

Naetrocymbaceae Höhn. ex R.C. Harris, More Florida Lichens, Incl. 10 Cent Tour Pyrenol. (New York): 59 (1995)

This family (as *Naetrocymbeen*) was originally described by Höhnelt (1909b). However, this description was illegitimate as it was not in Latin or in accordance with ICBN rules (Harris 1995), but this taxon continued to be recognized to varying degrees through the 1990's. Batista & Ciferri (1963) treated the genus *Naetrocymbe* as part of *Capnodiaceae*, while Luttrell (1973) regarded *Naetrocymbe* as questionable and of uncertain taxonomic position. In contrast, Barr (1979) and Eriksson (1981) informally recognized *Naetrocymbaceae* as a distinct family, albeit, with different circumscriptions. Harris (1995) later validated the family name and included four genera: *Jarxia*, *Leptorhaphis*, *Naetrocymbe*, and *Tomasellia*. This circumscription is also currently recognized by Lumbsch & Huhndorf (2010) and Wijayawardene et al. (2018).

Jarxia D. Hawksw., Stud. Mycol. 31: 93 (1989)

Saprobic on dead plant. Sexual morph: *Ascomata* perithecial, small, solitary, scattered, immersed becoming erumpent, finally superficial, globose to subglobose, top rounded, black to dark brown, membranous, surrounding by septate, dark brown, irregular, branched hyphae, about 3 µm wide, with a short, central ostiole. *Peridium* thick, composed of one layer of hyaline to brown cells of *textura angularis*. *Hamathecium* of gelatinous, hyaline, septate, cellular pseudoparaphyses. *Asci* 8-spored, bitunicate, clavate, with an ocular chamber. *Ascospores* elongate-ellipsoid, 1-septate, smooth-walled, upper cell larger but lower cell longer, occasionally guttulate, constricted at the septum, gelatinous sheath not observed. Asexual morph: Undetermined.

Type species – *Jarxia thelenula* (Müll. Arg.) D. Hawksw.

Notes – *Jarxia* D. Hawksw comprises two non lichen-forming species. The holotype of *Jarxia thelenula* was observed on twigs of *Gochnatia buchii* (Urb.) Jimenez collected in Cuba, however, we examined the syntype on an unidentified plant from same country, which has the same morphology as the holotype (Hawksworth 1989). *Jarxia* differs from *Naetrocymbe*, *Leptorhaphis* and *Tomasellia* in its superficial ascomata. *Naetrocymbe* forms clavate to obovoid asci, which separate it from other genera in *Naetrocymbaceae*. Both *Leptorhaphis* and *Tomasellia* have immersed, subglobose and dark brown ascomata and 8-spored, ellipsoid and apically rounded asci with an ocular chamber. However, *Leptorhaphis* forms fusiform ascospores, which differentiate it from the ellipsoid ascospores of *Tomasellia* (Hawksworth 1989).

Jarxia thelenula (Müll. Arg.) D. Hawksw., Stud. Mycol. 31: 95 (1989)

≡ *Microthelia thelenula* Müll. Arg., Bot. Jb. 6: 416 (1885)

Fig. 38

≡ *Verrucaria thelenula* Nyl., Flora, Regensburg 59: 364 (1876)
 = *Kirschsteiniella ciferriana* Petr., Anns mycol. 30(3/4): 191 (1932)
 Index Fungorum number: IF135893; Facesoffungi number: FoF04650

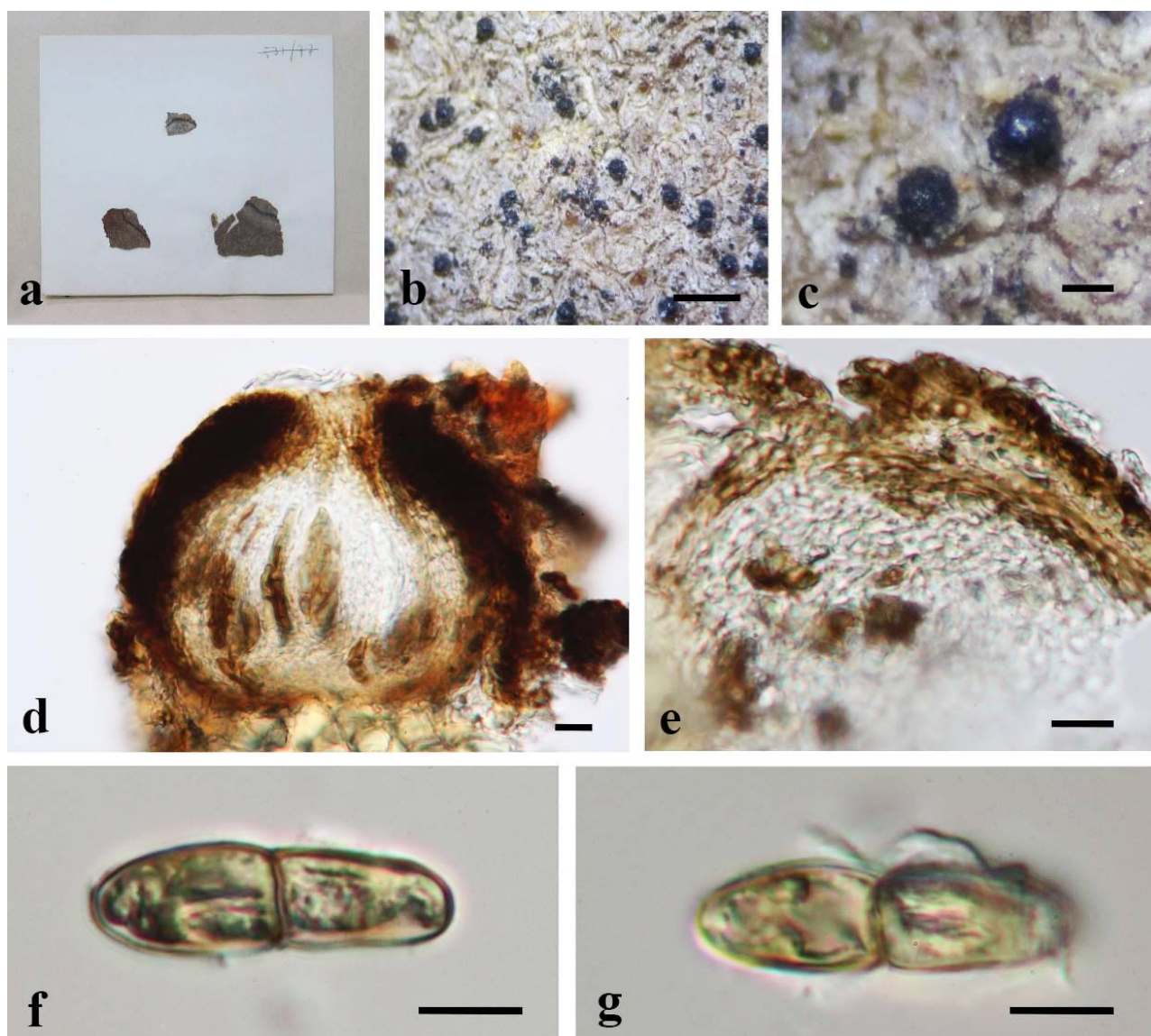


Figure 38 – *Jarxia thelenula* (G 00111325, holotype of *Microthelia thelenula*). a Herbarium specimen. b, c Appearance of black ascomata on host surface. d Vertical section of ascoma with asci. e Peridium. f, g Ascospores. Scale bars: b = 5 mm, c = 100 μ m, d–g = 10 μ m.

Saprobic on dead unidentified plant. Sexual morph: *Ascomata* perithecial, 100–145 μ m diam., 80–100 μ m high, small, solitary, scattered, immersed becoming erumpent, finally superficial, globose to subglobose, top rounded, black to dark brown, membranous, surrounding by septate, dark brown, irregular, branched hyphae, about 3 μ m wide, with a short, central ostiole. *Peridium* thick, 10–15 μ m thick, composed of one layer of hyaline to brown cells of *textura angularis*. *Hamathecium* of gelatinous, hyaline, septate, cellular pseudoparaphyses. *Asci* 45–85 \times 13–17 μ m (\bar{x} = 50.4 \times 15.6, n = 20), 8-spored, bitunicate, clavate, with an ocular chamber. *Ascospores* 23–26 \times 5.5–8 μ m (\bar{x} = 25.4 \times 6.3, n = 20), 2-seriate to irregularly arranged in asci, elongate-ellipsoid, brown to dark brown, 1-septate, smooth-walled, upper cell bigger but lower cell longer, occasionally guttulate, constricted at the septum, gelatinous sheath not observed. Asexual morph: Undetermined.

Material examined – CUBA, on dead unidentified plant, 1866, C. Wright (G 00111325, *Verrucaria thelenula*, holotype of *Microthelia thelenula*).

Leptorhaphis Körb., Syst. lich. germ. (Breslau): 371 (1855)

Lichenicolous, saprobic on dead plant. *Thallus* not observable. Sexual morph: *Ascomata* perithecial, small, solitary, scattered, immersed becoming erumpent, finally superficial, globose to subglobose, top rounded, black to dark brown, membranous, ostiole not observed. *Peridium* thick, composed of one layer of hyaline to brown cells of *textura angularis*. *Hamathecium* gelatinous, hyaline, septate, cellular and anastomosing pseudoparaphyses. *Asci* 8-spored, bitunicate, clavate, with an ocular chamber. *Ascospores* fusiform, hyaline, 1-septate, guttulate, smooth-walled, not constricted at the septum, gelatinous sheath not observed. Asexual morph: Undetermined.

Type species – *Leptorhaphis epidermidis* (Ach.) Th. Fr.

Notes – The genus *Leptorhaphis* was revised by Aguirre-Hudson & Hawksworth (1987) and Aguirre-Hudson (1991) and eventually restricted to 12 species occurring in temperate-boreal regions of the Northern Hemisphere. These typically occur on bark and exhibit a high level of host specificity (Aguirre-Hudson 1991, 2009, Aguirre-Hudson et al. 2002). Additional species have since been described including *L. opunticola*, occurring on *Opuntia* in the Balearic Islands of Spain (Aguirre-Hudson & Fiol 1993) and the lichenicolous *L. haematommatum* from New Zealand (Kalb et al. 1995), extending both the range and ecology of this genus. *Leptorhaphis* has typically been considered saprotrophic and non-lichen-forming (Vainio 1921, Swinscow 1965, Harris 1973, Aguirre & Hawksworth 1987, Harris 1995), however, some species have been observed to form loose associations with algae (Swinscow 1965, Aguirre-Hudson 1991, 2009, Aguirre-Hudson & Fiol 1993, Aguirre-Hudson et al. 2002), and one species is lichenicolous (Kalb et al. 1995). Harris (1995) has treated *Leptorhaphis* as part of *Naetrocymbaceae*, a placement Aguirre-Hudson et al. (2002) accepted. However, Harris (1995) noted that *Leptorhaphis* differed from the remaining *Naetrocymbaceae* genera in its hamathecium, ascus and presence of macroconidia. Consequently, it is unclear if this genus will be retained in *Naetrocymbaceae* and molecular data are needed.

In Index Fungorum (2018) the type species of *Leptorhaphis* is *L. oxyspora*, however, based on priority its correct name is *L. epidermidis*. Aguirre-Hudson (1991) revised *Leptorhaphis* and examined a specimen in H named as *Verrucaria oxyspora* and determined it to be the holotype of *V. oxyspora*. We observed this specimen and designate it as the syntype of *L. epidermidis*.

Leptorhaphis epidermidis (Ach.) Th. Fr., Nova Acta R. Soc. Scient. upsal., Ser. 3 3: 373 (1861) [1860] Fig. 39

≡ *Lichen epidermidis* Ach. [as 'epidermis'], Lich. succ. prodr. (Linköping): 16 (1799) [1798]

= *Leptorhaphis oxyspora* (Nyl.) Körb., Syst. lich. germ. (Breslau): 371 (1855)

= *Verrucaria oxyspora* Nyl., Bot. Notiser: 179 (1852)

Index Fungorum number: IF393549; Facesoffungi number: FoF04651

Saprobic on dead unidentified plant. *Thallus* not observable. Sexual morph: *Ascomata* perithecial, 100–170 µm diam., 80–150 µm high, small, solitary, scattered, immersed becoming erumpent, finally superficial, globose to subglobose, top rounded, black to dark brown, membranous, ostiole not observed. *Peridium* 15–20 µm thick, composed of one layer of hyaline to brown cells of *textura angularis*. *Hamathecium* gelatinous, hyaline, septate, cellular and anastomosing pseudoparaphyses. *Asci* 40–55 × 10–15 µm (\bar{x} = 58.7 × 12.6, n = 20), 8-spored, bitunicate, clavate, with an ocular chamber. *Ascospores* 20–30 × 1.5–3 µm (\bar{x} = 25.4 × 6.3, n = 20), 2–3-seriate, fusiform, hyaline, 1-septate, guttulate, smooth-walled, not constricted at the septum, gelatinous sheath not observed. Asexual morph: Undetermined.

Material examined – On dead unidentified plant, W. Nylander (H 7503, syntype).

Tomasellia A. Massal., Flora, Regensburg 39: 283 (1856)

Saprobic on smooth bark of trees and shrubs. Sexual morph: *Ascostromata* solitary to gregarious, immersed becoming erumpent, finally superficial, irregular, black to dark brown,

membranous, multilocules. *Locules* immersed in ascomata, globose to subglobose, usually with flat base, each locule with a short, central ostiole. *Peridium* thin, composed of one layer of hyaline to brown cells of *textura angularis* to *epidermoidea*. *Hamathecium* gelatinous, comprising hyaline, septate, cellular pseudoparaphyses. *Asci* 8-spored, bitunicate, broad clavate to elongate-subglobose, with an ocular chamber, and occasionally with a short-pedicel. *Ascospores* elongate-ellipsoid, hyaline, 1-septate, smooth-walled, upper cell larger but lower cell longer, constricted at the septum, gelatinous sheath not observed. Asexual morph: Undetermined.

Type species – *Tomasellia arthonioides* (A. Massal.) A. Massal.

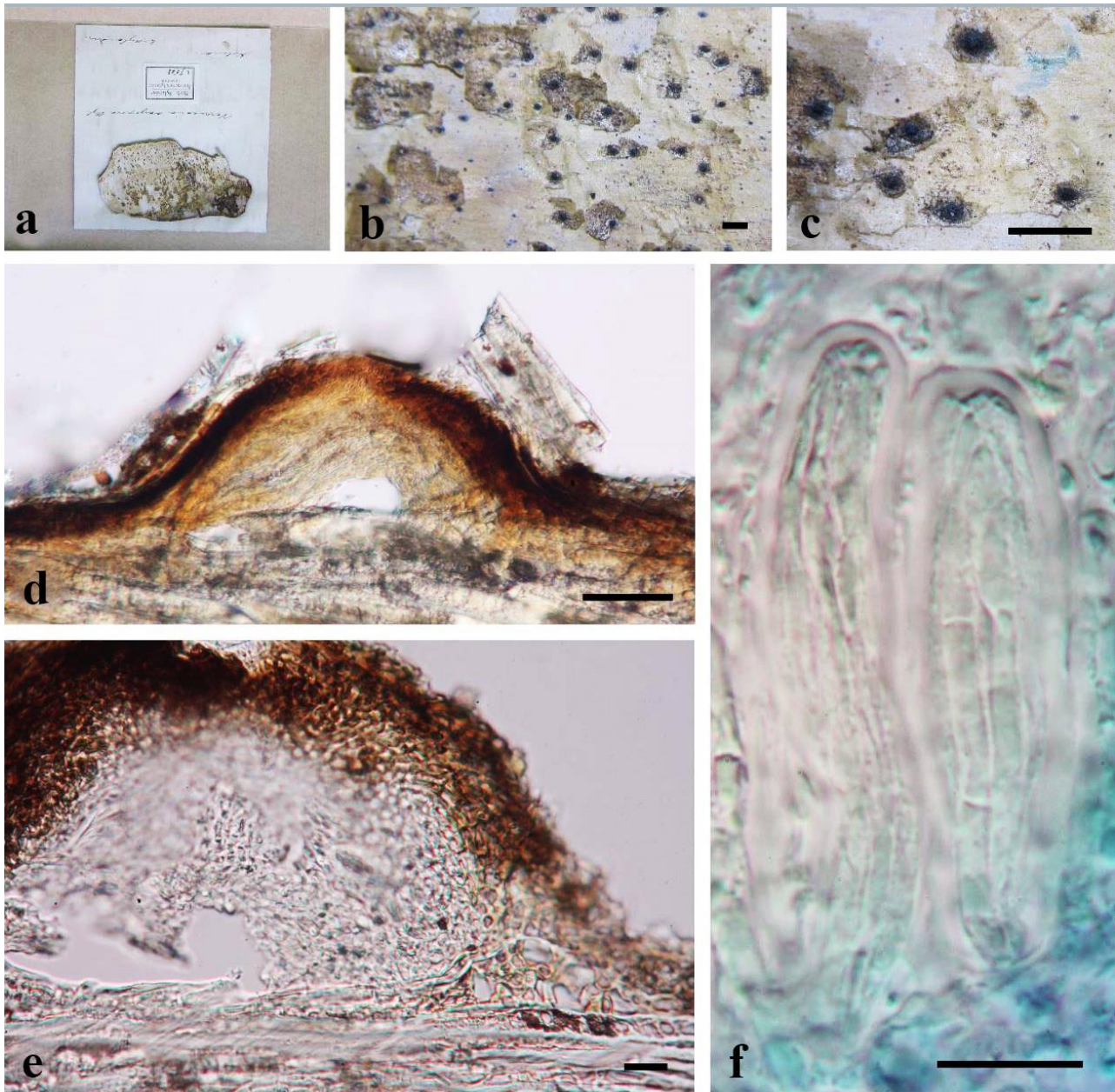


Figure 39 – *Leptorhaphis epidermidis* (H 7503, syntype). a Herbarium label and specimen. b, c Appearance of black ascomata on host surface. d Vertical section of ascoma. e Peridium. f, g Asci with immature ascospores. Scale bars: b, c = 5 mm, d = 100 μ m, e, f = 10 μ m.

Notes – *Tomasellia* has often been discussed with reference to *Mycoporum*; both form compound ascomata containing several locules, each producing their own ostiole (Harris 1995). The delimitation of these two genera has remained controversial. Harris (1995) transferred most species of *Tomasellia* to *Mycoporum* (*Mycoporaceae*) and suggested retaining five non-lichen-

forming species in the genus *Tomasellia*. He distinguished these two genera based on ascus, ascospore, conidial and hamathecial characters. The generic delimitations of Harris (1995) have been accepted by some (Sanderson & Coppins 2009a, b), while others (Aptroot 2002a, b) continue to employ a different circumscription of these genera. *Tomasellia arthonioides* is the type species of *Tomasellia*, introduced by Massalongo (1856). *Tomasellia arthonioides* is characterized by its black ascomata contents and multi-locules. Such character is similar to those of *Mycoporum* (Harris 1995). However, they are separable by asci and ascospores features.

Tomasellia arthonioides (A. Massal.) A. Massal., Flora, Regensburg 39: 284 (1856) Fig. 40
≡ *Arthopyrenia arthonioides* A. Massal., Ric. auton. lich. crost. (Verona): 169 (1852)
Index Fungorum number: IF1124738; Facesoffungi number: FoF04652

Saprobic on the bark of *Fraxinus ornus*. *Thallus* not observable. Sexual morph: *Ascostromata* 0.4–1.3 mm long, 0.2–0.65 mm wide, 100–200 µm high, solitary to gregarious, immersed becoming erumpent, finally superficial, irregular, black to dark brown, membranous, with 1–4 locules. *Locules* 100–200 × 130–150 µm, immersed in ascomata, globose to subglobose, usually with flat base, each locule with a short, central ostiole. *Peridium* 3–5 µm thick, composed of one layer of hyaline to brown cells of *textura angularis* to *epidermoidea*. *Hamathecium* gelatinous, comprising hyaline, septate, cellular pseudoparaphyses, 2–3 µm wide. *Asci* 40–48 × 10–17 µm (\bar{x} = 45.4 × 13.6, n = 20), 8-spored, bitunicate, broad clavate to elongate-subglobose, with an ocular chamber, and occasionally with a short-pedicel. *Ascospores* 10–15 × 3–4.5 µm (\bar{x} = 13.4 × 3.8, n = 20), 2–3-seriate to irregularly arranged in asci, elongate-ellipsoid, hyaline, 1-septate, smooth-walled, upper cell larger but lower cell longer, constricted at the septum, gelatinous sheath not observed. Asexual morph: Undetermined.

Material examined – ITALY, Trentino-Alto Adige Province, on the bark of *Fraxinus ornus* L. (*Oleaceae*), J. Milde (S-F217044).

Parmulariaceae E. Müll. & Arx ex M.E. Barr, Mycologia 71(5): 944 (1979)

Members of *Parmulariaceae* are obligate biotrophic, plant-parasitic fungi which develop on the surface of living plants (Guatimosim et al. 2015, Tian et al. 2016). Many studies have described and illustrated the genera in *Parmulariaceae* (Inácio et al. 2012, Hyde et al. 2013, Guatimosim et al. 2014, Tian et al. 2016). A key to genera of *Parmulariaceae* was provided in Hyde et al. (2013). Guatimosim et al. (2015) provided molecular phylogenetic studies of the *Parmulariaceae*. We transfer *Syrropeltis* to *Parmulariaceae* based on its morphology.

Syrropeltis Bat., J.L. Bezerra & Matta, in Batista & Bezerra, Portug. acta biol., Sér. B 7(4): 376 (1964)

Epiphytes on surface of leaves appearing as large black spots. *Superficial mycelium* absent. Sexual morph: *Ascostromata* superficial on surface of host, solitary, circular, flattened, swollen and cracked around the center, black. *Locules* central ostiole, walled cells arranged radially when viewed in squash mounts. *Hamathecium* hyaline, aseptate, embedded in a gelatinous matrix. *Peridium* very thin, comprising dark brown to black cells of *textura angularis*. *Asci* 8-spored, bitunicate, cylindrical to obovoid, with an ocular chamber, short and round pedicel. *Ascospores* 2-seriate, 1-septate, oval to ellipsoid, upper cell broader than lower cell, slightly constricted and darker at the septum, smooth-walled, hyaline when immature, pale brown at maturity. Asexual morph: Undetermined.

Type species – *Syrropeltis xylophia* Bat., J.L. Bezerra & Matta

Notes – *Syrropeltis* was introduced in Batista & Bezerra (1964), and it is a monotypic genus. MycoBank (2018) listed *Syrropeltis* in *Dothideales*, but the genus was listed as genera *incertae sedis* in *Dothideomycetes* by Wijayawardene et al. (2014, 2018) and Index Fungorum (2018). Stromata appear as a black circle on surface of leaves. No sequence data is available for *Syrropeltis xylophia*. We place *Syrropeltis* within *Parmulariaceae* based on its large and black ascostromata on

host substrate and 1-septate ascospores that are ovoid with upper cell broader and longer, slightly constricted and pale brown to brown at the septum.

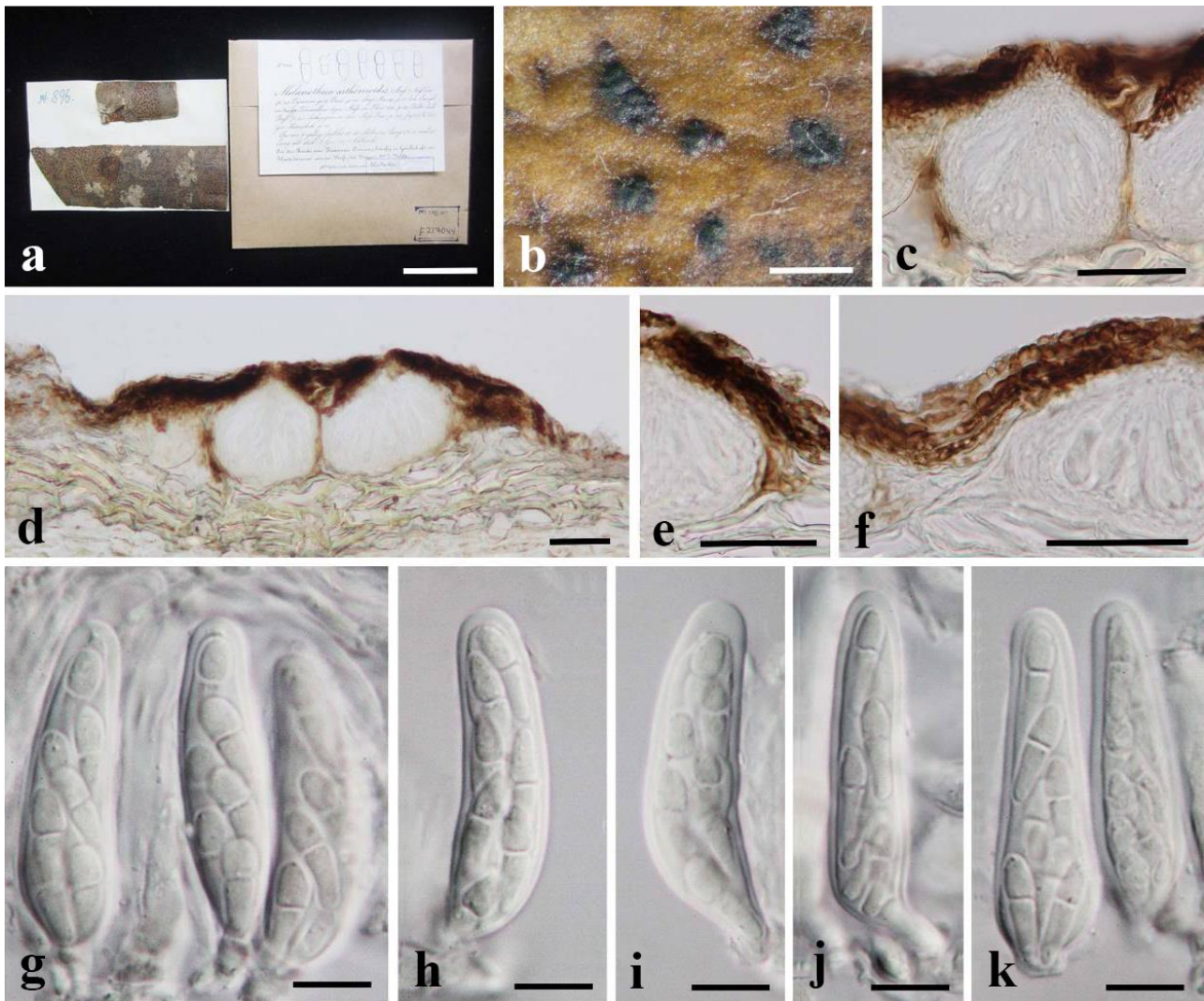


Figure 40 – *Tomasellia arthonioides* (S-F217044). a Herbarium label and specimen. b Black stromata on the host. c, d Vertical section of an ascostroma. e, f Peridium. g–k Asci with ascospores. Scale bars: a = 50 mm, b = 500 μ m, c–f = 50 μ m, g–k = 10 μ m.

Syrropeltis xylopia Bat., J.L. Bezerra & Matta, in Batista & Bezerra, Portug. acta biol., Sér. B 7(4): 377 (1964) Fig. 41

Index Fungorum number: IF311399; Facesoffungi number: FoF04653

Epiphytes on surface of leaves appearing as large black spots. *Superficial mycelium* absent. Sexual morph: *Ascostromata* up to 2000 μ m diam., superficial on surface of host, solitary, circular, flattened, swollen and cracked around the center, black. *Locules* up to 120 μ m, with central ostiole, cells arranged radially when viewed in squash mounts. *Hamathecium* 1 μ m, hyaline, aseptate, embedded in a gelatinous matrix. *Peridium* very thin, comprising dark brown to black cells of *textura angularis*. *Asci* 30–36 \times 8–10 μ m, (\bar{x} = 33 \times 9 μ m, n = 10), 8-spored, bitunicate, cylindrical to obovoid, with an ocular chamber, with short and round pedicel. *Ascospores* 8–10 \times 3–4 μ m (\bar{x} = 9 \times 3.5 μ m, n = 20), 2-seriate, 1-septate, oval to ellipsoid, upper cell broader than lower cell, slightly constricted and darker at the septum, smooth-walled, hyaline when immature, pale brown at maturity. Asexual morph: Undetermined.

Material examined – BRAZIL, Bahia, Ituberà, on leaves of *Xylopia emarginata* Mart. (*Annonaceae*), 21 August 1961, E.A. Matta & R. Pereira (URM 39757, holotype).

Dothideomycetes, genera incertae sedis

We examined the type specimens of *Epibelonium gaeumannii*, *Othia spiraeae* and *Phycorella scytonematis*. All of these are of uncertain taxonomic placement as they are not typical of any existing families of *Dothideomycetes*.

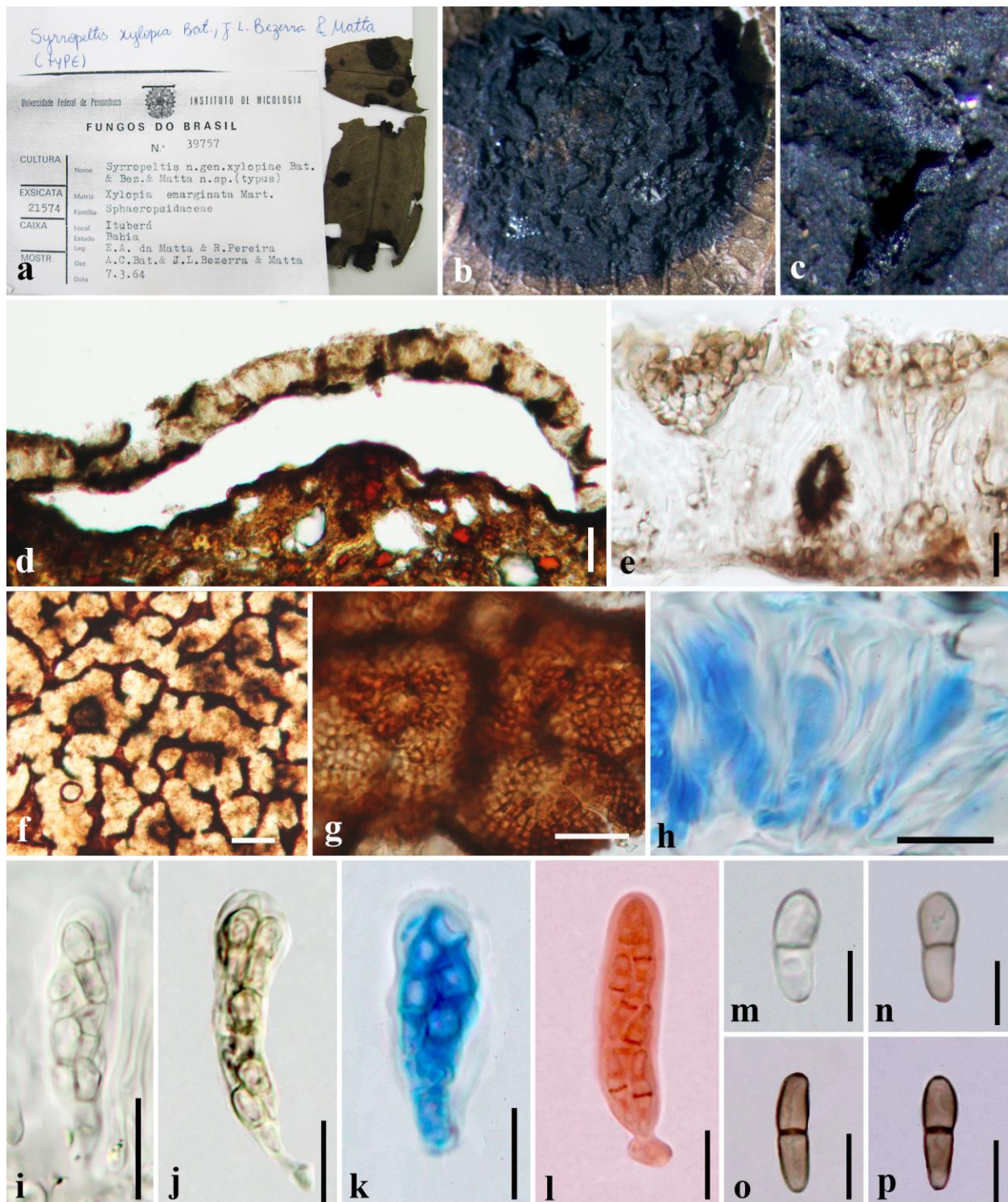


Figure 41 – *Syropeltis xylopii* (URM 39757, holotype). a Herbarium label and specimen. b, c Ascostromata on substrate. d, e Vertical section through ascostromata. f Ascostromata when viewed in squash mounts. g Peridium structure seen from above. h Asci embedded in pseudoparaphyses. i Ascus. j Ascus in Melzer's reagent. k Ascus in lactophenol cotton blue reagent. l Ascus in Congo red reagent. m, n Immature ascospores. o, p Mature ascospores. Scale bars: d, f, g = 50 μ m, e, h = 10 μ m, i–l = 10 μ m, m–p = 5 μ m.

Epibelonium E. Müll., *Phytopath. Z.* 47: 240 (1963)

Epiphytic on dead leaves of *Quercus ilex*. Sexual morph: *Apothecia* superficial, stalked, globose, reddish brown to dark brown, becoming black, scattered, solitary on upper surface of leaves, quadrilateral. *Exciple* angularis, brown to reddish brown. *Asci* 4-spored, bitunicate, clavate, cylindro-clavate, hyaline, apically rounded, with an ocular chamber, short-pedicellate. *Hamathecium* comprising numerous, filiform, 1.3–3.5 µm wide, hyaline, septate, hypha-like, straight or flexuous pseudoparaphyses, swollen and rounded at the base. *Ascospores* ellipsoid, hyaline, with transverse septa only, slightly constricted at the septa, smooth-walled. Asexual morph: Undetermined.

Type species – *Epibelonium gaeumannii* E. Müll.

Notes – *Epibelonium* was introduced by Müller (1963) as a genus in *Schizothyriaceae* with *Epibelonium gaeumannii* as the type species. Subsequently, the genus has been transferred to *Saccardiaceae* based on the ascomata that are apothecia-like, small, and borne on superficial mycelium (von Arx & Müller 1975). The genus is monotypic according to Index Fungorum (2018).

The major morphological characters of this genus are cupulate, stipitate apothecia and cylindric-clavate asci, with an ocular chamber. These characters do not match with the family limitation for *Saccardiaceae*. We suggest the genus may belong to *Patellariaceae*, but we place it in *Dothideomycetes* genera, *incertae sedis*. Fresh specimens with asexual morph link and sequence data are required to provide exact placement for this genus.

Epibelonium gaeumannii E. Müll. [as '*gaeumanni*'], *Phytopath. Z.* 47: 240 (1963)

Fig. 42

Index Fungorum number: IF330639; Facesoffungi number: FoF04654

Epiphytic on dead leaves of *Quercus ilex*. Sexual morph: *Apothecia* 150–230 × 75–100 µm (Müller 1963), superficial, cupulate, globose, reddish brown to dark brown becoming black, scattered, solitary on upper surface of leaves, quadrilateral. *Exciple* angularis, brown to reddish brown. *Hamathecium* 1–2.5 µm wide at the middle, 1.3–3.5 µm wide at the base, 3–6-septate, filiform, swollen and rounded at the base, apices swollen glued together with gelatinized material to form pseudoepithecium, hyaline, septate, hypha-like, numerous, straight or flexuous. *Asci* 37–55 × 8–12 µm (\bar{x} = 45 × 10 µm, n = 20), 4-spored, bitunicate, clavate, cylindro-clavate, hyaline, apically rounded, with an ocular chamber, short-pedicellate. *Ascospores* 9–13 × 3–5 µm (\bar{x} = 11 × 4 µm, n = 20), ellipsoid, hyaline, 1–3-septate, slightly constricted at the septa, smooth-walled. Asexual morph: Undetermined.

Material examined – FRANCE, Dept. Vaucluse, Mountain Ventoux, North side, on the road about 1000 m, on dead leaves of *Quercus ilex* L. (*Fagaceae*), 23 May 1962, E. Müller (ZT Myc 4388, holotype).

Othia Nitschke ex Fuckel, *Jb. Nassau. Ver. Naturk.* 23-24: 169 (1870) [1869-70]

Saprobic on dry twigs of *Spiraea*. Sexual morph: *Ascstromata* pseudothecia, immersed, or erumpent through bark fissures, gregarious to densely crowded, dark to black, short-stalked, globose or subglobose, with or without an ostiole. *Ostiole* central, short, slightly sunken, inconspicuous at the surface, reddish brown to dark brown. *Peridium* composed of cells of *textura angularis*. *Hamathecium* comprising numerous, filiform, hyaline, septate, hypha-like pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindrical, with rounded apex, short-pedicellate, arising from the ascoma base. *Ascospores* overlapping, initially hyaline, ellipsoid, becoming dark brown, ovoid to broadly ellipsoidal, 1-septate, slightly constricted at the septum, smooth-walled. Asexual morph: Undetermined.

Type species – *Othia spiraeae* (Fuckel) Fuckel

Notes – *Othia* was placed in the *Cucurbitariaceae*, *Pleosporales* (Winter 1885, Barr 1979). Phillips et al. (2005) examined *O. spiraeae* (IMI 63581b) and confirmed that morphology of this specimen did not match that of *Othia* but had greater affinity to *Botryosphaeria*; they therefore applied the name *Botryosphaeria sarmentorum* based on morphological and phylogenetical studies. This species is now regarded as *Dothiorella sarmentorum* (IMI 63581b) (Phillips et al. 2013).

Phillips et al. (2005) also examined *O. spiraeae* (K 104853, Fuckel, Fungi Rhenani No. 975). We examined the holotype specimen of *Cucurbitaria spiraeae* Fuckel (F88441) and found that it to be similar to K 104853 as described in Phillips et al. (2005). It has cylindrical, bitunicate asci with thin endotunica, 1-seriate, brown, 1-septate, oval ascospores with both ends rounded, and narrow, infrequently septate pseudoparaphyses. Kirk et al. (2008) listed *Othia* in *Botryosphaeriaceae* while Lumbsch & Huhndorf (2010) and Wijayawardene et al. (2018) placed it in *Dothideomycetes* genera *incertae sedis*. Hu (2010) described and identified isolate HKUCC10896 as *O. spiraeae* with illustrations and placed this isolate in *Botryosphaeriaceae* on the basis of sequences data from both LSU and SSU, which clustered it with other *Botryosphaeriaceae* species.

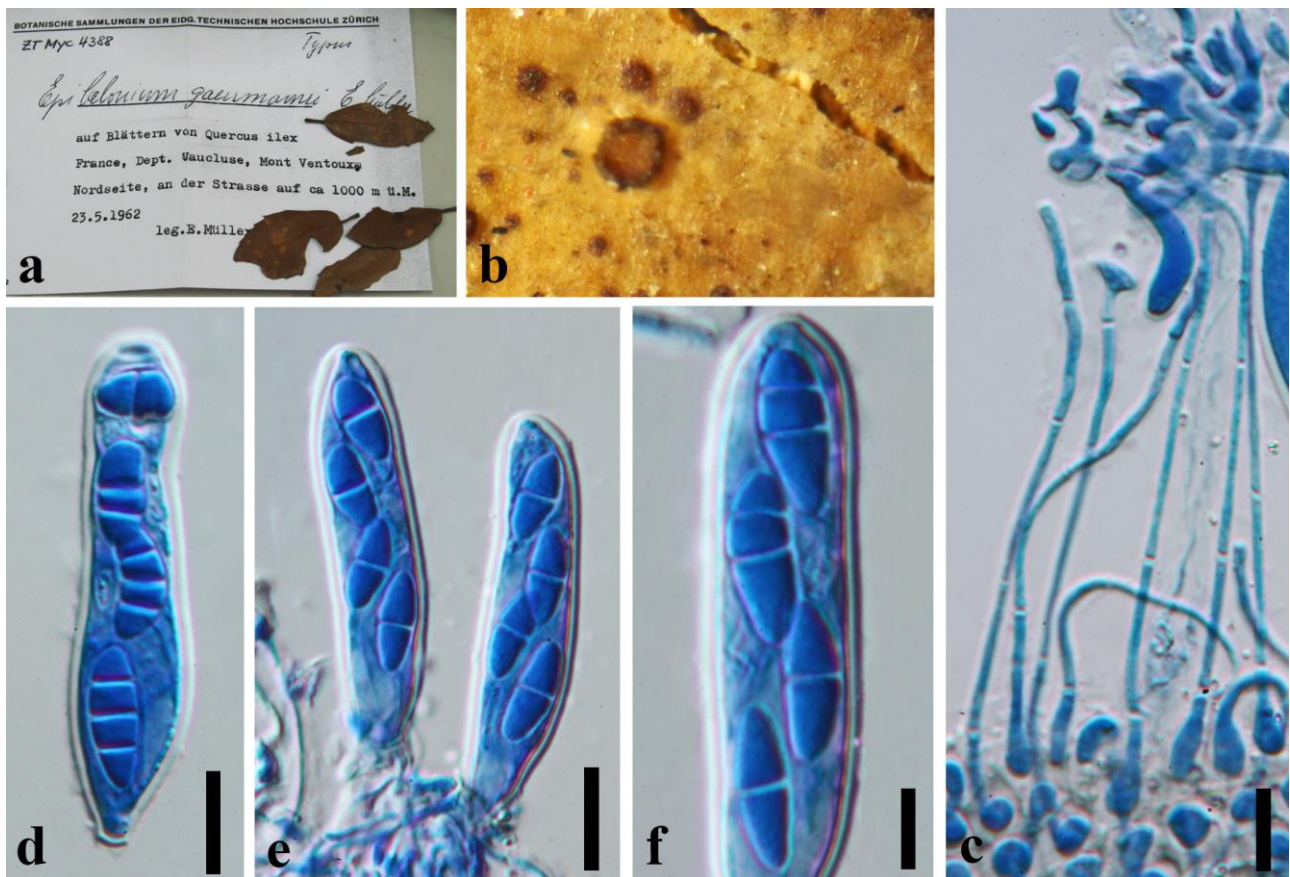


Figure 42 – *Epibelonium gaeumannii* (ZT Myc 4388, holotype). a Material label and specimen. b Apothecia on leaf. c Pseudoparaphyses. d–f Asci with ascospores. Note: c–f stained in lactophenol cotton blue. Scale bars: c = 20 μ m, d, e = 10 μ m, f = 5 μ m.

However, *Othia*, as typified by *O. spiraeae*, is morphologically distinct from *Botryosphaeria* in having asci that are cylindrical with a thin endotunica, while in *Botryosphaeria* the asci are clavate with a thick endotunica. Pseudoparaphyses in *Othia* are narrow and sinuous, infrequently septate and not constricted at the septa, as compared to the broader, frequently septate ones in *Botryosphaeria* (Phillips et al. 2005). *Othia* is characterized by globose to subglobose ascomata, cylindrical asci, and 1-septate ascospores, constricted at septum, mostly wider above septum, ellipsoidal with rounded ends. *Othia* somewhat resembles *Cucurbitaria* in *Cucurbitariaceae* (Doilom et al. 2013) in having ascomata that are immersed to erumpent through bark fissures on host substrates and cylindrical asci, but it differs in ascomata lacking a basal pseudostroma as seen in *Cucurbitaria*. Furthermore, ascospores in *Othia* are 1-septate, while in *Cucurbitaria* ascospores are muriform. *Othia* is similar to genera placed in *Didymosphaeriaceae*, however, we place it in *Dothideomycetes*, genera *incertae sedis* pending studies with molecular data.

Otthia spiraeae (Fuckel) Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 170 (1870) [1869-70] Fig. 43
 ≡ *Cucurbitaria spiraeorum* Fuckel, Fungi rhenani exsicc., fasc. 10: no. 975 (1864)
 Index Fungorum number: IF166179; Facesoffungi number: FoF04655

Saprobic on dry twigs of *Spiraea opulifoliae*. Sexual morph: *Ascostromata* (180–)305–330(–440) μm high \times (260–)355–420(–500) μm diam. (\bar{x} = 290 \times 360 μm , n = 30), pseudothecia, immersed, or erumpent through bark fissures, gregarious to densely crowded, dark to black, globose or subglobose, with or without an ostiole. *Ostiole* 180–300 μm high, 170–210 μm wide, central, short, slightly sunken, inconspicuous at the surface, reddish brown to dark brown. *Peridium* 55–105 μm thick at the sides, composed of cells of *textura angularis*, comprising two layers, outer

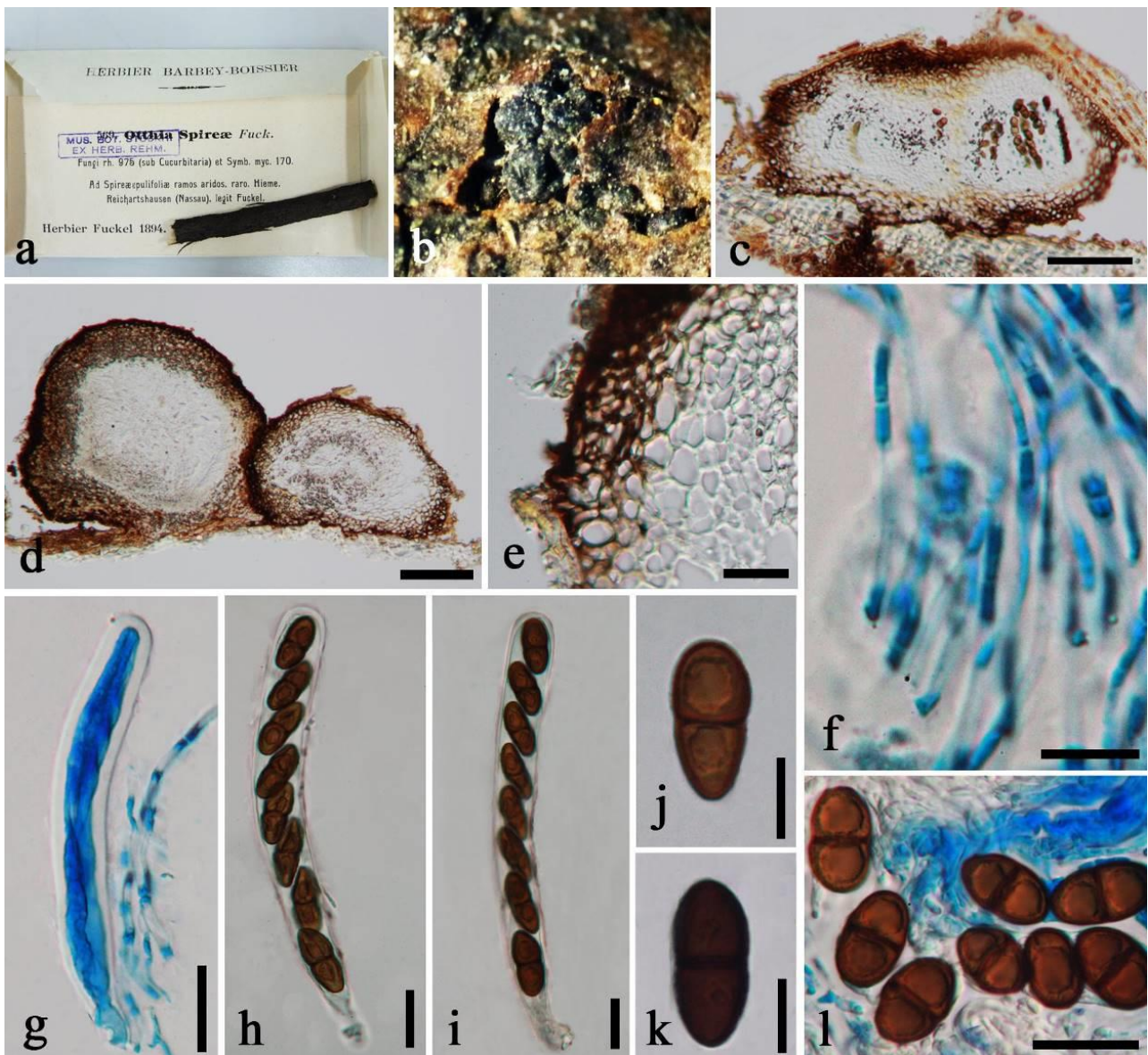


Figure 43 – *Otthia spiraeae* (S-F88441, holotype). a Material label and specimen. b Ascostromata on host. c, d Vertical section through ascostromata. e Peridium. f Pseudoparaphyses. g–i Asci. j–l Ascospores. Note: f, g, l stained in lactophenol cotton blue. Scale bars: c, d = 100 μm , e, g–i, l = 20 μm , f, j, k = 10 μm .

layer black, thick-walled, inner layer comprising 5–8 cell layers, light brown, reddish brown to hyaline, walled cells of *textura angularis*. *Hamathecium* comprising numerous, 2.5–4 μm wide, filiform, hyaline, septate, hypha-like, pseudoparaphyses. *Asci* (140–)160–170(–175) \times (15–)17–19(–20) μm (\bar{x} = 160 \times 17 μm , n = 30), 8-spored, bitunicate, cylindrical, rounded apex, short-

pedicellate, arising from the ascoma base. *Ascospores* (15–)20–21(–24) × 10–15 µm (\bar{x} = 20 × 12 µm, n = 30), overlapping 1-seriate, initially hyaline, becoming dark brown, ellipsoid, ovoid to broadly ellipsoidal, 1-septate, slightly constricted at the septum, smooth-walled, guttulate. Asexual morph: Undetermined.

Material examined – GERMANY, Hessen, Reichartshausen (Nassau), on dry twigs of *Spiraea opulifolia* L. (*Rosaceae*), collection date unknown, Fuckel (S-F88441, holotype).

Phycorella Döbbeler, Sydowia 33: 33 (1980)

Biotrophic on *Scytonema*, infects single cells by haustoria. Sexual morph: *Ascomata* solitary or scattered among or sitting on algal filaments, sphaerical or slightly longer than wide, colorless. *Peridium* comprised of nearly isodiametric or slightly irregular cells. *Ostiole* not prominent. *Paraphyses* absent. *Asci* 8-spored to few, ellipsoidal to cylindrical, bitunicate, with a broadly rounded end and a short, broad pedicel. *Ascospores* overlapping irregularly arranged, ellipsoidal, hyaline, 2-celled, and smooth-walled. *Hyphae* colorless, branched, irregularly extending between the filaments of the alga. *Appressoria* roundish in outline, sitting sideways or stalked, rarely intercalary, not always distinct from the mycelium. *Hauustoria* globose, usually individually inside the host cells. Asexual morph: Undetermined.

Type species – *Phycorella scytonematis* Döbbeler

Notes – The monotypic genus *Phycorella* was established by Döbbeler (1980) in *Dothideales* with *P. scytonematis* as the type species. Lumbsch & Huhndorf (2010) accommodated *Phycorella* in *Dothideomycetes*, genera *incertae sedis*. Unfortunately, the taxonomic position of *P. scytonematis* remains unresolved as no sequence data is available.

Phycorella scytonematis Döbbeler, Sydowia 33: 33 (1980)

Fig. 44

Index Fungorum number: IF116011; Facesoffungi number: FoF04656

Biotrophic on *Scytonema*, infects single cells of *Scytonema* by haustoria. Sexual morph: *Ascomata* solitary or scattered among or sitting on algal filaments, sphaerical or slightly longer than wide, colorless. *Peridium* 3–6 µm thick, comprised of nearly isodiametric or slightly irregular cells. *Ostiole* not prominent. *Paraphyses* absent. *Asci* 8-spored to few, ellipsoidal to cylindrical, bitunicate, with a broadly rounded end and a short, broad pedicel. *Ascospores* overlapping irregularly arranged, ellipsoidal, hyaline, 2-celled, smooth-walled. *Hyphae* colorless, branched, irregularly extending between the filaments of the alga. *Appressoria* roundish in outline, sitting sideways or stalked, rarely intercalary, not always distinct from the mycelium. *Hauustoria* globose, usually individually inside the host cells. Asexual morph: Undetermined.

Material examined – AUSTRALIA, Sydney, on *Scytonema* sp. (*Cyanophyceae*), collected before 1877 by an unknown niece KAYSER'S name (M- holotype).

Sordariomycetes O.E. Erikss. & Winka, Myconet 1(1): 10 (1997)

Amphisphaeriales*, genera *incertae sedis

Fasciatispora K.D. Hyde, Trans. Mycol. Soc. Japan 32(2): 265 (1991)

Saprobic on dead leaflet, frond and leaves. Sexual morph: *Ascomata* immersed to semi-immersed beneath a thin stroma, black, raised, solitary, in cross section globose, subglobose, irregular, with central ostiole. *Peridium* outwardly comprising thick-walled, compressed, dark brown cells of *textura angularis*. *Paraphyses* hyaline, filamentous, cylindrical, septate, branched. *Asci* 8-spored, unitunicate, cylindrical, short-pedicellate, apically rounded, with a J+, subapical ring. *Ascospores* unicellular, hyaline, olivaceous-brown to brown when mature, young ascospores fusiform becoming reniform to ellipsoidal at maturity, guttulate, smooth-walled, with a central pallid band, surrounded by a thick mucilaginous sheath. Asexual morph: Undetermined.

Type species – *Fasciatispora nypae* K.D. Hyde

Notes – Hyde (1991) introduced *Fasciatispora* and typified by *F. nypae* K.D. Hyde. We introduce a new species, *Fasciatispora arengae* based on morphology and place it within subclass *Xylariomycetidae*, families *incertae sedis*.

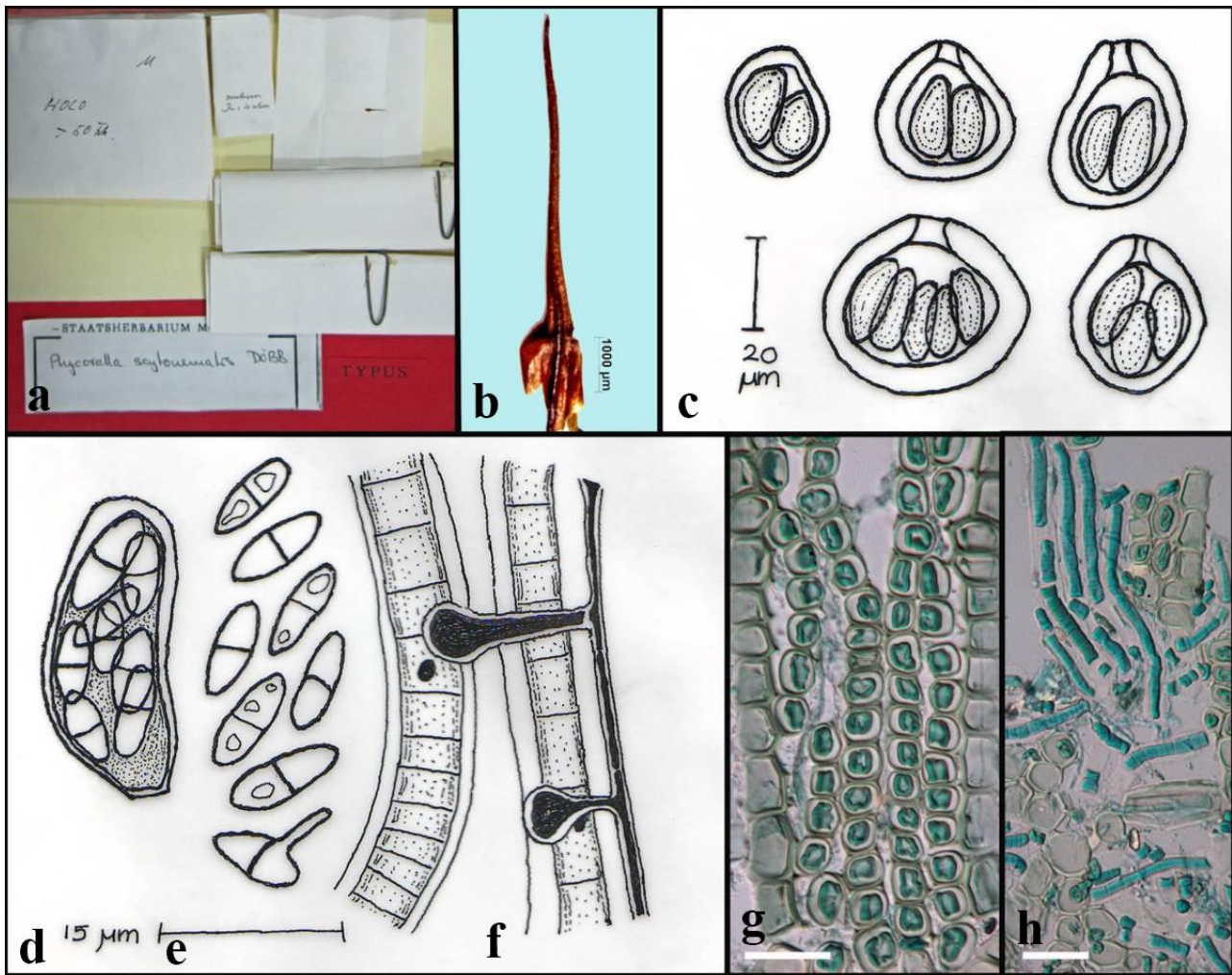


Figure 44 – *Phycorella scytonematis* (M- holotype). a, b Herbarium label and specimen. c Vertical section of ascomata. d Ascus with 8-ascospores. e Ascospores. f–h Infected *Scytonema* filaments and the haustoria inside the host cells. (c–f redrawn from the original type species drawing, Döbbeler (1980)). Scale bars: b = 1000 µm, c = 20 µm, d–f = 15 µm, g, h = 25 µm.

Fasciatispora arengae Konta & K. D. Hyde, sp. nov.

Fig. 45

Index Fungorum number: IF554299; Facesoffungi number: FoF04373

Etymology: refers to the host genus name (*Arenga*)

Saprobic on dead leaflet of *Arenga pinnata*. Sexual morph: *Ascomata* 147–333 µm diam. × 142–135 high µm (\bar{x} = 240 × 171 µm, n = 10), semi-immersed, visible as black, raised, solitary, in cross section globose, subglobose, lenticular, irregular, with central ostiole. *Ostiole* 42–60 µm diam. at the base × 34–52 µm high (\bar{x} = 52 × 44 µm, n = 5). *Peridium* 20–25 µm diam. (\bar{x} = 23 µm, n = 10), outwardly comprising thick-walled, compressed, dark brown cells of *textura angularis*. *Paraphyses* 1.8–3 µm diam. (\bar{x} = 2.4 µm, n = 10), hyaline, filamentous, cylindrical, septate, branched. *Asci* 80–130 × 8–11 µm (\bar{x} = 117 × 9 µm, n = 20), 8-spored, unitunicate, cylindrical, short-pedicellate, apically rounded, with a J+, subapical ring. *Ascospores* 12–16 × 6–8 µm (\bar{x} = 14 × 7 µm, n = 20), uniseriate, hyaline, brown when mature, young ascospore fusiform becoming ellipsoidal at maturity, unicellular, guttulate, smooth-walled, with a central pallid band, surrounded by a thick mucilaginous sheath, lacking germ slit. Asexual morph: Undetermined.

Material examined – THAILAND, Phang-nga Province, on dead leaflet of *Arenga pinnata* (Wurmb) Merr. (*Areaceae*), 5 December 2014, S. Konta, PHR07g (MFLU 15-0301, holotype).

Notes – *Fasciatispora arengae* is similar to species in genus *Fasciatispora* in having uniseriate, cylindrical asci, with a J+, subapical ring and unicellular ascospores with a central pallid band, but is distinct in its semi-immersed ascomata and ascospore dimensions. Ascospore

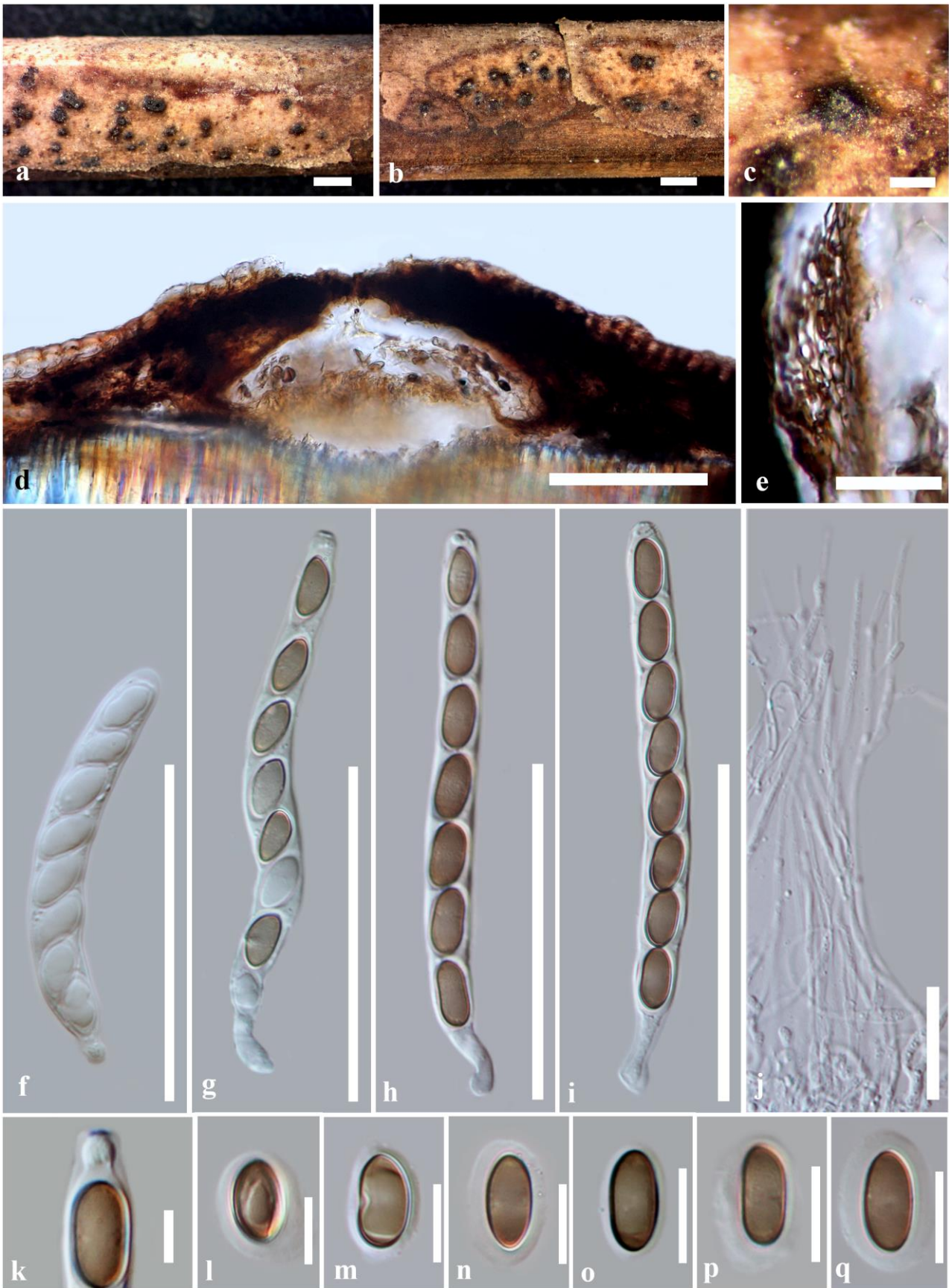


Figure 45 – *Fasciatispora arengae* (MFLU 15-0301, holotype). a, b Appearance of ascomata on host substrate. c Close up of ascomata. d Vertical section of ascoma. e Peridium. f–i Asci. j Paraphyses. k J+ reaction with Melzer’s reagent in apical ring. l–q Ascospores. Scale bars: a, b = 1000 μ m, c = 200 μ m, d = 100 μ m, e, j = 20 μ m, f–i = 50 μ m, k–q = 10 μ m.

dimensions of *F. arengae* (12–16 × 6–8 µm) are slightly similar to *F. nypae* (11.6–17 × 5.6–7.1 µm), but *F. arengae* is collected from dead leaflet of *Arenga pinnata*, while *F. nypae* is reported as a marine inhabitant (Hyde 1991). *Fasciatispora arengae* has larger ascospores than *F. calami* (12–13 × 5–6 µm) and *F. lignicola* (8.4–14.9 × 3.9–7.5 µm).

Diaporthomycetidae*, family *incertae sedis

Barbatosphaeriaceae H. Zhang, K.D. Hyde & Maharachch.

The family *Barbatosphaeriaceae*, in *Diaporthomycetidae*, families *incertae sedis* was introduced to accommodate three genera *Barbatosphaeria*, *Xylomelasma* and *Ceratostomella* (Zhang et al. 2017). Those genera were previously maintained in *Sordariomycetidae*, genera *incertae sedis* (Maharachchikumbura et al. 2016). The family is typified by genus *Barbatosphaeria* Réblová. Members of the family are characterized by dark, long-necked, astromatic ascomata, which are mostly surrounded by sparse mycelium or pubescence, clavate or cylindrical-clavate asci arising from ascogenous hyphae and mostly with ellipsoidal ascospores (Réblová 2007, Zhang et al. 2017).

Barbatosphaeria Réblová, Mycologia 99(5): 727 (2008) [2007]

Saprobic on decayed wood, branches and bark. Sexual morph: *Ascomata* non-stromatic, arranged in circular groups, slightly flattened, globose to subglobose, dark brown to black. *Neck* forming laterally, cylindrical, slightly flexuous, rounded-truncate at the apex. *Peridium* outer layer with dark brown to black, inner layer hyaline, thin-walled, composed of *textura prismatica*. *Paraphyses* septate, slightly constricted at the septa, tapering towards the tip, wider near the base, longer than the asci. *Asci* 8-spored, unitunicate, cylindrical-clavate. *Ascospores* 1-septate, ellipsoidal, hyaline, smooth-walled. Asexual morph: Ramichloridium-like and Sporothrix-like (Réblová 2007).

Type species – *Barbatosphaeria barbirostris* (Dufour) Réblová

Notes – The genus *Barbatosphaeria* was described for *Calosphaeria barbirostris* occurring on decayed wood beneath the periderm (Réblová 2007). There are eight species described based on molecular data (Réblová 2007, Réblová & Stepanek 2009, Réblová et al. 2015). This genus was accommodated in *Sordariomycetes incertae sedis* based on SSU sequences (Réblová 2007), and later by multigene phylogenetic analysis of the SSU, LSU and RPB2 sequences (Réblová et al. 2015). *Ascomata* are astromatic perithecia with a long neck, and ascospores usually group in the middle of the sporiferous part of ascus, forming an empty apex. The asexual morph of *Barbatosphaeria* is Ramichloridium-like and Sporothrix-like.

Barbatosphaeria hippocrepida (Réblová) Réblová, Persoonia 35: 32 (2015)

Fig. 46

≡ *Tectonidula hippocrepida* Réblová, Mycol. Res. 113(9): 998 (2009)

Index Fungorum number: IF810130; Facesoffungi number: FoF04658

Saprobic on decayed wood of branch of *Nothofagus* sp. Sexual morph: *Ascomata* 326–500 µm high, × 370–550 µm diam., growing on decayed wood beneath the peridium, astromatic, arrange in circular groups of 5–11, slightly flattened, globose to subglobose, dark brown to black. *Neck* 310–870 µm long, 100–115 µm wide, forming laterally, cylindrical, slightly flexuous, rounded to truncate at the apex. *Peridium* 30–50 µm wide, 3-layered, external layer with dark brown to black, opaque cells, middle layer composed of 10–15 cells of brown polyhedral *textura prismatica* or *textura globulosa*, inner layer composed of 3–5 cells of hyaline, thin-walled, elongated *textura prismatica*. *Paraphyses* 2.2–5.3 µm wide, septate, slightly constricted at the septa, tapering towards the apex, wider near the base, longer than the asci. *Asci* 17–20 × 3–5 µm (\bar{x} = 18 × 4 µm), unitunicate, cylindrical-clavate, with truncate apex, short stipe, mature asci with a septum near the bottom. *Ascospores* 2.8–4.6 × 0.65–0.83 µm (\bar{x} = 3 × 0.7 µm) diam., 1-celled, U- to horseshoe-shaped or 3/4 circular, allantoid, aseptate, hyaline, smooth-walled, arranged as a group in the middle of the ascus. Asexual morph: Sporothrix-like (Réblová et al. 2015).

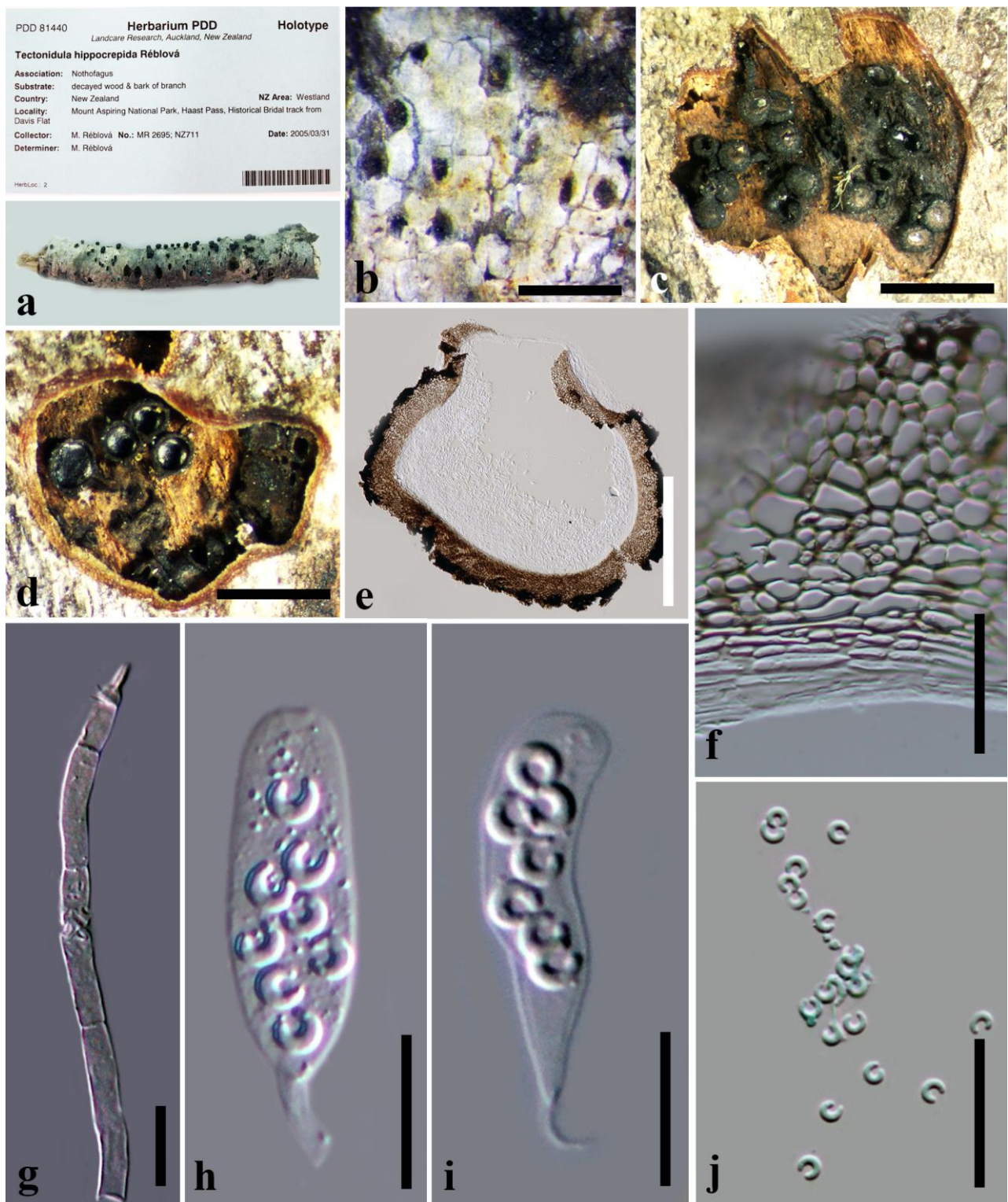


Figure 46 – *Barbatosphaeria hippocrepida* (PDD 81440, holotype). a Herbarium label and specimen. b Perithecial necks protruding in the cortex. c, d Perithecia growing on wood beneath the cortex; cortex peeled off with a razor blade. e Longitudinal section of peridium. f Longitudinal section of perithecial wall. g Paraphyses. h, i Asci. j Ascospores in lactophenol cotton blue. Scale bars: b = 500 μ m, c, d = 2 mm, e = 100 μ m, f = 20 μ m, g–i = 10 μ m, j = 20 μ m.

Material examined – NEW ZEALAND, Westland, Mount Aspiring National Park, Haast Pass, Historical Bridal Track, decayed wood of branch of *Nothofagus* sp., 31 March 2005, M. Réblová NZ 711 (PDD 81440, holotype).

Xylariales, genera incertae sedis

Xylariales is one of the largest orders in *Sordariomycetes* (subclass *Xylariomycetidae*) and is characterized by perithecial ascomycetes with unitunicate asci (Maharachchikumbura et al. 2015). Maharachchikumbura et al. (2016) accepted 24 genera in *Xylariales, genera incertae sedis*. A recent update by Wijayawardene et al. (2018) listed 44 genera in *Xylariales, genera incertae sedis*. Several genera previously included in *Xylariales, genera incertae sedis* have been treated in different families by various authors (Maharachchikumbura et al. 2015, 2016, Senanayake et al. 2015, Daranagama et al. 2018, Wijayawardene et al. 2018). Daranagama et al. (2018) revised the families *Graphostromataceae, Hypoxylaceae, Lopadostomataceae* and *Xylariaceae* in *Xylariales*.

***Diamantinia* A.N. Mill., Læssøe & Huhndorf, Sydowia 55(1): 94 (2003)**

Saprobic on decaying decorticated wood and corticated branches on the ground in dry deciduous shrubby vegetation. Sexual morph: *Stromata* turbinate, uni-loculate, superficial, surface minutely roughened, black. *Paraphyses* filiform, hyaline, septate. *Ascomata* uniperitheciate, globose, with yellow outer lining, superficial. *Asci* 8-spored, cylindrical, unitunicate, apical ring discoid, with flaring margins, amyloid. *Ascospores* upper cell swollen, ellipsoid, conical at apex, truncate at base, becoming pale brown then finally broadly fusiform, hyaline, initially 1-celled, becoming 2-celled, upper cell swollen, brown with a narrow, longitudinal germ slit, lower dwarf cell consisting of a small, conical, hyaline pedicel or appendage.

Type species – *Diamantinia citrina* A.N. Mill., Læssøe & Huhndorf

Notes – Miller et al. (2003) introduced this monotypic genus and suggested that *Diamantinia citrina* belonged in the *Lasiochaeraceae* based on the filiform paraphyses and apiosporous ascospores, which are reminiscent to those of *Strattonia* Cif. emend. Lundq. However, phylogenetic analysis based on LSU data suggested its placement in the *Xylariales*. The genus exhibits an amyloid apical ring and ascospores with germ slits, which are characteristic of *Xylariaceae*. However, *Diamantinia citrina* differs from other *Xylariaceae* members by the shape of the paraphyses (cylindrical vs. tapering), apical ascus ring, ascospores and peridial anatomy (Miller et al. 2003). Miller et al. (2003) mentioned that the genus did not cluster with other members of *Xylariaceae* and hence, we prefer to keep the genus in *Xylariales incertae sedis*.

***Diamantinia citrina* A.N. Mill., Læssøe & Huhndorf, Sydowia 55(1): 94 (2003)**

Fig. 47

Index Fungorum number: IF291381; Facesoffungi number: FoF04659

Saprobic on decaying decorticated wood and corticated branches on the ground in dry deciduous shrubby vegetation. Sexual morph: *Stromata* 190–210 µm diam. at base, 380–600 µm diam. at apex, 450–820 µm high, turbinate, uni-loculate, superficial, surface minutely roughened, black. *Paraphyses* 1.5–2 µm wide, filiform, hyaline, septate. *Ascomata* uniperitheciate, globose, with yellow outer lining, superficial. *Asci* 100–145 × 7–9.5 µm, 8-spored, cylindrical, unitunicate, apical ring discoid, with flaring margins, amyloid. *Ascospores* 12.5–15.5 × 4.5–6 µm, upper cell swollen, ellipsoid, 9.5–12.5 × 4.5–6 µm, conical at apex, truncate at base, becoming pale brown then finally broadly fusiform, initially 1-celled, becoming 2-celled by the formation of a septum, upper cell swollen, brown with a narrow, longitudinal germ slit, lower dwarf cell consisting of a small, conical, hyaline pedicel or appendage.

Material examined – BRAZIL, Bahia, Chapada Diamantina, Mco. Rio de Contas, lower slopes of Pico das Almas, ca. 15 km NW of Rio de Contas on road to Brumadinho, dry rocky vegetation, on decayed corticated branches, 27 October 1994, S.M. Huhndorf, W.R. Buck & R.C. Harris, (BUCK 26886, NY, F, isotype).

Sordariomycetes, genera incertae sedis

The genera *Urupe*, *Phialemoniopsis* and *Rhizophila* are treated as genera *incertae sedis* in *Sordariomycetes*. Descriptions and illustrations are provided below to further facilitate identification. DNA sequence data are required to establish a natural classification.

Urupe Viégas, *Bragantia* 4(1-6): 125 (1944)

Epiphytes on surface of leaves. *Mycelium* intercellular, septate, hyaline to pale brown. Sexual morph: *Ascstromata* solitary or clustered on the surface of host. *Locules* globose, brown, reddish, ostiole not observed. *Peridium* thick, comprising layer of *textura angularis* cells, outer layer darker brown. *Hamathecium* paraphysate. *Asci* 8-spored, unitunicate, clavate to broadly cylindrical, thin-walled, with short and round pedicel. *Ascospores* fusiform, 1-septate, not constricted at the septum, hyaline, narrowed ends, upper cell slightly broader than lower cell, guttulate, but smooth-walled when in Melzer's reagent. Asexual morph: Undetermined.

Type species – *Urupe guaduae* Viégas

Notes – *Urupe* was introduced by Viégas (1944), and it is a monotypic genus. *Urupe* is characterized by intercellular hyphae, branched, septate, reddish ascomata, 8-spored, clavate asci, lacks paraphyses, and has 3-septate, hyaline ascospores. Hongsanan et al. (2015) treated the genus as doubtful genus in *Sordariomycetes* based on morphology illustrated by Viégas (1944). Hongsanan et al. (2015) were unable to examine the type specimen of *Urupe guaduae*. However, they excluded this species from *Meliolales* because of its hyaline ascospores and non-hyphopodiate hyphae as described by Viégas (1944). We examined the type specimen and found that it has larger ascostromata (up to 300 µm), and 1-septate ascospores, while the original description reported smaller ascostromata (100–120 µm diam., Viégas 1944), with 3-septate ascospores. Based on our observations, the ascospores appear to be 2 or 3-septate when in the ascus because they overlap with one another. Based on the morphological characters of *Urupe guaduae* from both the original description and our study, we agree that this species should be excluded from *Meliolales*. The taxon may have similarities with *Phyllachorales*, however we placed it as a genus *incertae sedis* in *Sordariomycetes* until it can be sequenced.

Urupe guaduae Viégas, *Bragantia* 4(1-6): 125 (1944)

Fig. 48

Index Fungorum number: IF291870; Facesoffungi number: FoF04659

Epiphytes on surface of leaves. *Mycelium* intercellular, septate, hyaline to pale brown. Sexual morph: *Ascstromata* up to 300 µm diam., solitary or clustered on the surface of host. *Locules* 150–240 µm, globose, brown, reddish, ostiole not observed. *Peridium* 32–45 µm (\bar{x} = 40 µm, n = 5), comprising layer of *textura angularis* cells, outer layer darker brown. *Hamathecium* paraphysate. *Asci* 64–78 × 13–18 µm (\bar{x} = 74 × 15 µm, n = 10), 8-spored, unitunicate, clavate to broadly cylindrical, thin-walled, with short and round pedicel. *Ascospores* 31–35 × 3–5 µm (\bar{x} = 34 × 4 µm, n = 10), fusiform, 1-septate, not constricted at the septum, hyaline, narrowed ends, upper cell slightly broader than lower cell, guttulate, but smooth-walled when in Melzer's reagent. Asexual morph: Undetermined.

Material examined – BRAZIL, Morro do Aipim, Blumenau, État de Santa Catarina, on living leaves of *Guadua* sp., 28 October 1935, Nina Raeder 1289 (IAC, holotype).

Phialemoniopsis Perdomo, Dania García, Gené, Cano & Guarro, *Mycologia* 105(2): 408 (2013)

Endophytic on stem of plant and *pathogenic* on humans. Sexual morph: Undetermined. Asexual morph: *Conidiomata* pycnidium-like, globose to subglobose, dark brown to black. *Conidiophores* branched, aseptate, hyaline. *Conidiogenous cells* monophialidic, discrete, terminal or lateral, cylindrical to flask-shaped, straight to slightly flexuose, or intercalary with a cylindrical lateral projection. *Conidia* ellipsoidal to slightly allantoid, slightly curved, hyaline.

Type species – *Phialemoniopsis ocularis* (Gené & Guarro) Perdomo, Dania García, Gené & Guarro

Notes – The genus *Phialemoniopsis* was proposed to accommodate the opportunistic taxon *Phialemonium curvatum*, *Sarcopodium oculorum* and two new species, *Phialemoniopsis cornearis* and *Phialemoniopsis pluriloculosa* (Perdomo et al. 2013). The taxonomy of *Phialemoniopsis* has not been completely resolved, however, we place the genus in *Sordariomycetes* genera *incertae sedis* agreeing with Perdomo et al. (2013) and Wijayawardene et al. (2018). The genus currently comprises six species (Wijayawardene et al. 2017a).

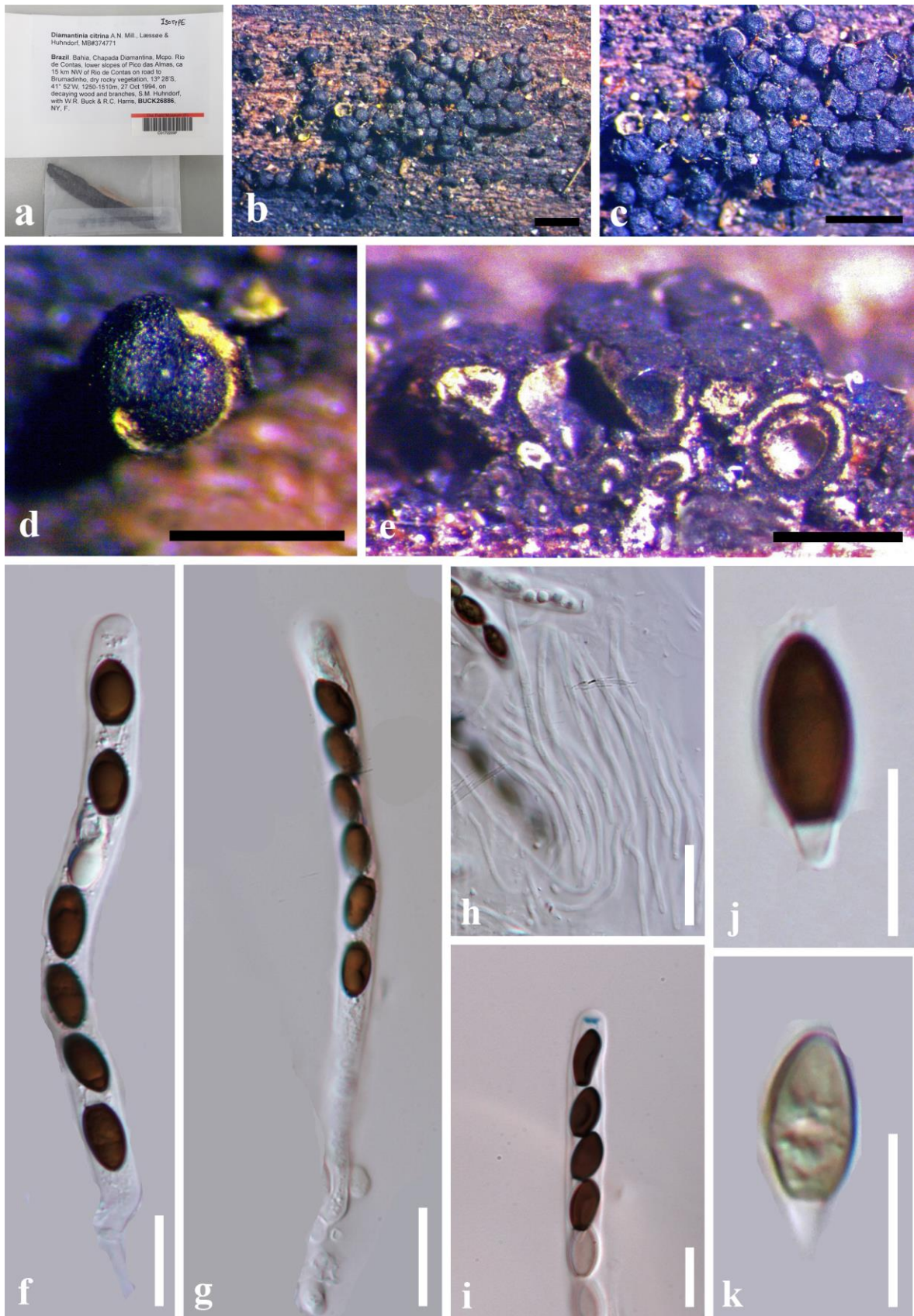


Figure 47 – *Diamantinia citrina* (BUCK 26886, isotype). a Details of herbarium and specimen. b, c Stromata on wood. d Stroma with yellow pigments. e Cross section of stromata showing perithecia encased in stromatal tissue. f, g Mature asci. h Paraphyses. i Ascus with apical ring bluing in Melzer's reagent. j, k Ascospores. Scale bars b, c = 1000 μm , d, e = 500 μm , f–i = 10 μm , j, k = 15 μm .

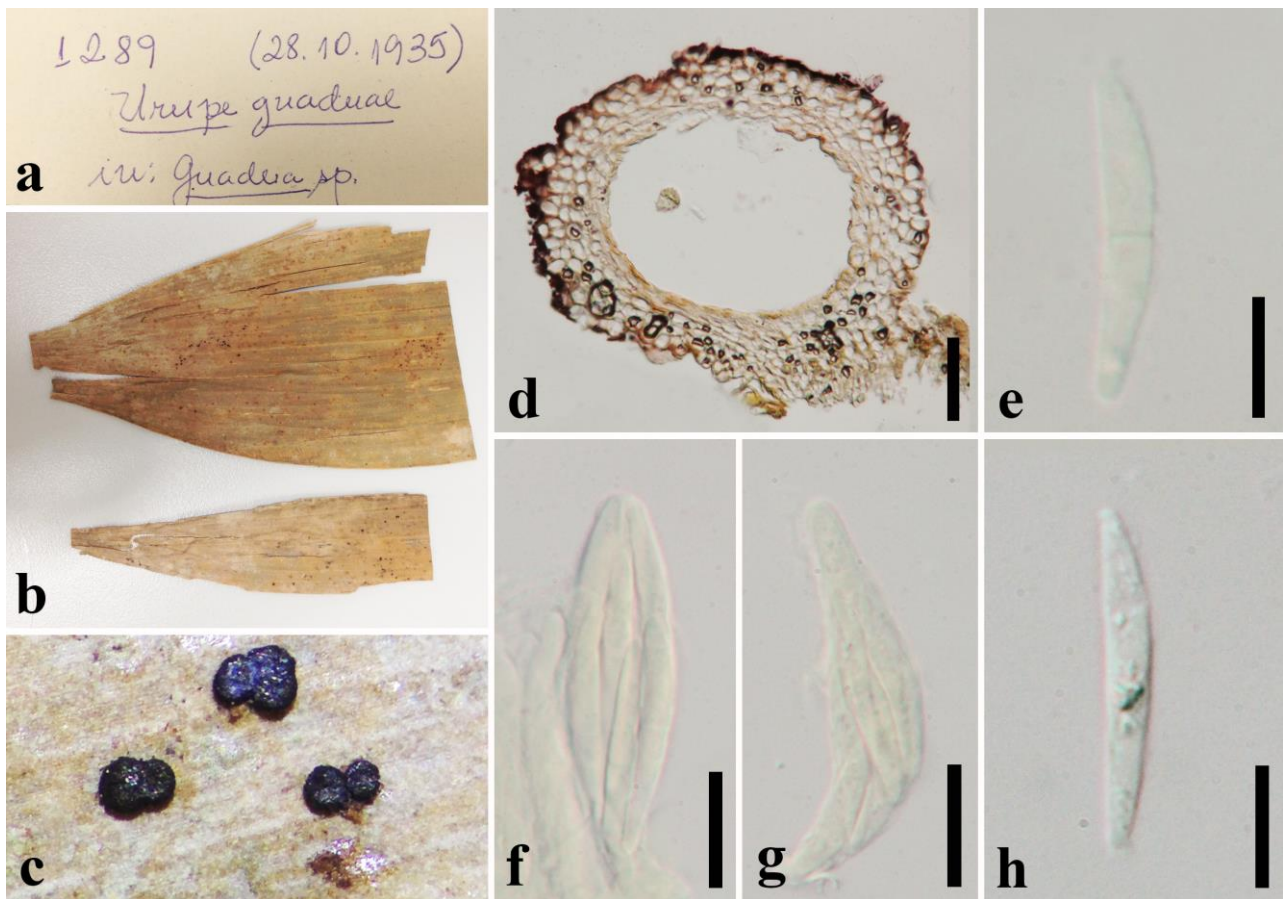


Figure 48 – *Urupe guaduae* (IAC, holotype). a, b Herbarium label and specimen. c Ascostromata on surface of plant. d Section through ascostroma. e Ascospore in Melzer's reagent. f, g Asci in Melzer's reagent. h Ascospore. Scale bars: d = 50 μ m, e, h = 10 μ m, f, g = 20 μ m.

Phialemoniopsis ocularis (Gené & Guarro) Perdomo, Dania García, Gené & Guarro, *Mycologia* 105(2): 411 (2013) Fig. 49

≡ *Sarcopodium oculorum* Gené & Guarro, in Guarro, Höfling-Lima, Gené, De Freitas, Godoy, Zorat-Yu, Zaror & Fischman (2002)

Index Fungorum number: IF563877; Facesoffungi number: FoF04661

Pathogenic on humans. Sexual morph: Undetermined. Asexual morph: *Conidiomata* 200–450 \times 100–580 μ m (\bar{x} = 370 \times 340 μ m, n = 5), pycnidium-like, globose to subglobose, dark brown to black. *Conidiophores* 2–18 \times 1–2 μ m (\bar{x} = 10 \times 1.5 μ m, n = 20), branched, aseptate, hyaline. *Conidiogenous cells* monophialidic, discrete, terminal or lateral, cylindrical to flask-shaped, straight to slightly flexuose, or intercalary with a cylindrical lateral projection. *Conidia* 3–4 \times 1–1.5 μ m (\bar{x} = 3 \times 1 μ m, n = 20), ellipsoidal to slightly allantoid, slightly curved, hyaline.

Material examined – BRAZIL, São Paulo, from cornea of *Homo sapiens*, 2000, O. Fischman (IMI 387421, holotype).

Rhizophila K.D. Hyde & E.B.G. Jones, *Mycotaxon* 34(2): 527 (1989)

Saprobic on dead wood. Sexual morph: *Ascomata* immersed, subglobose to ellipsoidal, solitary or gregarious, dark brown to black ostiolate, papillate, periphysate. *Periphyses* aseptate, hyaline. *Peridium* outer layer composed of irregular hyphae, dark brown to black, inner layer composed of elongated cells which fuse with the paraphyses-like structures, light brown to brown; paraphyses-like structures comprising irregular shaped cells, septate. *Asci* 8-spored, clavate, pedunculate, unitunicate, thin-walled with an indistinct apical thickening, slightly truncate, without an apical ring. *Ascospores* ellipsoidal to fusiform, 1-celled, hyaline to brown. Asexual morph: Undetermined.

Type species – *Rhizophila marina* K.D. Hyde & E.B.G. Jones

Notes – The genus *Rhizophila* is characterized by relatively large, periphysate, ascomata with paraphyses-like structures, yellowish brown to brown, 1-celled ascospores and clavate, unitunicate asci. This genus was introduced by Hyde & Jones (1989) and is typified by *R. marina* which was isolated from prop roots and branches of *Rhizophora mucronata*. Hyde & Jones (1989) stated that it has affinities to the family *Phyllachoraceae* but is distinct by thick-walled ascomata and asci lacking apical rings. *Rhizophila marina* has been reported from various locations including Seychelles, Brunei, Thailand, North Sumatra, Andaman and Nicobar Island and India (Hyde 1989, Sarma et al. 2001). The genus lacks molecular data in GenBank and its phylogenetic placement is uncertain, hence, the genus is placed in *Sordariomycetes incertae sedis* (Maharachchikumbura et al. 2016, Wijayawardene et al. 2018).

Rhizophila marina K.D. Hyde & E.B.G. Jones, Mycotaxon 34(2): 528 (1989)

Fig. 50

Index Fungorum number: IF135911; Facesoffungi number: FoF04662

Saprobic on dead wood. Sexual morph: *Ascomata* 350–700 × 400–840 µm immersed, subglobose to ellipsoidal, solitary or gregarious, dark brown to black ostiolate, papillate, periphysate. *Periphyses* 3–10 µm wide, aseptate, hyaline. *Peridium* 30–145 µm thick, 2-layered, outer layer composed of irregular hyphae, dark brown to black, inner layer composed of elongated cells which fuse with the paraphyses-like structures, light brown to brown; paraphyses-like structures comprising irregular-shaped cells, septate. *Asci* 8-spored, 2–3-seriate, clavate, pedicellate, unitunicate, thin-walled with an indistinct apical thickening, slightly truncate, without an apical ring. *Ascospores* 25–38 × 10–14 µm (\bar{x} = 32.5 × 12 µm, n = 10), ellipsoidal to fusiform, 1-celled, hyaline to brown. Asexual morph: Undetermined.

Material examined – SEYCHELLES, from *Rhizophora* sp. (*Rhizophoraceae*), December 1984, K.D. Hyde (IMI 325411, holotype).

Ascomycota, families incertae sedis

Saccardiaceae Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 369 [95 repr.] (1909)

Facesoffungi number: FoF04663

Saprobic on leaves. Sexual morph: *Ascomata* superficial on host tissue, globose to subglobose, initially pale yellow, becoming brown to dark brown, loose, fleshy and soft, solitary or gregarious, ostiole not seen. *Peridium* very thin-walled, composed of pale yellow to brown cells. *Hamathecium* lacking. *Asci* 8-spored, bitunicate, globose to ovoid or saccate, sessile or with pedicel. *Ascospores* 2–3-seriate, hyaline, oblong to ellipsoidal, with obtuse to rounded ends, muriform. Asexual morph: Undetermined.

Notes – The families *Phaeothecoidiaceae*, *Saccardiaceae* and *Schizothyriaceae* are a poorly understood assemblage of genera, which mostly lack sequence data. The types of *Saccardiaceae* and *Schizothyriaceae* need to be recollected to establish their phylogenetic relationships with other ascomata groups. We provide notes and illustrations for one genus placed in *Saccardiaceae* and suggest tentative placements for other taxa which were formerly placed in *Saccardiaceae* in Wijayawardene et al. (2018), acknowledging that they need to be recollected and sequenced to confirm our suggestions.

The family *Saccardiaceae* was established by Höhnelt (1909a). Taxa are mostly saprobic on living or dead plants. The understanding of the family by von Arx & Müller (1975) was as follows. *Ascomata* are small and discoid, disc convex or pulvinate and hyphae develop superficially on the cuticle of leaves or other plant parts, asci are surrounded by numerous pseudoparaphyses, forming an epithecium, mostly saccate, thick-walled, fissitunicate and ascospores are 2–3-celled or multi-celled and hyaline or brown. The family comprises 13 genera and has been placed as family *incertae sedis* within the Ascomycota (Lumbsch & Huhndorf 2010, Wijayawardene et al. 2018).

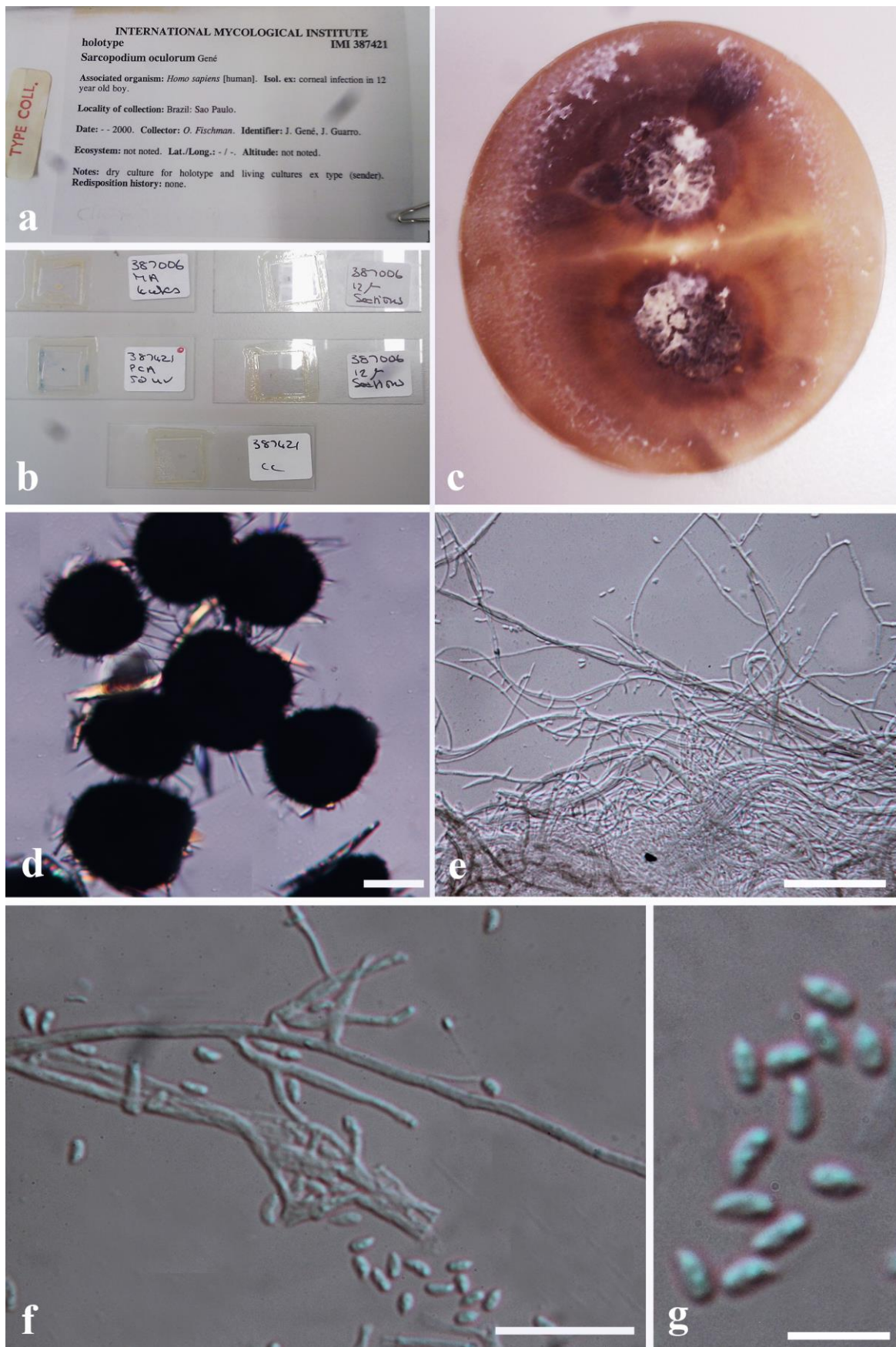


Figure 49 – *Phialemoniopsis ocularis* (IMI 387421, holotype). a Herbarium label. b Microslides. c Dried culture. d Pycnidium-like conidiomata. e, f Conidiophores and conidia. g Conidia. Scale bars: d = 50 μ m, e = 20 μ m, f–g = 10 μ m.

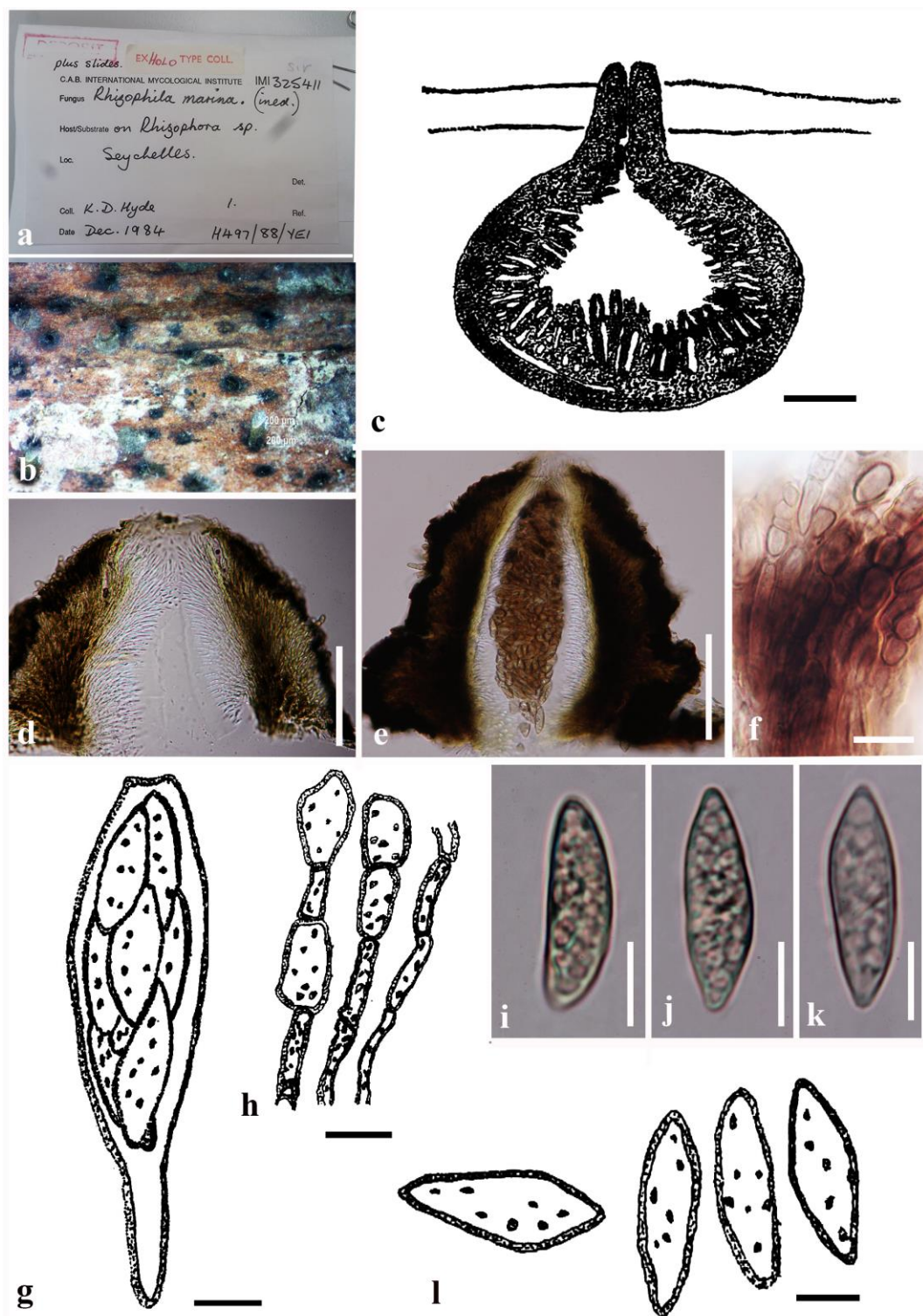


Figure 50 – *Rhizophila marina* (IMI 325411, holotype). a Herbarium label. b Ascomata on host surface. c Diagrammatic representation of vertical section through ascoma. d, e Papilla. f Peridium. g Diagrammatic representation of ascus with ascospores. h Diagrammatic representation of Paraphyses-like structures. i–k Ascospores. l. Diagrammatic representation of ascospores. (c, g, h, l redrawn from Hyde & Jones (1989), Figs. 1–5). Scale bars: c = 100 μ m, d, e, l = 10 μ m, f = 50 μ m, g–k = 5 μ m.

The family is based on *Saccardia* which is illustrated from material of *S. quercina* Cooke in H.W. Ravenel American Exsiccata and can be considered part of the type as the collection details match. The globose to ovoid or saccate asci are enclosed in very thin-walled, small ascomata

similar to *Translucidithyrium thailandicum* in *Phaeothecoidiaceae* (Zeng et al. 2018). The muriform ascospores, however, are unlike members of *Phaeothecoidiaceae*. We maintain the family *Saccardiaceae* based on *Saccardia quercina* and include the genera *Ascolectus*, *Cyanodiscus*, *Henningsiella*, *Phillipsiella*, *Pseudodiscus* and *Schenckiella*. We were unable to examine *Ascolectus*, *Cyanodiscus*, *Phillipsiella*, *Pseudodiscus*, and *Schenckiella* so these remain in *Saccardiaceae* pending further study. Phookamsak et al. (2016) provided a description and illustration of *Henningsiella* and tentatively placed it in *Saccardiaceae* until molecular phylogeny is available to clarify its natural placement.

We maintain the family *Saccardiaceae* to accommodate *Saccardia*, plus other genera, which were previously placed in this family that we have not been able to examine. The family is characterized by minute ascomata, surrounded by brown mycelial network forming plectenchymatous tissue, with very thin walls and rounded asci with eight muriform ascospores and a habit on leaves. The asexual morph is unknown (Wijayawardene et al. 2017b).

Saccardia Cooke, Grevillea 7(no. 42): 49 (1878)

Facesoffungi number: FoF04664

Saprobic on leaves. Sexual morph: *Ascomata* superficial on host tissue, visible as dark area on the lower side of host, easily removed, globose to subglobose, initially pale yellow, becoming brown to dark brown, loose, fleshy and soft, solitary or gregarious, ostiole not seen. *Peridium* thin-walled, composed of pale yellow to brown cells. *Pseudoparaphyses* lacking. *Asci* 8-spored, bitunicate, globose to ovoid or saccate, sessile. *Ascospores* hyaline, oblong to ellipsoidal, with obtuse to rounded ends, muriform. Asexual morph: Undetermined.

Type species – *Saccardia quercina* Cooke

Notes – The genus *Saccardia* was established by Cooke (1878) with *S. quercina* Cooke as the type species. The genus consists of three species epithets (Index Fungorum 2018). *Saccardia* is characterized by discoid ascomata developing on a superficial mycelium. Ascospores are hyaline, multi-septate with transverse and longitudinal septa (von Arx & Müller 1975).

Saccardia quercina Cooke, Grevillea 7(no. 42): 49 (1878)

Fig. 51

Index Fungorum number: IF208462; Facesoffungi number: FoF04665

Saprobic on leaves of *Quercus virens*. Sexual morph: *Ascomata* 95–130 µm high × 100–145 µm diam. (\bar{x} = 115 × 120 µm, n = 10), superficial on host tissue, visible as dark area on the lower side of host, easily removed, globose to subglobose, initially pale yellow, becoming brown to dark brown, loose, fleshy and soft, solitary or gregarious, ostiole not seen. *Peridium* thin-walled, composed of pale yellow to brown, granular cells. *Pseudoparaphyses* lacking. *Asci* 38–65 × 35–49 µm (\bar{x} = 45 × 41 µm, n = 20), 8-spored, bitunicate, fissitunicate, globose to ovoid or saccate, sessile, apically rounded. *Ascospores* 20–25 × 9–12 µm (\bar{x} = 23 × 11 µm, n = 25), 2–3-seriate, hyaline, oblong to ellipsoidal, with obtuse to rounded ends, muriform, with 6 transverse septa and 1–2 longitudinal septa, wall rough, constricted or not at the septa, apical cell mostly larger than basal cell. Asexual morph: Undetermined.

Material examined – USA, Georgia, Darien, on leaves of *Quercus virens* Aiton (*Fagaceae*), H.W. Ravenel Americana Exsiccata (BPI 566019, type).

Strangosporaceae S. Stenroos, Miadl. & Lutzoni

The monogeneric family *Strangosporaceae* was introduced by Miadlikowska et al. (2014) to accommodate *Strangospora* Körb., which was removed from the order *Lecanorales*. It was initially placed in *Lecanoromycetes*, families *incertae sedis* by Miadlikowska et al. (2014) based on analysis of combined mitSSU, nucLSU, nucSSU, RPB1 and RPB2 sequences, but they suspected that it might be outside of the class *Lecanoromycetes*. Recently, Wijayawardene et al. (2018) placed the family in *Ascomycota*, families *incertae sedis*. The family comprises epiphytic, epixylic or bryophylous lichens with crustose and often poorly developed thalli associated with a chlorococcoid photobiont (Miadlikowska et al. 2014). *Strangospora* is characterized by biatorine

apothecia with poorly developed exciple, clavate, multi-spored asci with gelatinous outer layer, a strongly thickened, I+, blue wall and apical dome and aseptate ascospores (Miadlikowska et al. 2014). The asexual morphs are undetermined (Wijayawardene et al. 2017b).

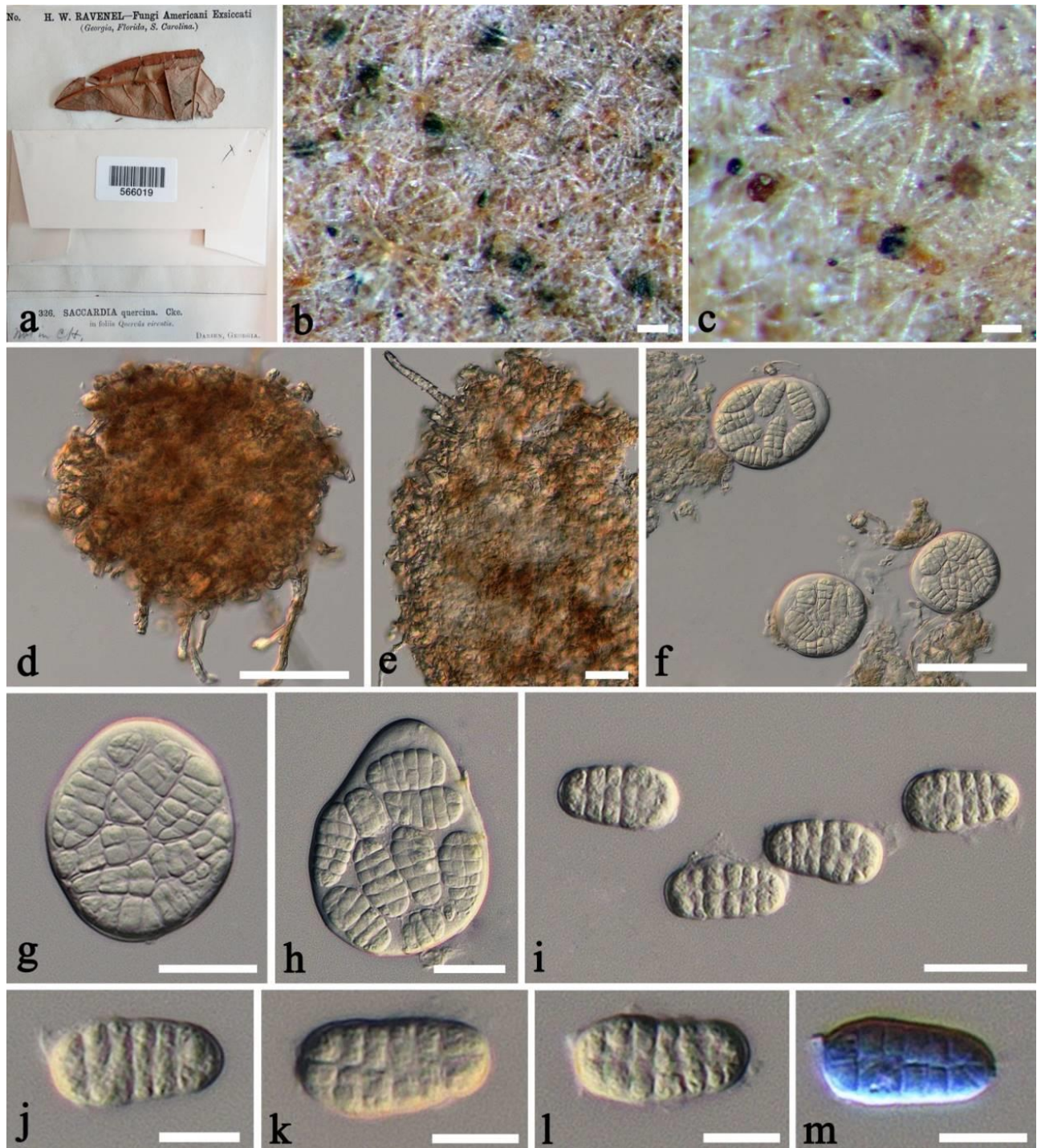


Figure 51 – *Saccardia quercina* (BPI 566019, type). a Herbarium label and specimen. b, c Ascomata on host surface. d Ascoma. e Peridium structure seen from above. f–h Asci. i–l Ascospores. m Ascospore stained in lactophenol cotton blue. Scale bars: b, c = 200 μm , d, f = 50 μm , e, g, h, i = 20 μm , j–m = 10 μm .

Strangospora Körb., *Parerga lichenol.* (Breslau) 2: 173 (1860)

Lichenized on wood. Sexual morph: *Apothecia* black, solitary, gregarious or confluent, superficial, pulvinate. *Apothecial wall* composed of hyaline to brown, moderately thick-walled cells

of *texura angularis*. *Hymenium* layer composed of asci and paraphyses, with a crust-like excipulum above. *Hamathecium* dense, hyaline, filamentous, hyphoid, septate, unbranched. *Asci* hyaline, bitunicate, wedge-shaped, broadly rounded above, narrow below, pedicellate, many-spored. *Ascospores* hyaline, multiseriate, irregularly arranged in the asci, globose, cupulate, smooth and thick-walled, aseptate. Asexual morph: Undetermined.

Type species – *Strangospora pinicola* (A. Massal.) Körb.

Notes – *Strangospora* was established by Körber (1860) with the type species *S. pinicola*. Reeb et al. (2004) excluded *Strangospora* from the subclass *Acarosporomycetidae*, family *Acarosporaceae* based on phylogenetic analyses using isolates of *S. pinicola*, and listed genera included in *Acarosporaceae*. The genus was placed as an uncertain genus in *Lecanoromycetes* by Eriksson (2006) and placed outside all families sampled from the order *Lecanorales* with high support by Miadlikowska et al. (2006). Lumbsch & Huhndorf (2007, 2010) accepted *Strangospora* in *Lecanorales* genera *incertae sedis*. Miadlikowska et al. (2014) removed *Strangospora* from *Lecanorales* and placed it in family *Strangosporaceae*, in *Lecanoromycetes incertae sedis*. Lücking et al. (2016) accepted *Strangospora* in the subphylum *Pezizomycotina*, *Strangosporaceae*, families *incertae sedis*.

Strangospora moriformis (Ach.) Stein, in Cohn, Krypt.-Fl. Schlesien (Breslau) 2(2): 176 (1879)

Fig. 52

≡ *Arthonia moriformis* Ach., Syn. meth. lich. (Lund): 5 (1814)

≡ *Biatorella moriformis* (Ach.) Th. Fr., Lich. Scand. (Upsaliae) 1(2): 401 (1874)

Index Fungorum number: IF406603; Facesoffungi number: FoF04666

Lichenized on wood. Sexual morph: *Apothecia* 210–220 µm diam., 355–365 µm high, black, solitary, gregarious or confluent, superficial, pulvinate. *Apothecial wall* 10–15 µm wide, composed of hyaline to brown, moderately thick-walled cells of *texura angularis*. *Hymenium* layer composed of asci and paraphyses, with a crust-like excipulum above. *Hamathecium* 1.5–2.5 µm wide, hyaline, filamentous, hyphoid, septate, unbranched, dense. *Asci* 34–88 × 18–60 µm (\bar{x} = 65 × 32, n = 20), hyaline, bitunicate, wedge-shaped, broadly rounded above, narrow below, pedicellate, many-spored. *Ascospores* 2.5–4.5 × 2.5–3 µm (\bar{x} = 3.5 × 2.8, n = 10), hyaline, multiseriate, irregularly arranged in the asci, globose, cupulate, smooth and thick-walled, aseptate. Asexual morph: Undetermined.

Material examined – SWEDEN, Jämtland, Undersåker, Rista., on wood, 1917, G.O.A. Malme (H).

Pezizomycotina*, genus *incertae sedis

Thelenidia Nyl., Flora, Regensburg 69: 463 (1886)

Lichen on pyrenocarp. *Superficial mycelium* absent. Sexual morph: *Ascomata* semi-immersed, solitary, globose to subglobose, dark brown to black, ostiole not observed. *Peridium* 2 layers, inner layer with hyaline *textura angularis* cells, outer layer with dark brown to black *textura angularis* cells. *Hamathecium* comprising paraphyses, embedded in a gelatinous matrix. *Asci* 1-spored, unitunicate, clavate, ocular chamber absent, long pedicel when young. *Ascospores* aseptate, obovoid, upper part broader than lower part, slightly constricted at the middle, verrucose, hyaline when immature, brown at maturity. Asexual morph: Undetermined.

Type species – *Thelenidia monosporella* Nyl.

Notes – *Thelenidia monosporella* was established by Nylander (1886) to accommodate *T. monosporella*. *Thelenidia* is placed in *Dothideomycetes*, genera *incertae sedis* (Wijayawardene et al. 2014) based on morphology such as habitat in lichens, 1-spored asci and aseptate ascospores. Lücking et al. (2016) changed its classification from *Dothideomycetes* to *Pezizomycotina incertae sedis*. There are no any other collections that can represent the characters of this species, and no sequence data to clarify its placement. We followed Lücking et al. (2016) and placed it in *Pezizomycotina incertae sedis*.

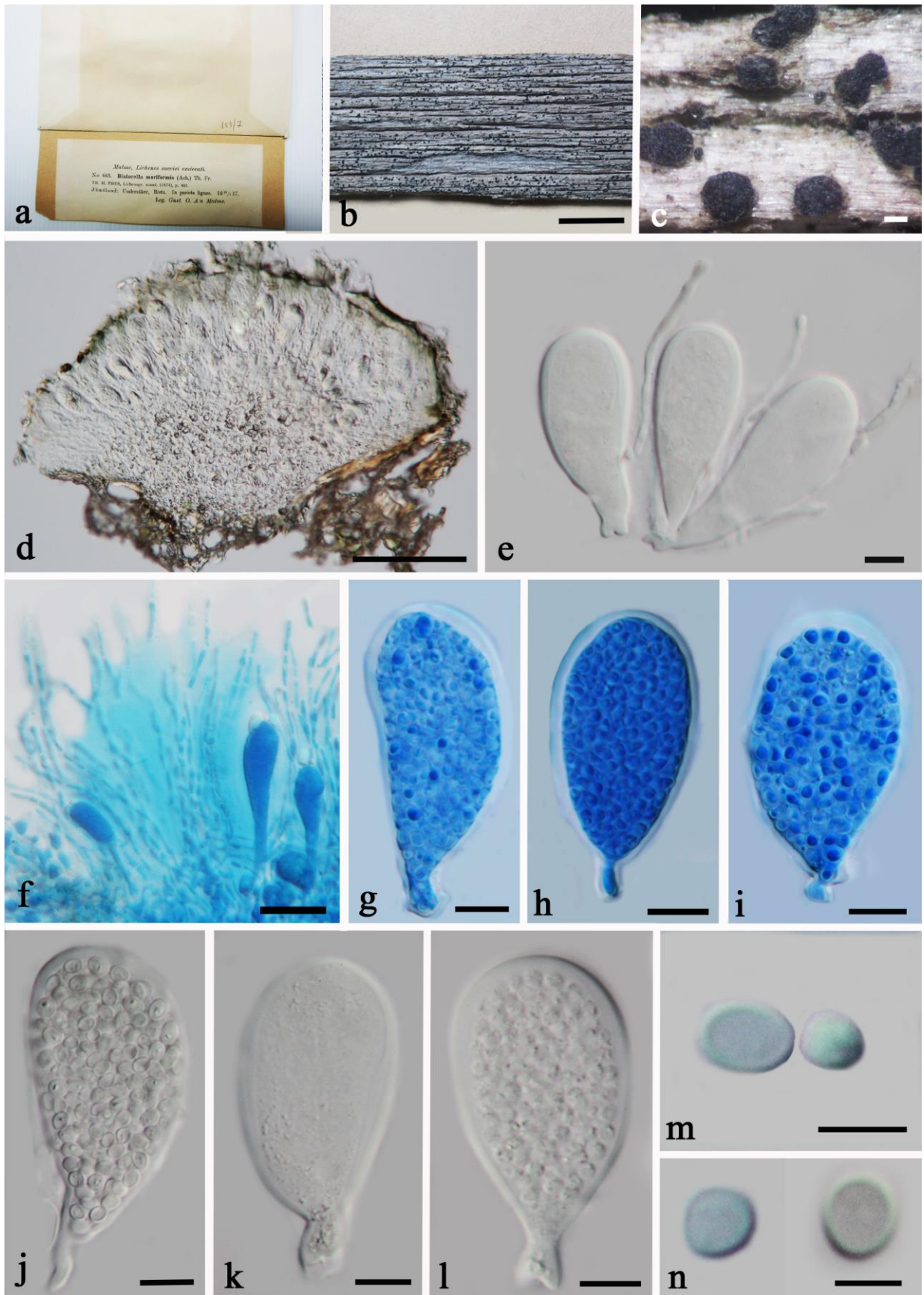


Figure 52 – *Strangospora moriformis*. a Herbarium label. b Herbarium specimen. c Appearance of black apothecia on the host. d Vertical section of apothecium with asci inside. e, f Paraphyses and asci. g–l Asci. m–n Ascospores. Note: f–i, m, n stained in lactophenol cotton blue. Scale bars: b = 20 mm, c = 100 µm, d = 100 µm, e, g–l = 10 µm, f = 20 µm, m, n = 5 µm.

Thelenidia monosporella Nyl., Flora, Regensburg 69: 463 (1886)

Fig. 53

Index Fungorum number: IF406941; Facesoffungi number: FoF04657

Lichen on pyrenocarp. *Superficial mycelium* absent. Sexual morph: *Ascomata* 360–410 μm diam. (\bar{x} = 385 μm , n = 3), semi-immersed, solitary, globose to subglobose, dark brown to black, ostiole not observed. *Peridium* 65–72 μm (\bar{x} = 67 μm , n = 10), 2 layers, inner layer with hyaline *textura angularis* cells, outer layer with dark brown to black *textura angularis* cells. *Hamathecium* of 1 μm , hyaline, paraphyses, embedded in a gelatinous matrix. *Asci* 68–75 \times 25–30 μm (\bar{x} = 71 \times 28 μm , n = 10), 1-spored, unitunicate, clavate, ocular chamber absent, long pedicel when young. *Ascospores* 49–58 \times 22–25 μm (\bar{x} = 56 \times 24 μm , n = 20), aseptate, obovoid, upper part broader than lower part, slightly constricted in middle, verrucose, hyaline when immature, brown at maturity. Asexual morph: Undetermined.

Material examined – SWITZERLAND, Helvetia, in Lichens, Hegetschweiler (H 4060, syntype).

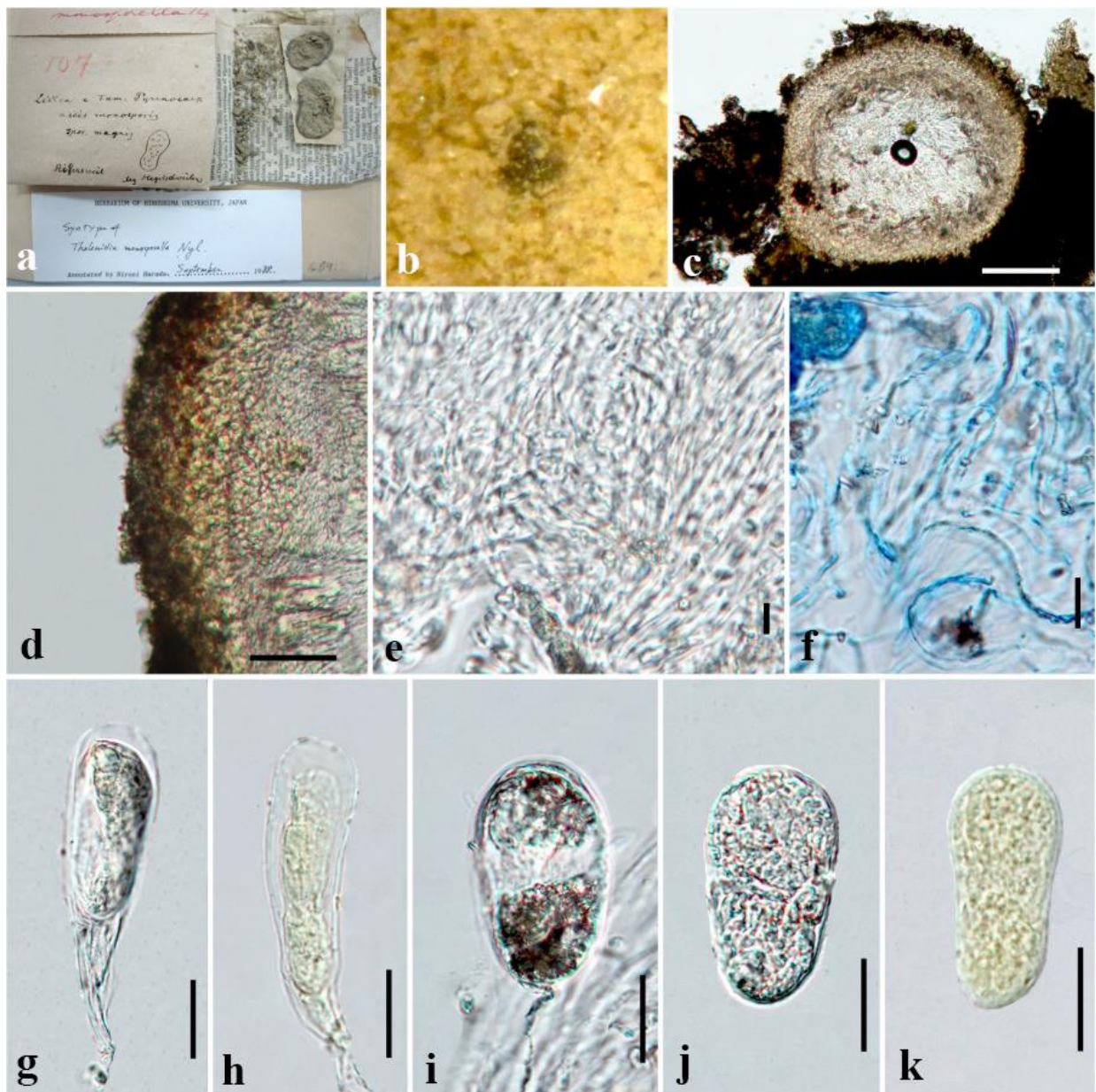


Figure 53 – *Thelenidia monosporella* (H 4060, syntype). a Herbarium label and specimen. b Ascoma on substrate. c Vertical section through ascoma. d Peridium. e Paraphyses. f Paraphyses in lactophenol cotton blue reagent. g Ascus. h Ascus in Melzer's reagent. i, j Ascospores. k Ascospore in Melzer's reagent. Scale bars: c = 100 μm , d = 20 μm , e, f = 5 μm , g–k = 20 μm .

Doubtful genus

Angatia Syd. & P. Syd., Anns mycol. 12(6): 566 (1914)

Epiphytic on living leaves, or associated with scale insects. Sexual morph: *Ascomata* superficial, discoid, dark to reddish brown, rounded or irregular, solitary or scattered, easily removed from the host, apothecium-like, with or without a basal hypostroma developing in the host tissue. *Peridium* dark, isodiametric, thick-walled. *Asci* 6–8-spored, bitunicate, ellipsoidal to cylindrical, subsessile to short pedicel, broadly rounded at the apex. *Ascospores* hyaline to brown, muriform, with transverse and longitudinal septa, oblong to ellipsoidal, broadly rounded at both ends, not constricted at the septa. Asexual morph: Undetermined.

Type species – *Angatia eugeniae* Syd. & P. Syd.

Notes – *Angatia* was introduced by Sydow & Sydow (1914) and is typified by *A. eugeniae*. von Arx & Müller (1975) placed *Angatia* in *Saccardiaceae*, while Barr (1987) placed it in *Myriangiaceae*. It was subsequently accepted in *Saccardiaceae* (Lumbsch & Huhndorf 2007, 2010, Wijayawardene et al. 2017a, 2018). *Angatia thwaitesii* has been reported from scale insects (Sydow & Sydow 1914, von Arx 1963, Batista et al. 1966). The genus comprises five species epithets (Index Fungorum 2018). There are no cultures and no phylogenetic analysis for *Angatia* species (Wijayawardene et al. 2017a). *Angatia* is thus treated as a doubtful genus until fresh collections with sequence data are available as no type exists.

Angatia rondoniensis Bat., J.L. Bezerra & Castr., Atas Inst. Micol. Univ. Recife 3: 65 (1966)

Figs 54, 55

Index Fungorum number: IF326199; Facesoffungi number: FoF04667

Epiphytic on leaves. Sexual morph: see notes below. Asexual morph: Undetermined.

Notes – We re-examined the specimen (URM 51224), but it was in poor condition and thus ascomata, asci and ascospores were redrawn (Fig. 55). According to the type description from Batista et al. (1966), ascomata are amphigenous, numerous, scattered, sub-discoid, 270–525 × 150–195 µm, globose, membranaceous to coriaceous, with dark brown epithecium, pseudoparenchymatous, 18.5–26 µm wide, composed of polygonal cells, 3–7.5 × 4.5–5 µm, basal stroma, 150–300 µm diam., context interthecial, hyaline, cellulose. Asci are ellipsoidal to cylindrical, bitunicate, subsessile, 6–8-spored, 48–66 × 18.5–22 µm, in different layers and aparaphysate. Ascospores are ellipsoid, with 7 transverse septa and 1 longitudinal septum, not constricted at the septum, hyaline, polystichae and 19–22 × 6–10.5 µm.

Material examined – BRAZIL, Marajá, Maranhão, on leaves of *Arecaceae*, 30 August 1965, G.E. Peres (URM 51224).

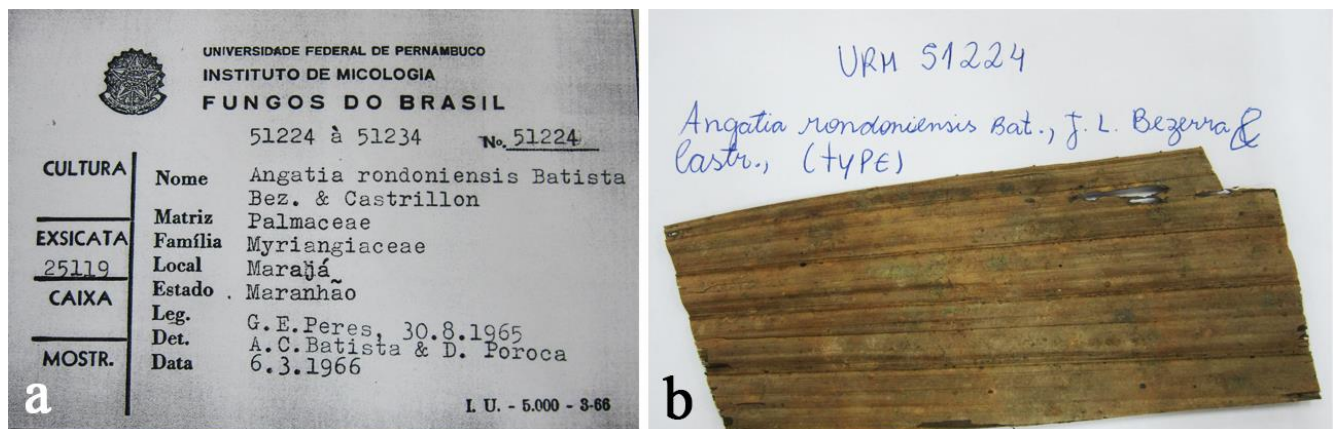


Figure 54 – *Angatia rondoniensis* (URM 51224). a Herbarium label. b Details of herbarium specimen with host.

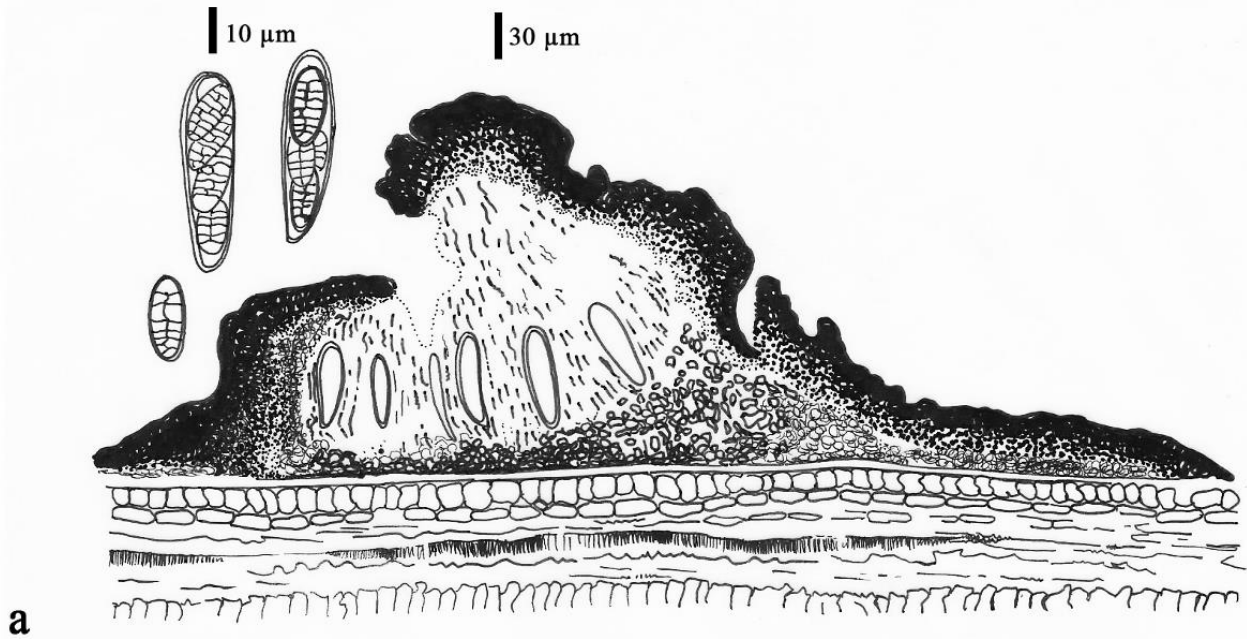


Figure 55 – *Angatia rondoniensis*. a Ascoma, asci and ascospores (redrawn from Batista et al. 1966; Page 79, Fig. 2). Scale bars: a = 30 μm for ascoma, 10 μm for asci and ascospores.

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