



Article

Doi 10.5943/mycosphere/8/10/6

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Mycosphere notes 51-101. Revision of genera in *Perisporiopsidaceae* and *Pseudoperisporiaceae* and other *Ascomycota* genera *incertae sedis*

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Boonmee S, Phookamsak R, Hongsanan S, Doilom M, Mapook A, McKenzie EHC, Bhat DJ, Hyde KD 2017 – Mycosphere notes 51–101. Revision of genera in *Perisporiopsidaceae* and *Pseudoperisporiaceae* and other *Ascomycota* genera *incertae sedis*. Mycosphere 8(10), 1695–1801, Doi 10.5943/mycosphere/8/10/6

Abstract

This is the second in a series, *Mycosphere notes*, wherein we provide notes on various fungal genera. In this set of notes we deal with genera of the families *Perisporiopsidaceae* and *Pseudoperisporiaceae*. These families have traditionally accommodated taxa associated with dead and living leaves of mostly tropical plants and comprised pathogens, saprobes or epiphytes. Most genera are poorly understood with only brief Latin descriptions, but molecular sequence data are needed to establish their taxonomic placements. In this study, 50 genera and 51 taxa are re-examined and their placements at the family level discussed. Thirteen new families *Alinaceae*, *Balladynaceae*, *Cleistosphaeraceae*, *Dysrhynchiscaeae*, *Hyalomeliolinaceae*, *Lizoniaceae*, *Nematotheciaceae*, *Neoparodiaceae*, *Phaeodimeriellaceae*, *Pododimeriaceae*, *Polyclypeolinaceae*, *Stomatogeneceae* and *Toroaceae* are introduced and *Dimeriaceae* is reinstated in this paper. One new species, *Phaeostigme alchorneae* is introduced. Nine genera are transferred to other families. However, fresh collections, epitypification or reference specimens including DNA sequence data, are required to confirm their phylogenetic placements.

Key words – Alinaceae – Balladynaceae – Botryosphaeriaceae – Cleistosphaeraceae – Coccoideaceae – Dimeriaceae – Dysrhynchiscaeae – Epibryaceae – Hyalomeliolinaceae – Lizoniaceae – Massarinaceae – Mycosphaerellaceae – Myriangiaceae – Nematotheciaceae – Neoparodiaceae – Opegraphaceae – Parmulariaceae – Phaeodimeriellaceae – Phaeosphaeriaceae – Pododimeriaceae – Polyclypeolinaceae – Schizothyriaceae – Stomatogeneceae – Teratosphaeriaceae – Toroaceae – Venturiaceae

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51. *Alina jasmini* Racib., Bull. int. Acad. Sci. Lett. Cracovie, Cl. sci. math. nat. Sér. B, sci. nat. 3: 375 (1909)

Balladynaceae Boonmee & K.D. Hyde, fam. nov.

52. *Balladyna gardeniae* Racib., Parasit. Alg. Pilze Java's (Jakarta) 2: 6 (1900)

53. *Balladynocallia glabra* (Hansf.) Bat., Atas Inst. Micol. Univ. Recife 2: 216 (1965)

54. *Balladynopsis philippinensis* Syd. & P. Syd., Annls mycol. 15(6): 476 (1918) [1917]

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55. *Pilgeriella perisporioides* Henn., Hedwigia 39(Beibl.): (137) (1900)

56. *Myxophora amerospora* Döbbeler & Poelt, Mitt. bot. St Samml., Münch. 14: 315 (1978)

Cleistosphaeraceae Boonmee & K.D. Hyde, fam. nov.

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58. *Coccoidella scutula* (Berk. & M.A. Curtis) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 847 [35 repr.] (1909)

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59. *Dimerium olivaceum* Syd. & P. Syd., Annls mycol. 2(2): 169 (1904)

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60. *Dysrhychnis pulchella* (Sacc.) Clem., Gen. fung., Edn 2 (Minneapolis): 253 (1931)

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61. *Hyalomeliolina guianensis* F. Stevens, Illinois Biol. Monogr. (Urbana) 8(no. 3): 27 (1924) [1923]

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67. *Nematostigma obducens* Syd. & P. Syd., Anns mycol. 11(3): 262 (1913)

68. *Ophioparodia pulchra* Petr. & Cif. Anns mycol. 30(3/4): 223 (1932)

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70. *Opegrapha reactiva* (Alstrup & D. Hawksw.) Etayo & Diederich (2008)

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71. *Inocyclus psychotriae* (Syd. & P. Syd.) Theiss. & Syd., Anns mycol. 13(3/4): 211 (1915)

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72. *Parodiellina manaosensis* (Henn.) G. Arnaud, Annals d'École National d'Agric. de Montpellier, Série 2 16(1-4): 21 (1918) [1917]

73. *Perisporiopsis struthanthi* Henn., Hedwigia 43: 83 (1904)

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78. *Chaetoscutula juniperi* E. Müll., Sydowia 12(1-6): 191 (1959) [1958]

Polyclypeolinaceae Boonmee & K.D. Hyde, fam. nov.

79. *Polyclypeolina brideliae* (Hansf.) Bat., Publicações Inst. Micol. Recife 56: 457 (1959)

Pseudoperisporiaceae Toro

80. *Eudimeriolum elegans* Speg., Anal. Mus. nac. Hist. nat. B. Aires 23: 36 (1912)

81. *Lasiostemma melioloides* (Berk. & Ravenel) Theiss., Syd. & P. Syd., in Sydow & Sydow, Anns mycol. 15(3/4): 218 (1917)

82. *Nematostoma artemisiae* Syd. & P. Syd., Anns mycol. 12(2): 161 (1914)

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83. *Schizothyrium pomi* (Mont. & Fr.) Arx, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 62: 336 (1959)

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84. *Stomatogene agaves* (Ellis & Everh.) Theiss., Anns mycol. 14(6): 406 (1918) [1917]

85. *Stomatogene yuccae* Hansf., Sydowia 11(1-6): 68 (1958) [1957]

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86. *Placocrea pulchella* Syd., Anns mycol. 37(4/5): 380 (1939)

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87. *Toroa dimerosporioides* (Speg.) Syd. [as 'dimerosporoides'], J. Dept. Agric. Porto Rico 2: 20 (1926)

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88. *Dimeriella hirtula* Speg. Revta Mus. La Plata 15(2): 12 (1908)
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90. *Eumela chiococcae* Syd., Anns mycol. 23(3/6): 335 (1925)
91. *Leptomeliola hyalospora* (Lév.) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 128: 558 (1919)
92. *Leveillina arduinae* (Kalchbr. & Cooke) Theiss. & Syd., Anns mycol. 13(3/4): 286 (1915)
93. *Phaeostigme alchorneae* Boonmee & K.D. Hyde, sp. nov.
94. *Phaeostigme picea* (Berk. & M.A. Curtis) Syd. & P. Syd., Anns mycol. 15(3/4): 200 (1917)
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96. *Stuartella formosa* Fabre, Anns Sci. Nat., Bot., sér. 6 9: 95 (1879) [1878]

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101. *Raciborskiomyces longisetosus* (Volkart) M.E. Barr, Mycotaxon 64: 165 (1997)

Introduction

This paper is a continuation of a series, which provides notes on new species, new records and poorly known taxa. Re-examination, description, illustration and notes on species, genera and families are provided. The paper mainly deals with genera of *Perisporiopsidaceae* and *Pseudoperisporiaceae*, which previously included numerous taxa of foliar epiphytes or pathogens from the surface of the living leaves, as well as saprobes on dead leaves (Toro 1952, Barr 1997, Hyde et al. 2013). Most taxa are found on dicotyledonous leaves and some on ferns, monocotyledonous leaves, gymnosperms or angiosperms, branches and wood in various tropical areas. Most genera and species are devoid of clear understanding of morphological characters and molecular data to indicate their placement (Lumbsch & Huhndorf 2010, Hyde et al. 2013). This series of Mycosphere notes contains descriptions, illustrations and notes on 51 taxa.

Materials & Methods

Holotype and other specimens of taxa were obtained on loan from the collections of Kew Royal Botanic Gardens (K & IMI), Botanischer Garten und Botanisches Museum Berlin-Dahlem (B), Universidad de Buenos Aires (BAFC / LPS), US National Fungus Collections (BPI), Orange Agricultural Institute (DAR), Farlow Reference Library and Herbarium of Cryptogamic Botany in Harvard University (FH), Karl-Franzens-Universität Graz (GZU), University of Illinois (ILL), University of Michigan (MICH), New York Botanical Garden (NY), Università degli Studi di Padova (PAD), Muséum National d'Histoire Naturelle (PC), Swedish Museum of Natural History (S), Naturhistorisches Museum Wien (W) and University of Zurich (Z). Morphological features were examined and photomicrographs made using a Nikon ECLIPSE 80i compound microscope fitted with a Canon 450D digital camera and measurements made using Tarosoft (R) Image Frame Workprogram. Figures were processed with an Adobe Photoshop CS3 Extended version 10.0 (Adobe Systems Inc., USA). Faces of fungi numbers and Index Fungorum numbers were obtained as detailed in Jayasiri et al. (2015) and Index Fungorum (2017).

Results

Dothideomycetes

For the classification of *Dothideomycetes* we follow Hyde et al. (2013), Ariyawansa et al. (2014), Wijayawardene et al. (2014) and updates in Liu et al. (2017)

Alinaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553826; Facesoffungi number: FoF03661

Parasitic or *epiphytic* on living leaves. Sexual morph: *Ascomata* superficial, seated on hyphae, globose to subglobose, brown, covered by brown hyphae, with peridium composed of brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, subglobose to clavate, sessile, thick-walled. *Ascospores* ovoid to obovoid, apex wider, narrower towards the lower and rounded end, brown. Asexual morph: hyphomycetous, *Septoidium* sp., *Shivomyces* sp.

Family type – *Alina* Racib.

Notes – The family *Alinaceae* is introduced to accommodate the monotypic genus *Alina*, which was found on living leaves of *Jasminum* sp. in Indonesia. Morphologically, *Alinaceae* species are characterised by superficial ascomata, seated on a subiculum of hyphae, lack of pseudoparaphyses, subglobose to clavate asci and ovoid to obovoid, 1-septate, brown, smooth-walled ascospores, features that distinguish *Alina* from other generic types in *Perisporiopsidaceae*. In this study, we introduce the new family *Alinaceae*, because it has a suite of characters that differ from other families of *Dothideomycetes*.

Alina Racib., Bull. int. Acad. Sci. Lett. Cracovie, Cl. sci. math. nat. Sér. B, sci. nat. 3: 375 (1909)

Parasitic or *epiphytic* on the surface of living leaves of *Jasminum* sp. Sexual morph: *Ascomata* superficial, seated on hyphae, globose to subglobose, brown, covered by brown hyphae, peridium composed of brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, subglobose to clavate, sessile, thick-walled. *Ascospores* ovoid to obovoid, apex wider, narrower towards the lower and rounded ends, 1-septate, slightly above the center, slightly brown. Asexual morph: hyphomycetous, *Septoidium* sp., *Shivomyces* sp. (Sivanesan 1981, Kirk et al. 2008, Seifert et al. 2011).

Type species – *Alina jasmini* Racib.

Notes – *Alina jasmini* was found on living leaves of *Jasminum* sp. in Indonesia and is characterised by superficial mycelium with hyphopodia-like structures, and relatively small ascomata formed on hyphae, containing 1 to 2 asci (Raciborski 1909). Sivanesan (1981) re-examined and described *A. jasmini* specimens from IMI (IMI 214481 = ex isotype and IMI 89544 = Bogor 13614 with slide specimen IMI 71057), and found some hyphomycetous conidial structures similar to the genus *Tretospora*, the asexual morph of *Balladynopsis*. We examined a Kew specimen (K (M) 177969), but it was dried and brittle, and we were unable to find some structures

e.g. setae, hyphopodia-like structures or even conidia as previously shown (Raciborski 1909, Sivanesan 1981). The genus *Alina* is separated from *Balladynopsis* and *Balladynocallia* based on intramatrial hypostroma and mycelium lacking hyphopodia. Thus, a new family *Alinaceae* is introduced to accommodate the monotypic genus *Alina*. The placement of taxa is based on morphology and therefore it is important to recollect these taxa and obtain sequence data to confirm our conclusions.

Alina jasmini Racib., Bull. int. Acad. Sci. Lett. Cracovie, Cl. sci. math. nat. Sér. B, sci. nat. 3: 375 (1909)

Index Fungorum number: IF205013; Facesoffungi number: FoF03662

Figs 51, 52

Parasitic or epiphytic on the surface of living leaves of *Jasminum* sp. Sexual morph: *Ascomata* 38–50 μm diameter \times 41–55 μm high, superficial, seated on hyphae, globose to subglobose, brown, covered by brown hyphae, peridium composed of brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 26–39 \times 14–21 μm (\bar{x} = 32 \times 17 μm , n = 10), 8-spored, bitunicate, subglobose to clavate, sessile, thick-walled. *Ascospores* 12–15 \times 4–5 μm (\bar{x} = 14 \times 5 μm , n = 10), 3–4-seriate in the ascus, ovoid to obovoid, apex wider, narrower towards the lower and rounded end, 1-septate, slightly above the center, slightly constricted at the septum, brown, smooth-walled. Asexual morph: hyphomycetous, *Septoidium* sp., *Shivamyces* sp.

Material examined – INDONESIA, Java, Djasinga, on living leaves of *Jasminum* sp. (*Oleaceae*), 1900, M. Raciborski (K (M) 177969 = IMI 214481, ex-isotype).

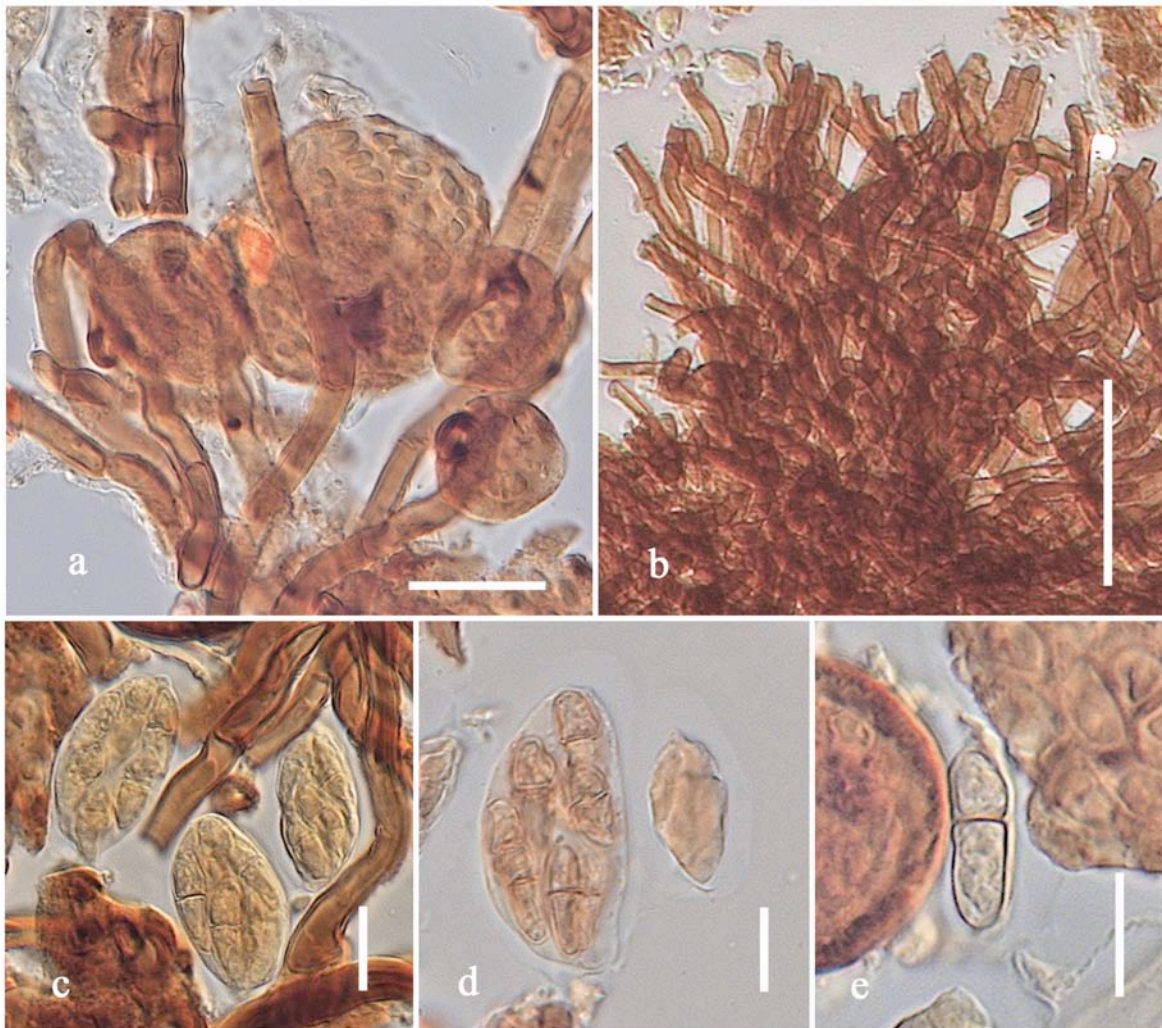


Figure 51 – *Alina jasmini* (K (M) 177969 = IMI 214481, ex-isotype). a Squash mount of ascomata. b Mycelia. c, d Asci. e Ascospore. Scale bars: a = 20 μm , b = 50 μm , c–e = 10 μm .

Balladynaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553827; Facesoffungi number: FoF03663

Parasitic on living leaves. Sexual morph: *Ascomata* superficial, formed on hyphae, with a subiculum, solitary, scattered, globose to subglobose, with apical pore, minutely pedicellate at the base, olivaceous brown to dark brown, with transparent wall, surrounded by a superficial mycelium network, branched, septate, with numerous dark brown, knob-like hyphopodia, with or without setae. *Peridium* comprising 1–2 layers of olivaceous-brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, globose to subglobose, sessile. *Ascospores* multi-seriate in the ascus, ellipsoid, upper cell wider, 1-septate, hyaline to light brown when immature, fawn to olivaceous-brown or brown at maturity. Asexual morph: hyphomycetous, *Clasterosporium* sp., *Tretospora* sp.

Family type – *Balladyna* Racib.

Notes – A new family *Balladynaceae* is introduced to accommodate the genera *Balladyna*, *Balladynocallia* and *Balladynopsis* based on their parasitic lifestyle on living leaves, ascomata formed on hyphae, with or without setae, subglobose asci and 1-septate, hyaline to pigmented ascospores. With these combinations of characters, *Balladynaceae* can be separated from *Perisporiopsidaceae* and it also has a suite of characters that differ from other families of *Dothideomycetes*.

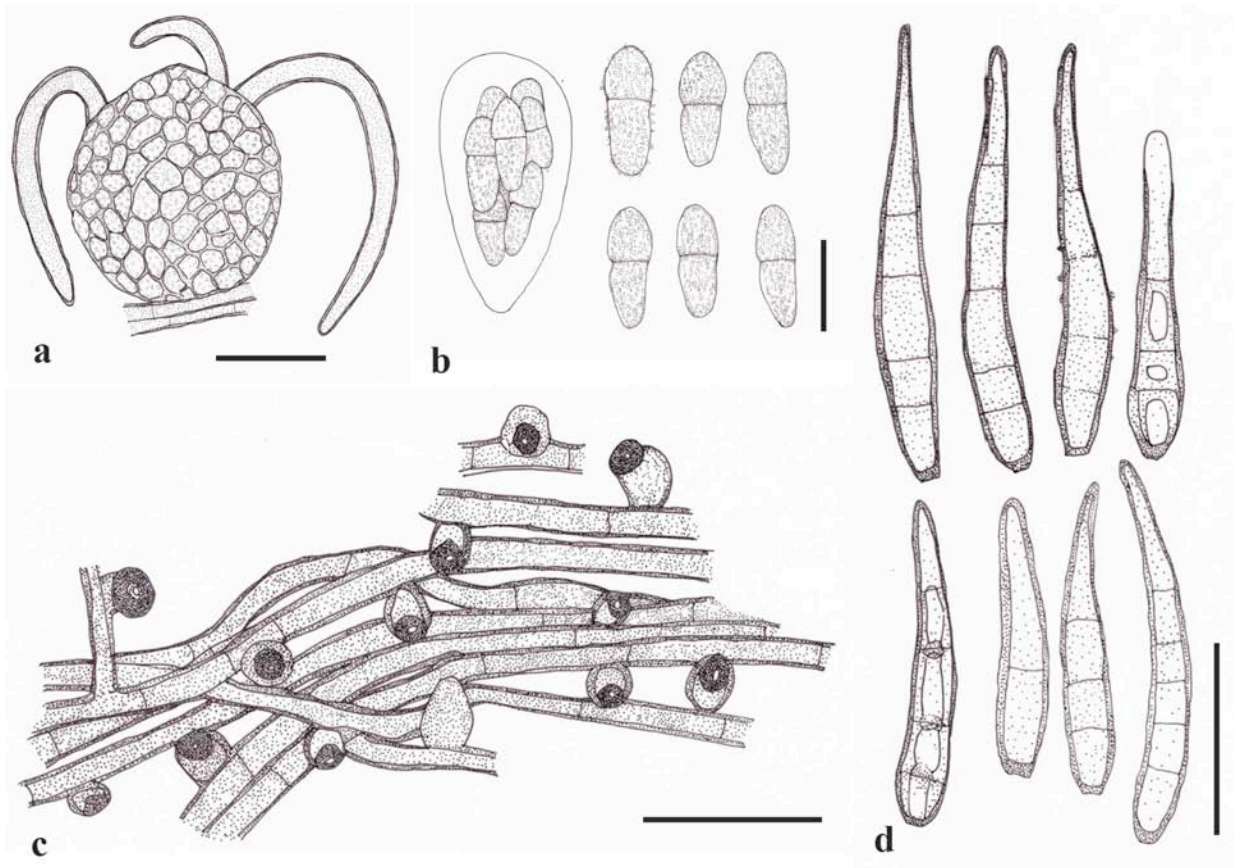


Figure 52 – *Alina jasmini* (redrawn from Sivanesan, 1981, Fig. 17). a Ascoma. b Ascus and ascospores. c Mycelium with conidiophores. d Hyphomycetous conidia. Scale bars: a, c, d = 25 µm, b = 10 µm.

Balladyna Racib., Parasit. Alg. Pilze Java's (Jakarta) 2: 6 (1900)

Parasitic on living leaves. Sexual morph: *Ascomata* superficial, formed on hyphae, with a subiculum, solitary, scattered, globose to subglobose, with apical pore, minutely pedicellate at the base, olivaceous brown to dark brown, with transparent wall, surrounded by a superficial mycelium network, branched, septate, with numerous dark brown, knob-like hyphopodia, bearing dark setae.

Peridium 3–5 µm wide, comprising 1–2 layers of olivaceous-brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, with a single ascus, globose to subglobose, sessile. *Ascospores* multi-seriate in the ascus, ellipsoid, upper cell wider, 1-septate, hyaline to light brown when immature, fawn to olivaceous brown, smooth-walled to slightly ornamented. Asexual morph: hyphomycetous, *Clasterosporium* sp., *Tretospora* sp. (Thaung 1976, Kirk et al. 2008, Seifert et al. 2011).

Type species – *Balladyna gardeniae* Racib.

Notes – Raciborski (1900) described and introduced the genus *Balladyna* based on the type species *B. gardeniae*, which was found on living leaves of *Gardenia lucida* from Indonesia. Morphologically, the genus is characterised by ascomata formed on hyphae, mycelium with numerous hyphopodia-like structures, lack of pseudoparaphyses and a single bitunicate ascus. The genus currently has 54 species epithets, but only 41 species are listed under *Balladyna* (Index Fungorum 2017). Seifert et al. (2011) referenced its asexual morphs to *Clasterosporium* sp. found in *Balladyna vanderystii* var. *ferulae-foetidae* and *Tretospora* sp. found in *Balladyna negrii*. In our re-examined isotype specimen BPI 691469, we were unable to find the asexual morph of *B. gardeniae* Racib. According to morphological characters, *Balladyna* can be raised to the family *Balladynaceae*. All species lack sequence data.

Balladyna gardeniae Racib., Parasit. Alg. Pilze Java's (Jakarta) 2: 6 (1900)

Index Fungorum number: IF218036; Facesoffungi number: FoF03664

Fig. 53

Parasitic on living leaves of *Gardenia lucida* Roxb. Sexual morph: *Ascomata* (45–)51–67(–80) µm diameter × (56–)62–77.5(–88) µm high, superficial, formed on hyphae, with a subiculum, solitary, scattered, globose to subglobose, with apical pore, minutely pedicellate at the base, olivaceous brown to dark brown, with transparent wall, surrounded by a superficial mycelium network, branched, septate, with numerous dark brown, knob-like hyphopodia, (8–)10–14.5 µm × 6–9(–11) µm, bearing dark setae, 93–98 µm long × 7–11 µm wide. *Peridium* 3–5 µm wide, comprising 1–2 layers of olivaceous-brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* (35–)41–45 × (29–)33.5–41 µm (\bar{x} = 41 × 35.5 µm, n = 10), 8-spored, bitunicate, one per ascus, globose to subglobose, sessile. *Ascospores* 20–23 × 11–13 µm (\bar{x} = 22 × 12 µm, n = 10), 8-spored, multi-seriate, ellipsoid, upper cell wider, ends rounded, 1-septate, with constricted and darkened at the septum, hyaline to light brown when immature, fawn to olivaceous brown, smooth-walled to slightly ornamented. Asexual morph: Undetermined, however, hyphopodia-like structures produced on hyphae.

Material examined – INDONESIA, Java, Bogor, on living leaves of *Gardenia lucida* Roxb. (*Rubiaceae*), M. Raciborski Nr. 88 (BPI 691469, isotype).

Balladynocallia Bat. (Hansf.) Bat., Atas Inst. Micol. Univ. Recife 2: 216 (1965)

Parasitic on living leaves. *Colonies* amphigenous, dark pigmented, up to 3 mm diameter, superficial mycelium and hyphopodia, pale brown, branched, densely reticulate, with somewhat undulating hyphae, up to 4 µm thick, lacking setae. *Hyphopodia* unilateral to alternate, concolourous with hyphae, continuous, ovoid, hemisphaerical to irregular. Sexual morph: *Ascomata* up to 90 µm diameter, densely dispersed, subglobose to ovate, with an irregular apical pore, glabrous, black, numerous, short-stalked, lacking pseudoparaphyses. *Peridium* 4–6 µm wide, comprising brown cells of *textura angularis*, with granular appearance. *Asci* 8-spored, bitunicate, with 2–6-asci in ascoma, broadly ellipsoid to saccate, sessile, upper cell wider and rounded, narrower towards the lower end. *Ascospores* multi-seriate, ovoid to obovoid, upper cell wider, narrower towards the lower and rounded end, 1-septate, somewhat unequally, dark brown. Asexual morph: Undetermined.

Type species – *Balladynocallia glabra* (Hansf.) Bat.

Notes – *Balladynocallia* was introduced by Batista et al. (1965) to accommodate two species *B. amazonensis* Bat. & A.A. Silva and *B. glabra* (Hansf.) Bat. (type species) and is characterised by ascomata lacking setae. Sivanesan (1981) included *B. magna* (Eboh & Cain) Sivan. as it shares

morphology typical of *Balladynocallia*. We re-examined the type specimen *Balladynocallia glabra* from Kew (K (M) 177971, holotype = ex herb. IMI 5081a), but it was not in good condition and we were unable to see microscopic structures. Based on Sivanesan's (1981) descriptions and illustrations, its morphology and substrate are consistent with *Balladyna* in *Balladynaceae*. We therefore include *Balladynocallia* in the family *Balladynaceae*.



Figure 53 – *Balladyna gardenia* (BPI 691469, isotype). a Herbarium specimen and habit on leaf. b Appearance of ascomata on leaf surface. c Close up of hyphae with hyphopodia. d Setae. e, f Squash mount of ascomata. g–i Asci when immature and mature. j Ascospores. Scale bars: b = 50 μ m, c = 10 μ m, d–f = 50 μ m, g–j = 20 μ m.

Balladynocallia glabra (Hansf.) Bat., Atas Inst. Micol. Univ. Recife 2: 216 (1965)

≡ *Balladynastrum glabrum* Hansf., Proc. Linn. Soc. London 157: 157 (1946) [1944-45]

Index Fungorum number: IF326909; Facesoffungi number: FoF03665 Figs 54, 55

*Parasitic on living leaves of *Rutidea rufipilis* Hiern. Ascomata 54–77 μ m diameter \times 61–75(–91) μ m high, superficial, solitary, scattered, globose to subglobose, dark brown, with apical pore, but asci and ascospores absent.*

Notes – Sivanesan (1981) described *Balladynocallia glabra* from the holotype (5081a) and other herbarium specimens (redrawn in Fig. 55). *Colonies* amphigenous, dark pigmented, up to 3 mm diameter, superficial mycelium with hyphopodia, pale brown, branched, densely reticulate, somewhat undulating hyphae, up to 4 μ m thick, lacking setae. *Hyphopodia* unilateral to alternate, concolourous with hyphae, continuous, ovoid, hemispherical to irregular, 6–12 μ m \times 6–10 μ m. Sexual morph: *Ascomata* up to 90 μ m diameter, densely dispersed, subglobose to ovate, with an irregular apical pore, glabrous, black, numerous, short-stalked, lacking pseudoparaphyses.

Peridium 4–6 μm wide, comprising brown cells of *textura angularis*, with granular appearance. *Asci* 60 \times 40 μm , 8-spored, bitunicate, with 2–6 asci in ascoma, broadly ellipsoid to saccate, sessile, upper cell wider and rounded, narrower towards the lower end. *Ascospores* 18–21 \times 8–10 μm , multi-seriate, ovoid to obovoid, upper cell wider, narrower towards the lower and rounded end, 1-septate, constricted at the septum, somewhat unequally, dark brown, smooth-walled. Asexual morph: Undetermined.

Material examined – UGANDA, Entebbe, on leaves of *Rutidea rufipilis* Hiern (*Rubiaceae*), November 1940, G.C. Hansford 2916 (K (M) 177971, holotype = IMI 5081a, ex herb.).

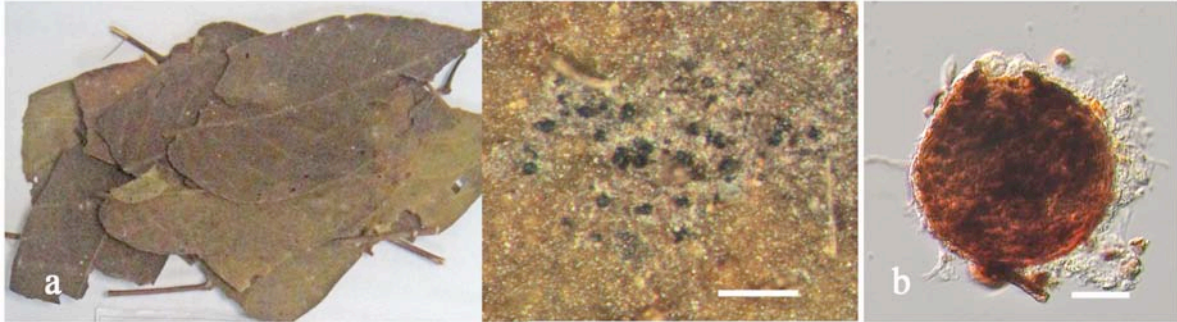


Figure 54 – *Balladynocallia glabra* (K (M) 177971, holotype). a Herbarium specimen and habit on leaves. b Squash mount of ascoma. Scale bars: a = 200 μm , b = 20 μm .

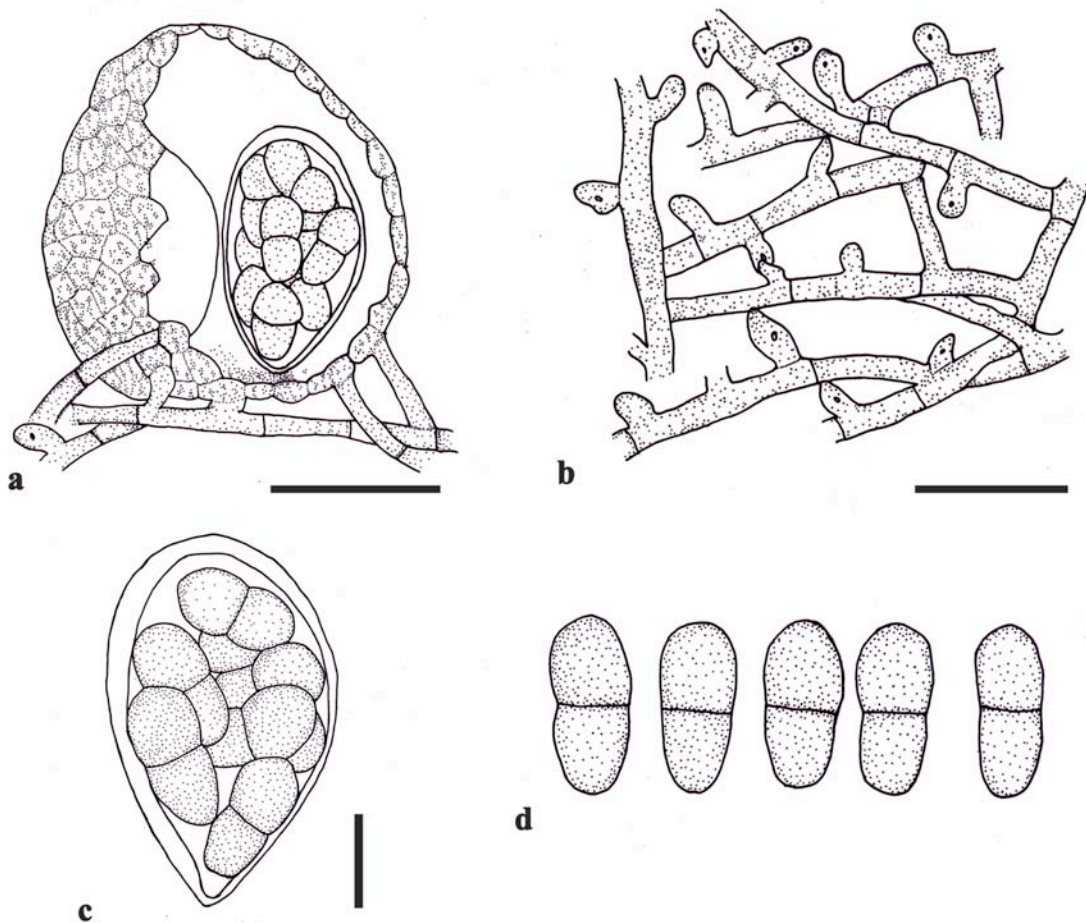


Figure 55 – *Balladynocallia glabrum* (redrawn from Sivanesan 1981, Fig. 19). a Ascoma. b Superficial mycelium with hyphopodia. c Ascus. d Ascospores. Scale bars: a, b = 25 μm , c = 10 μm , d = 5 μm .

Balladynopsis Theiss. & Syd., *Annls mycol.* 15(6): 475 (1918) [1917]

Parasitic on living leaves. Sexual morph: *Ascomata* superficial, solitary, scattered, globose to subglobose, black, with apical pore, seated on mycelium colonies, radial hyphae, branched, with hyphopodia-like structures, dark brown, with setae, thickened, black, apex subacute and bright, lacking pseudoparaphyses. *Peridium* comprising 2–3 layers of relatively large, hyaline to dark brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, globose to subglobose, sessile, apically thickened and rounded. *Ascospores* multi-seriate, fusoid to ellipsoid, oblong, upper cell wider, apex rounded, tapering towards the narrow and subacute base, 1-septate, supra-median, hyaline when immature, brown at maturity, smooth to slightly verruculose. Asexual morph: Undetermined.

Type species – *Balladynopsis philippinensis* Syd. & P. Syd.

Notes – Theissen & Sydow (1917) introduced the genus *Balladynopsis* with *B. philippinensis* (Basionym: *Henningsomyces philippinensis* Syd. & P. Syd.) characterised by mycelium with hyphopodia, ascomata with setae, bitunicate asci and 1-septate brown ascospores. *Balladynopsis* is included in *Balladynaceae* based on its superficial hyphae with hyphopodia, subglobose asci and 1-septate ascospores. The genus comprises ten species epithets (Index Fungorum 2017).

Balladynopsis philippinensis Syd. & P. Syd., *Annls mycol.* 15(6): 476 (1918) [1917]

≡ *Henningsomyces philippinensis* Syd. & P. Syd., *Philipp. J. Sci., C, Bot.* 9(2): 161 (1914)

Index Fungorum number: IF222867; Facesoffungi number: FoF03666

Fig. 56

Parasitic on living leaves of *Morinda* spp. Sexual morph: *Ascomata* 37–59 µm diameter × 40–58 µm high, superficial, solitary, scattered, globose to slightly subglobose, black, with apical pore, seated on mycelial colonies, radial hyphae, branched, with hyphopodia-like structures, dark brown, with setae, 45–60 µm long × 6–7 µm wide, thickened, black, apex subacute and bright, lacking pseudoparaphyses. *Peridium* 4–4.5 µm wide, comprising 2–3 layers of relatively large, hyaline to dark brown cells of *textura angularis*. *Asci* (33–)36.5–40(–49) × (25–)30–39 µm (\bar{x} = 40 × 31 µm, n = 10), 8-spored, bitunicate, globose to subglobose, sessile, apically thickened and rounded. *Ascospores* 20–25.5(–27) × 7–8 µm (\bar{x} = 24 × 8 µm, n = 10), multi-seriate, fusoid to ellipsoid, oblong, upper cell wider, apex rounded, tapering towards the narrow and subacute base, 1-septate, constricted at the septum, supra-median, hyaline when immature, brown at maturity, smooth-walled to lightly verruculose. Asexual morph: Undetermined.

Material examined – PHILIPPINES, Palawan, Taytay, on living leaves of *Morinda* spp. (*Rubiaceae*), April 1913, E.D. Merrill No. 8823 (S-F10387, holotype).

Botryosphaeriaceae Theiss. & Syd.

Currently, *Botryosphaeriales* includes eight families of biotrophic, necrotrophic and saprobic species common on wood in terrestrial habitats (Hyde et al. 2013, Dissanayake et al. 2016, Wijayawardene et al. 2017). Characteristics comprise immersed to superficial, globose to subglobose, uni to multi-loculate ascomata, with apical ostioles, bitunicate and fissitunicate, sessile to short pedicellate and thick-walled asci, and occasionally with an ocular chamber, aseptate to septate, fusoid to ellipsoid or ovoid, hyaline to brown ascospores. The asexual morph is coelomycetous and has hyaline to brown conidia (Hyde et al. 2013). *Myxophora* and *Pilgeriella* share a similar morphology with genera in *Botryosphaeriaceae*, we therefore include these two genera in this family.

Myxophora Döbbeler & Poelt, *Mitt. bot. St Samml., Münch.* 14: 315 (1978)

Hyperparasitic, saprobic, algicolous or *lichenicolous*, on dead parts of leaves of moss. Sexual morph: *Ascomata* superficial, globose to subglobose, dark brown, with apical pore, lacking superficial mycelium. *Peridium* comprising 3–4 layers of dark brown cells of *textura angularis*. *Hamathecium* comprising hyaline, pseudoparaphyses, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, fissitunicate, saccate, oblong ellipsoid to cylindrical clavate, sessile or with short pedicel, apex rounded, with minute ocular chamber, thick-walled. *Ascospores* 1–2-seriate, oblong

ellipsoid to fusiform, subglobose, aseptate, hyaline, with large guttules, smooth-walled. Asexual morph: Undetermined.

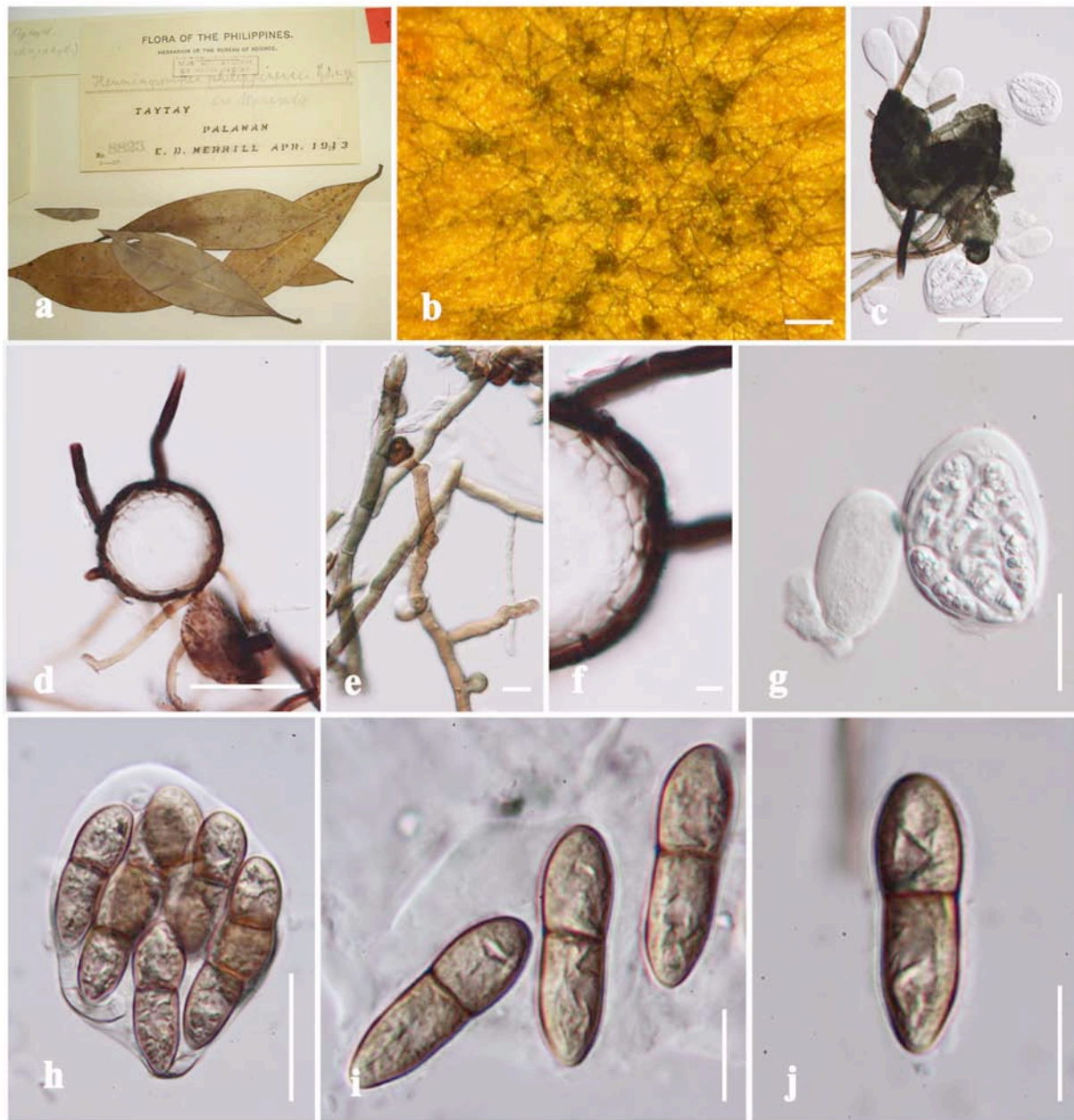


Figure 56 – *Balladynopsis philippinensis* (S-F10387, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Squash mount of ascoma. d Section of ascoma with setae. e Close up of mycelium with hyphopodia-like structures. f Close up of peridium. g–h Immature and mature asci. i–j Ascospores. Scale bars: b = 200 μm , c, d = 50 μm , e, i, j = 10 μm , f = 5 μm , g, h = 20 μm .

Type species – *Myxophora amerospora* Döbbeler & Poelt

Notes – *Myxophora* was introduced by Döbbeler (1978) to accommodate *M. amerospora* Döbbeler & Poelt (type species) which was found on moss (*Campylium halleri*) and placed in *Dimeriaceae*, *Dothideales*. Subsequently, six new species were added to the genus, i.e. *M. apotheciicola* Nik. Hoffm. & Hafellner, *M. leptogiophila* Nik. Hoffm. & Hafellner, *M. ovalispora* Nik. Hoffm. & Hafellner, *M. placynthii* Nik. Hoffm. & Hafellner, *M. tetraspora* Nik. Hoffm. & Hafellner and *M. tjibodensis* Döbbeler on the basis of bitunicate asci and unicellular hyaline ascospores (Döbbeler 1995, Hoffmann & Hafellner 2000). Barr (1997) accepted *Myxophora* in

Pseudoperisporiaceae and this was followed by Eriksson & Hawksworth (1993) and Hawksworth et al. (1995). *Myxophora* shares common features of ascomata, asci and ascospores with *Cleistosphaera*, *Parodiellina*, *Pilgeriella* and is atypical of *Pseudoperisporiaceae*. These genera are therefore excluded from *Pseudoperisporiaceae* and are transferred to *Botryosphaeriaceae*, *Botryosphaeriales* in this study. Fresh collections of the type, epitypification and DNA sequence data are required to confirm the taxonomic rank of *Myxophora*.

Myxophora amerospora Döbbeler & Poelt, Mitt. bot. St Samml., Münch. 14: 315 (1978)

Index Fungorum number: IF318440; Facesoffungi number: FoF03667

Fig. 57

Hyperparasitic, saprobic, algicolous or lichenicolous, on dead parts of leaves of *Campyllum halleri* (Hedw.) M. Fleisch. Sexual morph: *Ascomata* (102–)108–120(–134) μm diameter \times (88–)97–105(–108) μm high, superficial, globose to subglobose, dark brown, with apical pore, lacking superficial mycelium. *Peridium* 13–15 μm wide, comprising 3–4 layers of dark brown cells of *textura angularis*. *Hamathecium* ca. 1–1.5(–2) μm wide, comprising hyaline, pseudoparaphyses, embedded in a gelatinous matrix. *Asci* (34–)37–46(–48) \times (10–)13–15(–16) μm (\bar{x} = 41 \times 13 μm , n = 20), 8-spored, bitunicate, fissitunicate, saccate, oblong ellipsoid to cylindrical to clavate, sessile or with short pedicel, apex rounded, with minute ocular chamber, thick-walled. *Ascospores* (10–)11–12.5 \times 5–6(–7) μm (\bar{x} = 11.5 \times 6 μm , n = 20), 1–2-seriate, oblong ellipsoid to fusiform, subglobose, aseptate, hyaline, with large guttules, smooth-walled. Asexual morph: Undetermined.

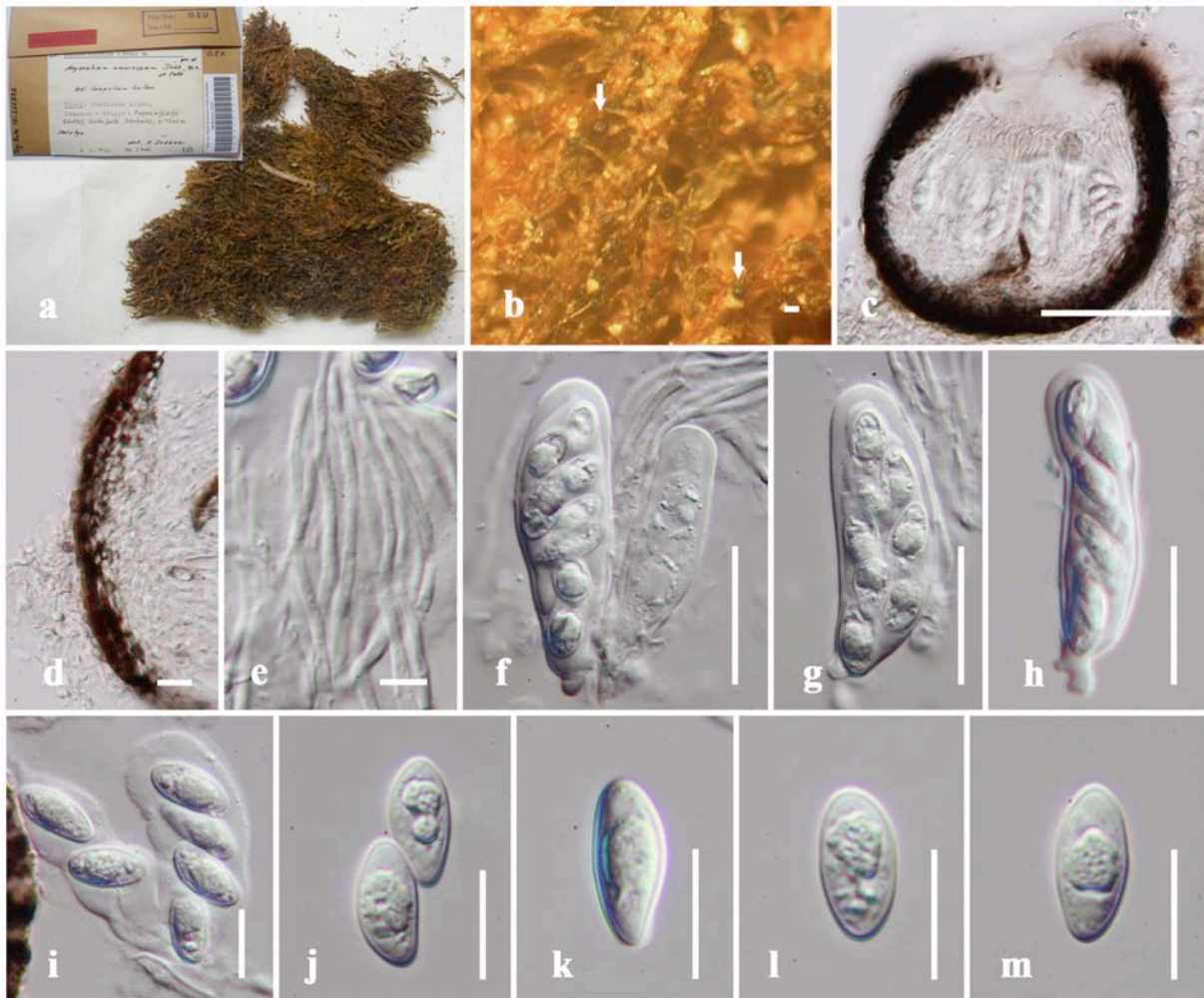


Figure 57 – *Myxophora amerospora* (GZU 000291904, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Peridium. e Pseudoparaphyses. f–h Asci. i–m Ascospores. Scale bars: b, c = 100 μm , d, i–m = 10 μm , e = 5 μm , f–h = 20 μm .

Material examined – AUSTRIA, Tyrol, Rhaetian Alps, Samnaun-Group, Argenschlucht southern Serfaus, alt. \pm 1200 m., on hairy leaves of *Campyllum halleri* (Hedw.) M. Fleisch. (*Amblystegiaceae*), 6 September 1972, J. Poelt (DigiBota ID 266898, GZU 000291904, holotype).

Pilgeriella Henn., Hedwigia 39(Beibl.): (137) (1900)

Parasitic on living leaves. Sexual morph: *Ascomata* superficial, gregarious, solitary, seated on a subiculum, globose to subglobose, obovoid, dark brown, with apical ostiole. *Peridium* comprising 3–4 layers of dark brown cells of *textura angularis*. *Hamathecium* 5–8(–10) μm wide, comprising sparse, branched, septate, anastomosed, pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, broadly obovoid to subclavate, with short pedicel, apically thickened, with an ocular chamber. *Ascospores* 2–3-seriate, ellipsoidal oblong, tapering towards the ends, aseptate, hyaline, sometimes with granulate cells. Asexual morph: Undetermined.

Type species – *Pilgeriella perisporioides* Henn.

Notes – *Pilgeriella* was introduced by Hennings (1900) with *P. perisporioides* as the type species and placed in the family *Trichosphaeriaceae*. von Höhnelt (1910) placed this genus in *Botryosphaeria*. Hansford (1946) suggested that *P. perisporioides* should be transferred to *Guignardiella* Sacc. & P. Syd. (*Dothideaceae*) based on its ascospores. von Arx & Müller (1975) placed *Pilgeriella* in *Parodiellinaceae* based on its parasitic mode on leaves. The genus was moved to the family *Parodiopsidaceae* (Toro 1952, Sivanesan 1984, Kirk et al. 2008, Lumbsch and Huhndorf 2010, Wijayawardene et al. 2017). Hyde et al. (2013) listed *Pilgeriella* in the family *Perisporiopsidaceae*. We re-examined the isotype specimen of *P. perisporioides* from S herbarium (F12920) in which the asci and ascospores showed morphology similar to taxa in *Botryosphaeriaceae*, but its ascomata were atypical of *Botryosphaeria*. Therefore, we suggest that this genus should be placed in *Botryosphaeriaceae* as asci are broadly obovoid to subclavate, thick-walled and short pedicellate, with an ocular chamber and ascospores are ellipsoidal oblong, aseptate and hyaline. Currently the genus comprises two species, *P. anacardii* (Bat. et al.) Arx & E. Müll. and *P. perisporioides* Henn. Although, Seifert et al. (2011) mentioned that an asexual morph in *Septoidium*, we could not find any asexual morph on the isotype specimen.

Pilgeriella perisporioides Henn., Hedwigia 39(Beibl.): (137) (1900)

Index Fungorum number: IF221107; Facesoffungi number: FoF03668

Fig. 58

Parasitic on living leaves of *Loranthus* sp. Sexual morph: *Ascomata* 278–318 μm diameter \times 323–391 μm high, superficial, gregarious, solitary, seated on a subiculum, globose to subglobose, obovoid, dark brown, with apical ostiole. *Peridium* 40–45 μm wide, comprising 3–4 layers of dark brown cells of *textura angularis*. *Hamathecium* 5–8(–10) μm wide, comprising sparse, branched, septate, anastomosed, hyaline, pseudoparaphyses, constricted at the septa. *Asci* (138–)159–190(–201) \times 42–61 μm (\bar{x} = 173 \times 50.5 μm , n = 20), 8-spored, bitunicate, fissitunicate, broadly obovoid to subclavate, with short pedicel, apically thickened, with an ocular chamber. *Ascospores* (46.5–)50–61 \times 19–23 μm (\bar{x} = 54 \times 21 μm , n = 20), 2–3-seriate, ellipsoidal oblong, tapering towards the ends, aseptate, hyaline, sometimes with granulate cells, smooth-walled. Asexual morph: Undetermined.

Material examined – BRAZIL, Mato Grosso, larch forest on the shore Kulischu Lake, on leaves of *Loranthus* sp. (*Loranthaceae*), 14 March 1899, Pilger (S-F12920, isotype).

Cleistosphaeraceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553828; Facesoffungi number: FoF03669

Parasitic or *saprobic* on leaves. Sexual morph: *Ascomata* superficial, grouped to solitary, globose to subglobose, dark brown, covered with dark brown mycelium, branched, septate, with subglobose and dark brown hyphopodia. *Hamathecium* comprising sparse, septate, pseudoparaphyses. *Peridium* comprising dark brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, ovoid to broadly clavate, sessile or with knob-like pedicel. *Ascospores* ellipsoid-oblong, 1-celled, hyaline to pale grey, smooth-walled. Asexual morph: coelomycetous.



Figure 58 – *Pilgeriella perisporioides* (S-F12920, isotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Peridium. e Hamathecium. f–h Asci. i–m Ascospores. Scale bars: b = 500 μm , c, f–h = 100 μm , e = 10 μm , i–m = 20 μm .

Family type – *Cleistosphaera* Syd. & P. Syd.

Notes – The new family *Cleistosphaeraceae* is introduced to accommodate the monotypic genus *Cleistosphaera*, which is typified by *C. macrostegia* Syd. & P. Syd. *Cleistosphaeraceae* has superficial, sphaerical, dark brown ascomata, mycelium with hyphopodia, sparse pseudoparaphyses, ovoid to broadly clavate asci and ellipsoid oblong, 1-celled, hyaline ascospores, with granular contents and a gelatinous sheath. The family shares some similar characters of asci and ascospores with *Botryosphaeriaceae*. However, *Cleistosphaera* differs from *Botryosphaeriaceae* by its ascomata features, mycelium with hyphopodia and sparse pseudoparaphyses.

Cleistosphaera Syd. & P. Syd., *Annls mycol.* 14(1/2): 74 (1916)

Parasitic or saprobic on leaves. Sexual morph: *Ascomata* superficial, grouped or solitary, uniloculate, globose to subglobose, with a subiculum, with apical pore, dark brown, covered with

5–9 µm wide, branched, septate, dark brown mycelium, hyphopodia 12–15 µm wide, subglobose and dark brown. *Hamathecium* comprising sparse, septate, hyaline, pseudoparaphyses constricted at the septa. *Peridium* comprising 2–3 layers of dark brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, ovoid to broadly clavate, sessile or with knob-like pedicel, apically thickened and rounded, with small ocular chamber. *Ascospores* 2–3-seriate, ellipsoid to oblong, 1-celled, hyaline to pale grey, surrounded by thin gelatinous sheath, with granular contents. Asexual morph: coelomycetous associated with *Cleistosphaera macrostegia*. *Pycnidia* superficial, globose to subglobose, dark brown, apical pore not seen. *Peridium* comprising 2–3 layers of brown cells of *textura angularis*, conidiophores and conidiogenous cells not seen. *Conidia* subglobose to ellipsoidal, 1-celled, hyaline to brown, guttulate, smooth-walled.

Type species – *Cleistosphaera macrostegia* Syd. & P. Syd.

Notes – The genus *Cleistosphaera* was introduced by Sydow & Sydow (1916) with the type species *C. macrostegia*. The genus is characterized by its superficial ascomata, aerial mycelium with hyphopodia and aseptate hyaline ascospores. The type species *C. macrostegia* was found associated with a coelomycetous asexual morph and its conidia are phoma-like, which differentiates it from all genera in *Perisporiopsidaceae* which are hyphomycetous. *Cleistosphaera* shares common features with taxa in *Botryosphaeriaceae* in asci and ascospores. *Cleistosphaera macrostegia* differs from *Botryosphaeriaceae* in having mycelium with hyphopodia. The genus contains two species epithets in *Cleistosphaera*, *C. leguminis* Bat. & A.A. Silva and *C. macrostegia* Syd. & P. Syd. (Index Fungorum 2017).

Cleistosphaera macrostegia Syd. & P. Syd. [as 'macrostegiae'] Annl. mycol. (1916)

Index Fungorum number: IF161307; Facesoffungi number: FoF03670

Fig. 59

Parasitic or saprobic on leaves of *Piptadenia* sp. Sexual morph: *Ascomata* 102–116 µm diameter × 100–120 µm high, superficial, grouped or solitary, uniloculate, globose to subglobose, with a subiculum, dark brown, with apical pore, with 5–9 µm wide, branched, septate, dark brown mycelium, hyphopodia 12–15 µm wide, subglobose and dark brown. *Hamathecium* 3.5–5(–8) µm wide, comprising sparse, septate, hyaline, pseudoparaphyses with constricted at the septa. *Peridium* 11–15(–20) µm wide, comprising 2–3 layers of dark brown, 5–10 µm diameter cells of *textura angularis*. *Asci* 66–80 × 26–33 µm (\bar{x} = 72 × 29.5 µm, n = 10), 8-spored, bitunicate, ovoid to broadly clavate, sessile or with knob-like pedicel, apically thickened and rounded, with small ocular chamber. *Ascospores* 22–28 × 9–11 µm (\bar{x} = 25 × 10 µm, n = 10), 2–3-seriate, ellipsoid oblong, aseptate, hyaline to pale grey, surrounded by a thin gelatinous sheath, with granular contents, smooth-walled. Asexual morph: coelomycetous associated with *Cleistosphaera macrostegia*. *Pycnidia* 75–99.5 µm high × 50–80 µm diameter, superficial, globose to subglobose, dark brown, apical pore not seen. *Peridium* 6–9 µm wide, comprising 2–3 layers of brown cells of *textura angularis*, conidiophores and conidiogenous cells not seen. *Conidia* 5–6(–7) × 2–3 µm (\bar{x} = 5 × 3 µm, n = 10), subglobose to ellipsoidal, 1-celled, hyaline to brown, guttulate, smooth-walled.

Material examined – PERU, Amazonas, Rio Acre, Seringal Auristela, on leaves of *Piptadenia* sp. (*Leguminosae*), August 1911, E.H.G Ule No. 3502 (S-F10853, holotype).

Coccoideaceae P. Henn. ex Sacc. & D. Sacc.

Coccoideaceae was redescribed and illustrated by Hyde et al. (2013). This family is characterised by parasitic, superficial, circular or discoid, multi-loculate, dark pigmented, ascostromata immersed at the base, and 1-septate and light pigmented ascospores. Currently, the family comprises two genera *Coccoidea* and *Coccoidella*. Further study, fresh collections, isolation and sequencing are required to determine the phylogenetic placement of this family in *Dothideomycetes*, especially as the type species is yet to be sequenced.



Figure 59 – *Cleistosphaera macrostegia* (S-F10853, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Dark brown mycelium. e Hyphopodia. f Peridium. g Cells of hamathecium in gelatinous matrix. h Ascus. i, j Ascospores. k Pycnidium and conidia. Scale bars: b = 500 μ m, c, k = 50 μ m, d–f, h = 20 μ m, g, i, j = 10 μ m.

Coccoidella Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 847 [35 repr.] (1909)

Parasitic on living leaves. Sexual morph: *Ascstromata* superficial, discoid or cupulate, dimidiate-scutate, solitary, gregarious, black, stipitate immersed in host tissue, multi-loculate. *Ascomata* globose to subglobose, oval, with thickened walls. *Peridium* comprising dark to black cells of *prismatica-angularis*, inner layer composed of a gelatinous membrane, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, saccate-oblong to ellipsoidal, sessile, apically thickened, with a small ocular chamber. *Ascospores* 2-seriate overlapping in the ascus, ellipsoidal-oblong to clavulate, 1-septate, darkened at the septum, hyaline to pale-brown. Asexual morph: Undetermined.

Type species – *Coccoidella scutula* (Berk. & M.A. Curtis) Höhn.

Notes – The genus *Coccoidella* was introduced and placed in the family *Coccoideaceae* by von Höhnel (1909) and typified by *Coccoidella scutula* (Berk. & M.A. Curtis) Höhn. The type species *C. scutula* shares similar characters with the genus *Coccoidea*, such as circular or discoid ascostroma, multi-loculate, dark pigmented, bitunicate asci and 1-septate and light pigmented ascospores. *Coccoidella* is therefore included in the family *Coccoideaceae*.

Coccoidella scutula (Berk. & M.A. Curtis) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: (1909)

≡ *Dothidea scutula* Berk. & M.A. Curtis 1876

Index Fungorum number: IF121383; Facesoffungi number: FoF03671

Fig. 60

Parasitic on living leaves of *Persea palustris* (Raf.) Sarg. Sexual morph: *Ascostromata* 0.8–0.9(–1) mm diameter, superficial, discoid or cupulate, dimidiate-scutate, solitary, gregarious, black, stipitate immersed in host tissue, multi-loculate. *Ascomata* 60–68 µm diameter × 135–157 µm high, globose to subglobose, oval, with thickened walls. *Peridium* 11–18 µm wide, comprising dark to black cells of *prismatica-angularis*, inner layer composed of gelatinous membrane *ca.* 7–10 µm wide, lacking pseudoparaphyses. *Asci* (64–)70–78 × (16.5–)18–22 µm (\bar{x} = 72 × 19 µm, n = 10), 8-spored, bitunicate, fission-tunicate, saccate-oblong to ellipsoidal, sessile, apically thickened, with a small ocular chamber. *Ascospores* (18–)21–23 × 6–7.5 µm (\bar{x} = 21 × 7 µm, n = 10), 2-seriate overlapping in the ascus, ellipsoidal-oblong to clavulate, 1-septate, slightly constricted and darkened at the septum, hyaline to pale-brown, smooth-walled. Spores can produce germ tubes on slides. Asexual morph: Undetermined.

Material examined – USA, Florida, Green Cove Springs, on living leaves of *Persea palustris* (Raf.) Sarg. (*Lauraceae*), undetermined date, G. Martin (BPI 642219, other herbaria: Rehm: Ascomyceten 1669).

Dimeriaceae E. Müll. & Arx ex Arx & E. Müll.

Index Fungorum number: IF80704; Facesoffungi number: FoF03672

Parasitic on living leaves, colonies dark brown, mycelium superficial, dark brown, amphigenous. Sexual morph: *Ascomata* superficial, subglobose, with hyphal appendages, flexuous, cylindrical, septate, dark brown, roughened. *Asci* 8-spored, bitunicate, fission-tunicate, saccate-oblong to ellipsoidal, apically thickened. *Ascospores* conglobate, ellipsoid-fusiform to subclavate, ends rounded, 1-septate, darkly pigmented at septum, upper cell wider than lower cell, septum suprmedian, olivaceous-brown to brown. Asexual morph: hyphomycetous.

Family type – *Dimerium* (Sacc. & P. Syd.) McAlpine

Notes – The family *Dimeriaceae* was introduced by Müller & von Arx (1962) and validated by von Arx & Müller (1975). The family has been placed in *Dothideales* (von Arx & Müller 1975) and *Pleosporales* (Barr 1987). Hawksworth & Eriksson (1986) proposed to conserve the family *Dimeriaceae* as widely used, while *Pseudoperisporiaceae* was proposed as the rejected name. Barr (1997) revised three families *viz.* *Epipolaeaceae*, *Dimeriaceae* and *Pseudoperisporiaceae*. She proposed *Pseudoperisporiaceae* to the family rank based on earlier name and treated *Epipolaeaceae* and *Dimeriaceae* under the family. In this study, we selected *D. olivaceum* Syd. & P. Syd. as the type species of *Dimerium*, *Dimeriaceae*. *Dimerium* is characterized by its irregular colonies, dark pigmented ascomata, olivaceous brown to brown ascospores and long conidial hyphomycetes. It is rather atypical of *Pseudoperisporiaceae* (Hyde et al. 2013). Therefore, the family *Dimeriaceae* is reinstated to accommodate species in *Dimerium*.

Dimerium (Sacc. & P. Syd.) McAlpine, Proc. Linn. Soc. N.S.W. 28: 98 (1903)

≡ *Dimerosporium* subgen. *Dimerium* Sacc. & P. Syd. 1902

Parasitic on living leaves, colonies dark brown, mycelium superficial, dark brown, amphigenous. Sexual morph: *Ascomata* superficial, subglobose, with hyphal appendages, flexuous, cylindrical, septate, dark brown, roughened. *Asci* 8-spored, bitunicate, fission-tunicate, saccate-oblong to ellipsoidal, apically thickened. *Ascospores* conglobate, ellipsoid-fusiform to subclavate, ends rounded, 1-septate, constricted at the septa and dark pigmented, upper cell wider than lower cell, septum suprmedian, olivaceous brown to brown. Asexual morph: hyphomycetous, *Heterosporiopsis* sp. Colonies large, superficial, epiphyllous, dark brown, with numerous mycelium, brown to darkly brown hyphae, scattered, with brown to dark brown hyphopodia-like structures. *Conidia* formed on superficial hyphae, irregular, subglobose to elongate ellipsoidal, basal cell wider, multi-septate, dark brown, rough-walled.

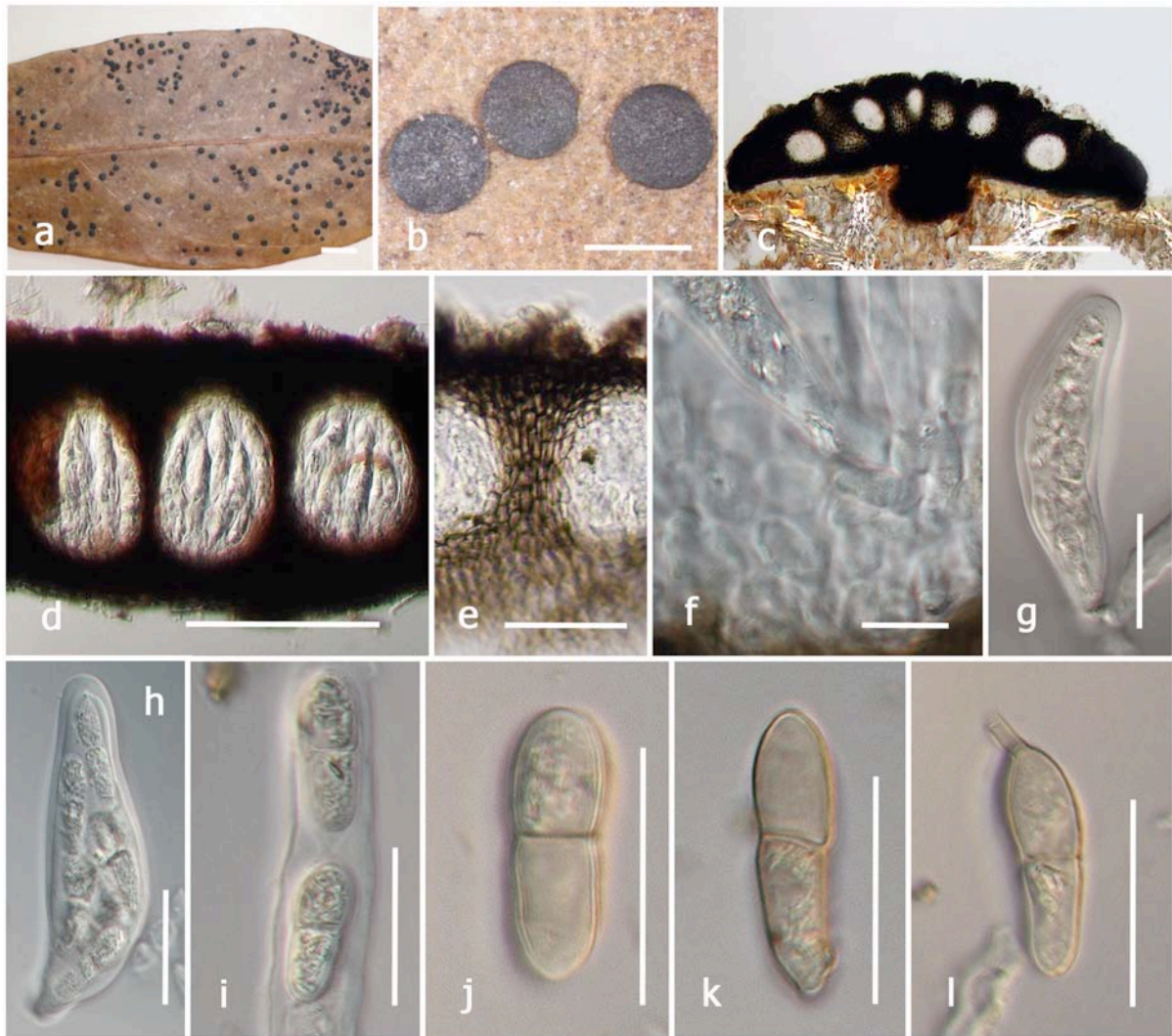


Figure 60 – *Coccoidella scutula* (BPI 642219). a Herbarium specimen and habit on leaf. b Appearance of ascostromata on leaf surface. c Section of ascostroma. d, e Close up of ascomata and peridium cells. f Gelatinous tissues. g, h Asci. i–l Ascospores. Scale bars: a = Label, b = 1 mm, c = 200 μ m, d = 100 μ m, e = 50 μ m, f = 10 μ m, g–l = 20 μ m.

Type species – *Dimerium olivaceum* Syd. & P. Syd.

Notes – Currently, the type species of the genus *Dimerium* remains unresolved. *Dimerium* was introduced by Saccardo & Sydow (1902) as a subgenus of *Dimerosporium*. Subsequently, McAlpine (1903) raised *Dimerium* to generic rank without designating a generic type. He separated it from *Dimerosporium* based on the coloured ascospores. Clements & Shear (1931) selected *Dimerium pulveraceum* (Speg.) Theiss. as the lectotype species and several mycologists followed this (Hansford 1946, Müller & von Arx 1962, von Arx & Müller 1975, Eriksson & Hawksworth 1993). Hughes (1993) restudied *Dimerosporium pangerangense*, *D. ctenotrichum*, *D. tasmanicum* and *D. occultum* and transferred them to other genera, while *Dimerium pulveraceum* was not included in this group. Therefore, *Dimerium olivaceum* Syd. & P. Syd. was considered and described as the type species (Hughes 1993). Barr (1997) disagreed with Hughes (1993) in assigning *D. olivaceum* as the type species, because of lack of hypostromata and lack of internal haustoria. The feature of ascospores and aparaphysate ascomata is similar to members of *Asterinales*. Thus, *D. tasmanicum* was considered as the lectotype species of *Dimerium*. Furthermore, *D. tasmanicum* should be used as an earlier generic name for species transferred to *Maireella*. Morphologically, *Dimerium tasmanicum* is characterized by a subcuticular plate, ascostromata, multi-loculate, obclavate to cylindrical asci and clavate, 1-septate, light brown

ascospores (Hansford 1954). The genus *Maireella* is characterized by superficial, uniloculate, solitary, globose to subglobose, ostiole and papillate ascomata (Li et al. 2014). Barr (1997) mentioned that *Maireella* should be included in the family *Coccoideaceae*, rather than the family *Venturiaceae*. Hansford (1946, 1954) described many species of *Dimerium* as mycoparasitic on other leaf fungi, with superficial ascomata, lacking setae, seated on mycelium, with globose to ovate-conoid exhyphopodia, which differs from the characters of *D. tasmanicum*. According to Hughes (1993), *D. olivaceum* seems appropriate for the type species. Thus, we provide a photo plate and brief description of *D. olivaceum* referenced from Hughes (1993). The type species *D. olivaceum* shows distinctive morphological features from the type species *Lasiostemma melioides*, *Pseudoperisporiaceae* and is connected with a hyphomycetous asexual morph (Hughes & Seifert 1998). In this study, we place *Dimerium* in the family *Dimeriaceae*.

Dimerium olivaceum Syd. & P. Syd., *Annls mycol.* 2(2): 169 (1904)

Index Fungorum number: IF234107; Facesoffungi number: FoF03673 Figs 61–63

Parasitic on living leaves of *Cynocton nummulariifolium* (Hook. & Arn.) Decne., colonies dark brown, mycelium superficial, amphigenous. Sexual morph: *Ascomata* (92–)156–194(–250) μm diameter, superficial, subglobose, flexuous, cylindrical, 3–4.5 μm wide, septate, dark brown, roughened, with apical pore *ca.* 30 μm diameter. *Asci* 50–63 \times (9–)11–14 μm (\bar{x} = 56 \times 12 μm , n = 10), 8-spored, bitunicate, fissitunicate, saccate-oblong to ellipsoidal, apically thickened. *Ascospores* 11–16 \times 5–7 μm (\bar{x} = 13 \times 6 μm , n = 20), conglobate, ellipsoid, upper cell wider, ends rounded, 1-septate, constricted at the septa and darkly pigmented, upper cell wider than lower cell, septum suprmedian, olivaceous brown to brown, smooth-walled. Asexual morph: hyphomycetous, *Heterosporiopsis* sp. *Colonies* large, superficial, epiphyllous, dark brown, with dense mycelia, brown to dark brown, with hyphopodia-like structures, 5–5.5 μm diameter, brown to dark brown, *Conidia* 28–64 \times 6–9 μm , formed on superficial hyphae, irregular, subglobose to elongate ellipsoidal, basal cell wider, 3–5-septate, dark brown, rough-walled.

Material examined – CHILE, Anden bei Villarica, on living leaves of *Cynoctonum nummulariaefolium* (Hook. & Arn.) Decne. (*Asclepiadaceae*), February 1897, F.W. Neger (S-F11956, holotype).

Dysrhynchisceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553829; Facesoffungi number: FoF03674

Saprobic on dead leaves. Sexual morph: *Ascomata* superficial, globose to subglobose, dark brown, solitary, aggregated, pore central, with a protruding synnematus neck, comprised of tightly compacted hyphae, sparse superficial mycelium with hyphopodia, brown to dark brown, with partially immersed mycelia, lacking setae, lacking pseudoparaphyses. *Peridium* membranous, comprising brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, broadly obclavate to ovoid, sessile, apically thickened. *Ascospores* multi-seriate, conglobate, ellipsoidal, clavate to obpyriform, hyaline to light brown. Asexual morph: hyphomycetous.

Family type – *Dysrhynchis* Clem.

Notes – The family *Dysrhynchisceae* is introduced based on *Dysrhynchis* Clem. The family is characterized by a long necked ascomata, with hyphomycetous conidia produced at the apex of the ascomata, mycelium with hyphopodia, lack of pseudoparaphyses, broadly obclavate to ovoid asci, and conglobate, ellipsoid, 1-septate, hyaline to light brown ascospores. Therefore, *Dysrhynchisceae* can be separated from the families *Capnodiaceae* and *Perisporiopsidaceae*. *Dysrhynchisceae* differs from *Capnodiaceae* and *Perisporiopsidaceae* in having sexual ascomata protruding synnematus necks, mycelium with hyphopodia, transversally uni-septate ascospores and a hyphomycetous asexual morph. *Capnodiaceae* is characterized by black mycelium on the host surface, lack of hyphopodia, lack of necks, multi-septate or muriform ascospores and a coelomycetous asexual morph comprising pycnidium with long necks and ellipsoidal, one-celled conidia (see in the genus *Phragmocapnias*, Chomnunti et al. 2011). In addition, several species in *Capnodiaceae* are commonly associated with the honeydew produced by insects such as aphids

(Chomnunti et al. 2011). We therefore introduce the new family *Dysrhynchisceae*, because it has a suite of characters that differ from other families of *Dothideomycetes*.

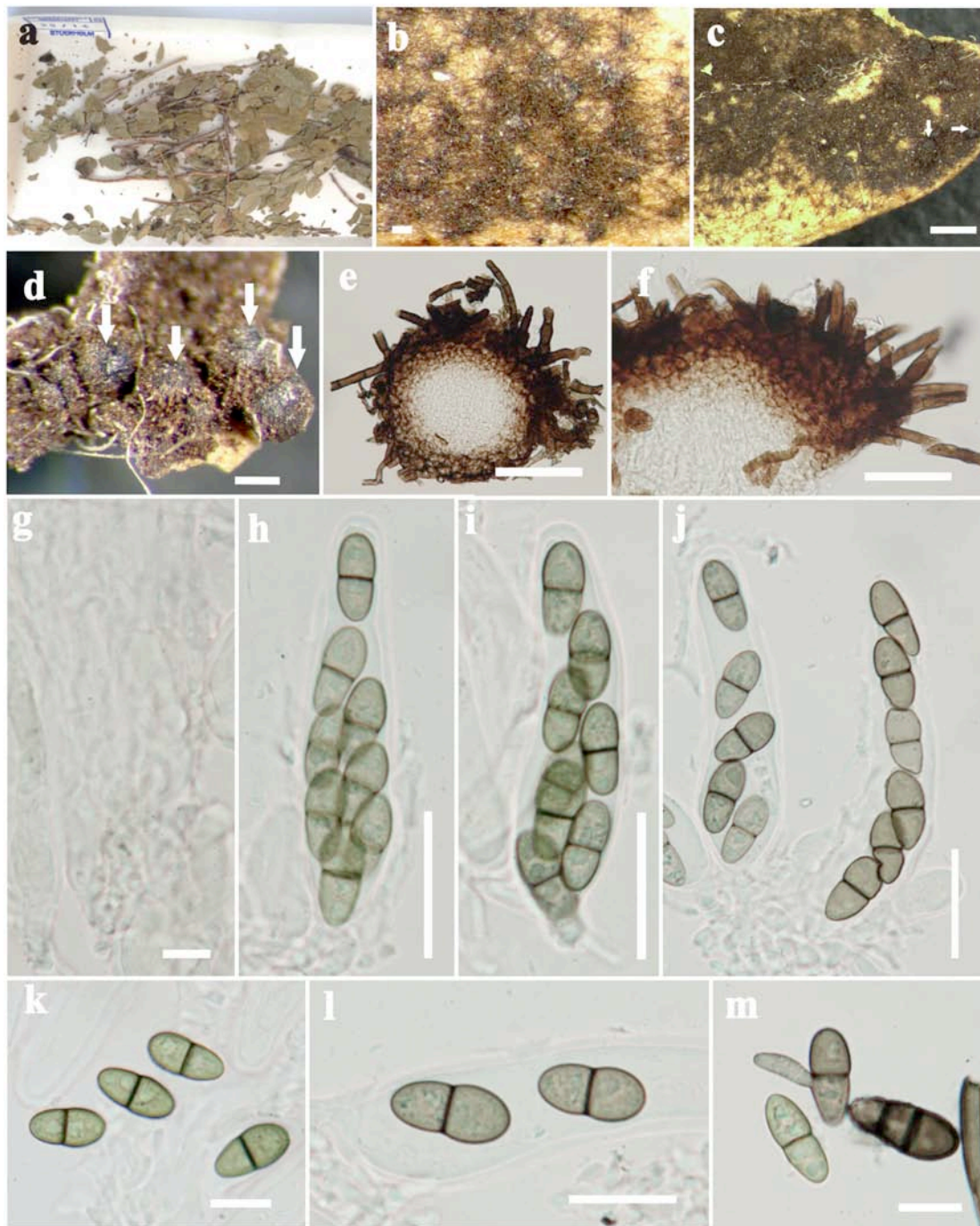


Figure 61 – *Dimerium olivaceum* (S-F11956, holotype). a Herbarium specimen and habit on leaves. b, c Appearance of colonies on leaves surface. d Ascomata, marked by arrows. e Section of ascoma. f Peridium. g Hamathecium comprising pseudoparaphyses. h–j Asci. k, l Ascospores. m Germ tube of ascospore. Scale bars: b = 100 μ m, c = 500 μ m, d = 200 μ m, e = 50 μ m, f, h–j = 20 μ m, g, k–m = 10 μ m.

Dysrhynchis Clem., Gen. fung. (Minneapolis): 3(1909)

Saprobic on dead leaves. Sexual morph: *Ascomata* superficial, globose to subglobose, dark brown, solitary, aggregated, pore central, with a protruding synnematosus neck, comprised of tightly compacted hyphae, sparse superficial mycelium with hyphopodia, brown to dark brown, partially immersed mycelia, lacking setae, lacking pseudoparaphyses. *Peridium* membranous, comprising



Figure 62 – *Dimerium olivaceum* (S-F11956, holotype). a Fungal colonies on leaf surface. b, c Mycelium with hyphopodia-like structures and conidia, marked by arrows. d–g Conidiophores and different stages of developing conidia. h–k Conidia. Scale bars: a = 200 μm , b = 50 μm , c = 10 μm , d–g = 20 μm , h–k = 10 μm .

brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, broadly obclavate to ovoid, sessile, apically thickened. *Ascospores* multi-seriate, conglobate, ellipsoidal, clavate to obpyriform, upper cell wider, septate, hyaline to light brown. Asexual morph: hyphomycetous, with synnemata. *Conidiophores* and conidiogenous cells were not observed. *Conidia* cylindrical-oblong to fusiform, multi-septate, constricted at the septa, brown, smooth-walled.

Type species – *Dysrhynchis pulchella* (Sacc.) Clem.

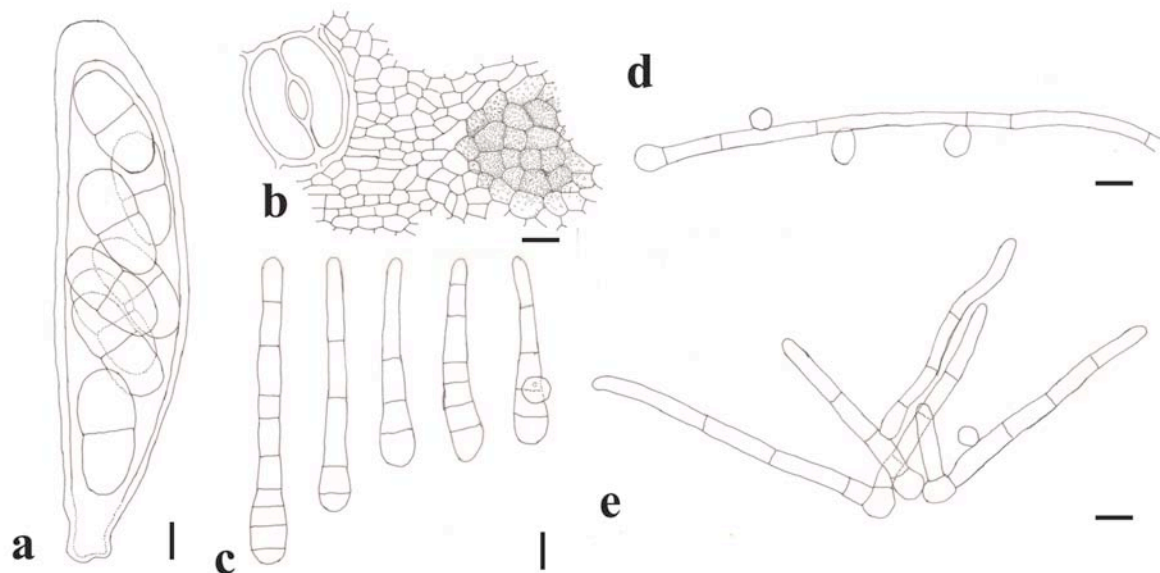


Figure 63 – *Dimerium pulveraceum* (redrawn from Hughes 1993, Fig. 134). a. Ascus with ascospores. b. Subcuticular hyphae. c. Conidia. d, e. Hyphae with forming conidia. Scale bars: a–e = 10 μ m.

Notes – Clements (1909) introduced the genus *Dysrhynchis* without mentioning a type species. Theissen & Sydow (1917) transferred *Henningsomyces* (*H. pulchellus* Sacc, type species) to the family *Capnodiaceae* based on features of elongated synnematosus neck and 1-septate, hyaline to brown spores. Clements & Shear (1931) treated *Dysrhynchis pulchella* (\equiv *Henningsomyces pulchellus*) as the type species. Hansford (1946) re-examined the type species *H. pulchellus* Sacc. (an earlier name of *Dysrhynchis pulchella* (Sacc.) Clem.) and noted that this fungus was of doubtful position, and suggested fresh collections were needed for a clear systematic understanding. Müller & von Arx (1962) revised several genera and synonymized them under *Dysrhynchis*, i.e. *Balladyna amazonica* Höhn., *B. uncinata* Syd. & P. Syd., *Diatrypella palmicola* Syd., *Meliola oligotricha* Mont., *Pisomyxa amomi* Berk. & Broome and *Rizalia confusa* Doidge, and also placed the genus in the family *Perisporiopsidaceae*. Currently there are seven names listed in Index Fungorum (2017). *Perisporiopsidaceae* is characterized by superficial mycelium covering the ascomata and multi-septate ascospores. We re-examined the holotype specimen *Dysrhynchis pulchella* from PAD and compared morphological characters with genera in *Capnodiaceae* and *Perisporiopsidaceae* including their asexual morphs and decided both families are mismatched for *Dysrhynchis* (Hyde et al. 2013, Chomnunti et al. 2011, 2014, Yang et al. 2014, Hongsanan et al. 2015). We therefore exclude the genus *Dysrhynchis* from *Perisporiopsidaceae* and introduce the new family *Dysrhynchisceae* for the genus *Dysrhynchis*.

Dysrhynchis pulchella (Sacc.) Clem., Gen. fung., Edn 2 (Minneapolis): 253 (1931)

\equiv *Henningsomyces pulchellus* Sacc. Syll. fung. (Abellini) 17: 689 (1905)

Index Fungorum number: IF254191; Facesoffungi number: FoF03675

Fig. 64

Saprobic on dead leaves of *Byrsonima sericae* A. Juss. Sexual morph: *Ascomata* 77–97(–105) μ m diameter \times 76–99(–106) μ m high (\bar{x} = 92 \times 90 μ m), superficial, globose to subglobose, dark brown, solitary, aggregated, pore central, 20–25 μ m diameter, with a protruding synnematosus neck, comprised of tightly compacted hyphae, 196–323 μ m long, sparse superficial mycelium with hyphopodia, 6–8 μ m diameter, brown to dark brown, partially immersed mycelia, lacking setae, lacking pseudoparaphyses. *Peridium* 8–9 μ m wide, comprising membranous of brown cells of *textura angularis*. *Asci* 40–56 \times 20–35 μ m (\bar{x} = 47 \times 24 μ m, n = 10), 8-spored, bitunicate, broadly obclavate to ovoid, sessile, apically thickened. *Ascospores* 21–33 \times 7–12 μ m (\bar{x} = 28 \times 10 μ m, n = 20), multi-seriate, conglobate, ellipsoidal, clavate to obpyriform, upper cell wider, 1-septate in the

center or above, constricted at the septum, hyaline to light brown, smooth-walled. Asexual morph: hyphomycetous, with synnemata. Conidiophores and conidiogenous cells not observed. *Conidia* 20–25 μm \times 4–5 μm , cylindrical oblong to fusiform, 2–3-septate, constricted at the septa, brown, smooth-walled.

Material examined – BRAZIL, Rio de Janeiro, Mauá, on dead leaves of *Byrsonima sericae* A. Juss. (*Malpighiaceae*), 21 July 1899, E.H.G. Ule, Mycotheca brasiliensis no. 71 (PAD, holotype).

Hyalomeliolinaceae Boonmee & K.D. Hyde fam. nov.

Index Fungorum number: IF553830; Facesoffungi number: FoF03676

Parasitic on living leaves. Sexual morph: *Colonies* form on lower surface of leaves, black, subcircular with outwardly radiating mycelium, with hyphae that are long hairy, flexible, dark brown to black, densely, fluffy, partially erect, unbranched, and septate. *Ascomata* superficial, globose to subglobose, black, seated on dark hyphae, covered by dense hyphae, superficial mycelium, unbranched, septate, dark to black. *Peridium* comprising dark brown to black cells of *textura angularis*. *Hamathecium* comprising elongate-filiform, septate, unbranched, filamentous pseudoparaphyses, extending over asci, constricted at the septa. *Asci* 8-spored, bitunicate, fissitunicate, saccate-oblong to ellipsoidal, sessile, lower median widest, with small ocular chamber. *Ascospores* 2-seriate, ellipsoid-fusiform, ends narrow, multi-septate, pigmented. Asexual morph: Undetermined.

Notes –The new family *Hyalomeliolinaceae* is introduced to accommodate three species in *Hyalomeliolina*. Morphologically, *Hyalomeliolina* differs from the type species in *Perisporiopsidaceae* in having numerous hyphal colonies and saccate-oblong to ellipsoidal, up to 3-septate, light to dark pigmented ascospores. According to its characteristics, *Hyalomeliolina* can be separated from *Perisporiopsidaceae* and is raised to familial rank. We introduce the new family *Hyalomeliolinaceae*, because it has a suite of characters that differ from other families of *Dothideomycetes*.

Hyalomeliolina F. Stevens, Illinois Biol. Monogr. (Urbana) 8(no. 3): 27 (1923)

Parasitic on living leaves. Sexual morph: *Colonies* formed on lower surface of leaves, black, subcircular with outwardly radiating mycelium, with hyphae that are long hairy, flexible, dark brown to black, densely, fluffy, partial erect, unbranched, and septate. *Ascomata* superficial, globose to subglobose, black, seated on dark hyphae, covered by dense hyphae, superficial mycelium, unbranched, septate, dark to black. *Peridium* comprising dark brown to black cells of *textura angularis*. *Hamathecium* comprising ca. 2 μm wide, elongate-filiform, septate, unbranched, hyaline, filamentous pseudoparaphyses, extending over the asci, slightly constricted at the septa. *Asci* 8-spored, bitunicate, fissitunicate, saccate-oblong to ellipsoidal, sessile, lower median cell widest, with small ocular chamber. *Ascospores* 2-seriate, ellipsoid-fusiform, ends narrow, initially 1-septate, becoming 3-septate at maturity, light brown, olivaceous brown to dark brown at maturity. Asexual morph: Undetermined.

Type species – *Hyalomeliolina guianensis* F. Stevens

Notes – Stevens (1923) established the genus *Hyalomeliolina* to accommodate a species having superficial ascomata, with mycelia lacking hyphopodia. The genus is typified by *H. guianensis* Stevens and was placed in family *Perisporiaceae*. Sivanesan (1987) revised the genus *Hyalomeliolina* and transferred it to *Parodiopsidaceae*. Petrak (1953) synonymized three genera viz. *Leptomeliola* Hohn, *Meliolinopsis* Beeli and *Phaeophragmeriella* Hansf. under *Hyalomeliolina*. Hughes (1993) redescribed several genera closely related to *Meliolina* and introduced the family *Meliolinaceae*, also, excluding several genera and species which included *Hyalomeliolina*. Currently three species are listed in the genus in Index Fungorum (2017). Kirk et al. (2008) indexed *Hyalomeliolina* in the family *Pseudoperisporiaceae*. Lumbsch & Huhndorf (2010) placed this genus in family the *Parodiopsidaceae* and commented on its uncertain taxonomic position. Based on morphological characters this genus can be placed in the new family *Hyalomeliolinaceae*.

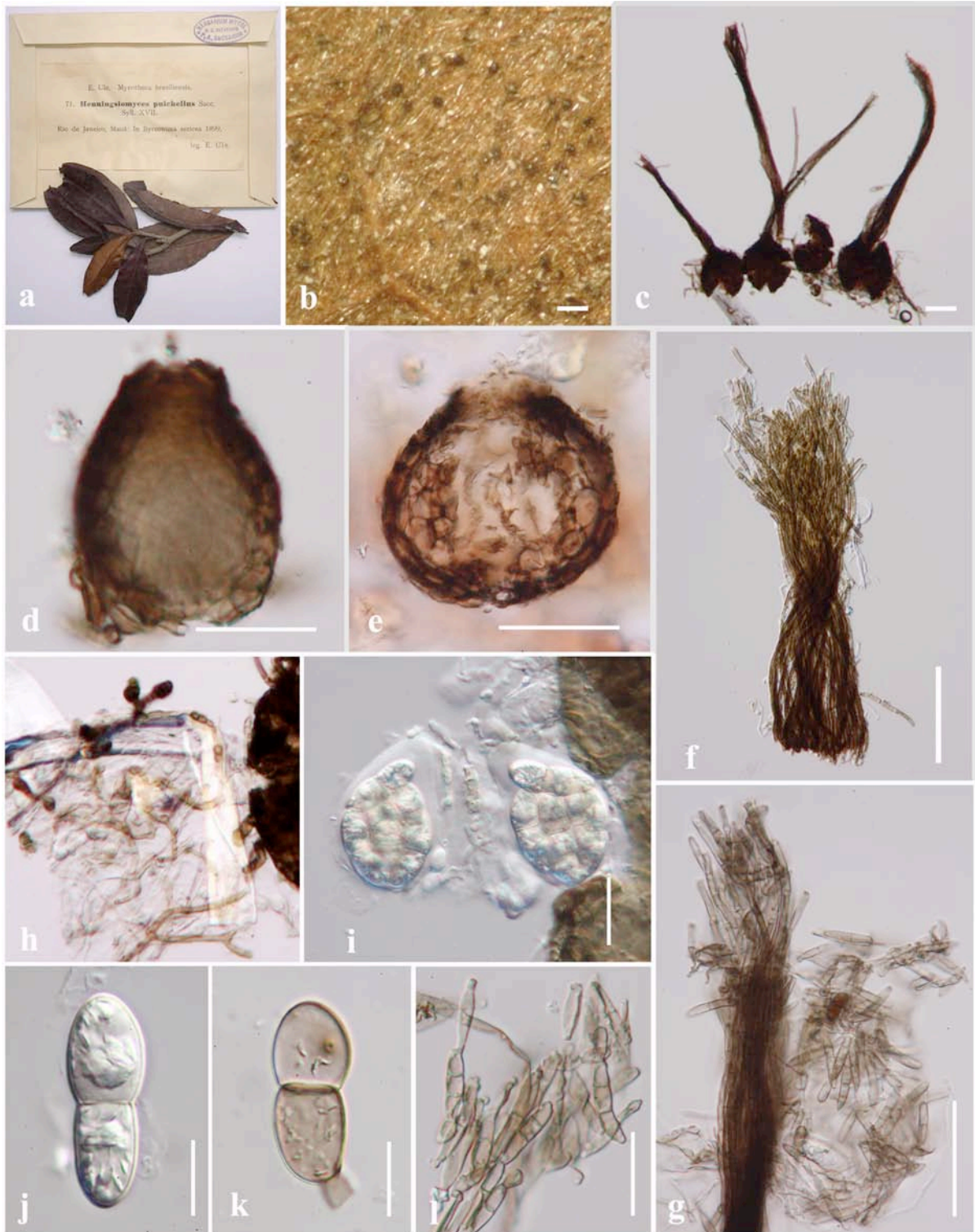


Figure 64 – *Dysrhynchis pulchella* (PAD No. 71, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Squash mount of ascomata with protruding synnematus necks. d, Section of ascoma. e Peridium. f Bulbous base of a synnema through the apex. g Synnema with apical conidia. h Hyphopodia and appressoria. i Asci. j, k Ascospores (Fig. k Germ tube of ascospore). l Conidia. Scale bars: b–d, f, g = 50 μ m, e, i, l = 20 μ m, h, j, k = 10 μ m.

Hyalomeliolina guianensis F. Stevens, Illinois Biol. Monogr. (Urbana) 8(no. 3): 27 (1924) [1923]
 Index Fungorum number: IF266643; Facesoffungi number: FoF03677 Fig. 65
Parasitic on living leaves of *Licania* sp. Sexual morph: Colonies 2.5–3.5 mm diameter, formed on lower surface of leaves, black, subcircular with outwardly radiating mycelium, with hyphae that are

long hairy, flexible, dark brown to black, densely, fluffy, partial erect, unbranched, and septate. *Ascomata* 193–216 μm diameter \times 189–210 μm high, superficial, globose to subglobose, black, seated on dark hyphae, covered by dense hyphae, superficial mycelium, unbranched, septate, dark to black. *Peridium* 23–27 μm wide, comprising dark brown to black cells of *textura angularis*. *Hamathecium* comprising *ca.* 2 μm wide, elongate-filiform, septate, unbranched, hyaline, filamentous pseudoparaphyses, extending over the asci, slightly constricted at the septa. *Asci* (86–)98–113(–127.5) \times (28–)31–34 μm (\bar{x} = 103 \times 32 μm , n = 10), 8-spored, bitunicate, fissitunicate, saccate-oblong to ellipsoidal, sessile, lower median cell widest, with small ocular chamber. *Ascospores* 35–44(–48) \times 11–15 μm (\bar{x} = 41 \times 12.5 μm , n = 10), 2-seriate, ellipsoid-fusiform, ends narrow, initially 1-septate, becoming 3-septate at maturity, constricted at the median septum, light brown, olivaceous brown to dark brown at maturity, smooth-walled. Asexual morph: Undetermined.

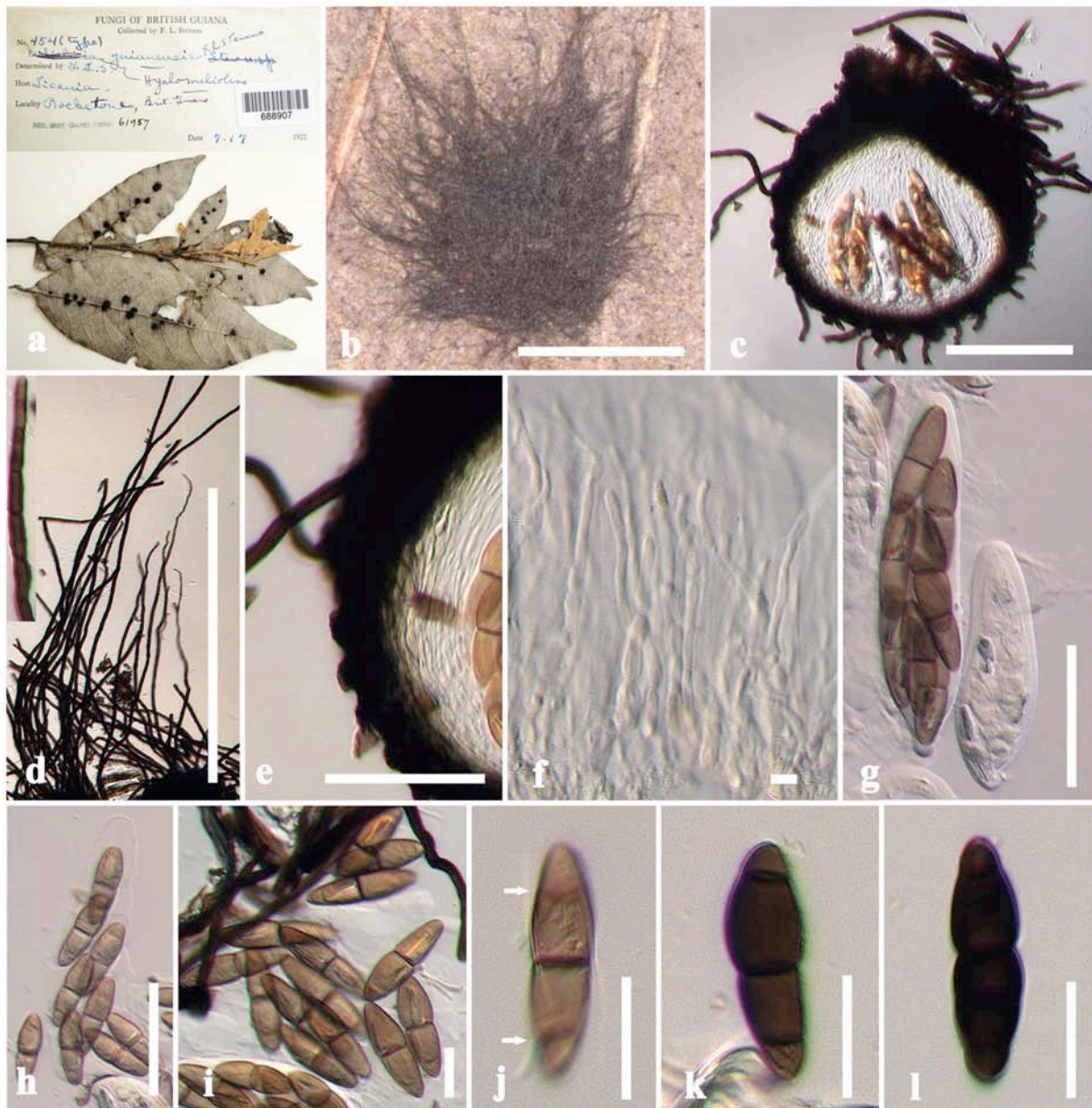


Figure 65 – *Hyalomeliolina guianensis* (BPI688907, holotype). a Herbarium specimen and habit on leaves. b Ascomata covered by hyphae on leaf surface. c Section of ascoma. d Hairy hyphae. e Peridium. f Pseudoparaphyses. g, h Asci. i–l Ascospores. Scale bars: b = 2 mm, c = 100 μm , d = 500 μm , e = 50 μm , f = 5 μm , g, h = 50 μm , i–l = 20 μm .

Material examined – GUYANA (= British Guiana), Rockstone, on living leaves of *Licania* Aubl. (*Chrysobalanaceae*), 17 July 1922, F.L. Stevens No. 454 (BPI688907, holotype).

Lizoniaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553831; Facesoffungi number: FoF03678

Parasitic, foliicolous on perichaetial leaves of living mosses. Sexual morph: *Ascomata* superficial, solitary or in groups, unilocular, globose to subglobose, black, with obscure ostiole, superficial mycelium absent. *Peridium* comprising 3–4 layers of brown cells of *textura angularis*. *Hamathecium* comprising numerous, long cylindrical, unbranched, septate, pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindric-clavate, sessile or with short pedicel, apex rounded. *Ascospores* 1–2-seriate, ellipsoidal-fusiform, upper cell broader than basal cell, 1-septate, brown. Asexual morph: Undetermined.

Family type – *Lizonia* (Ces. & De Not.) De Not.

Notes – The new family *Lizoniaceae* is introduced to accommodate the genus *Lizonia* based on its bryophilous characteristic. The family is characterized by superficial, sphaerical, black ascomata, bitunicate asci, pseudoparaphyses and septate, hyaline to coloured ascospores. Phylogenetically, *Lizonia* clustered in a strongly supported clade among the families in the order *Pleosporales* (Fig. 1b in Stenroos et al. 2010). We introduce the new family *Lizoniaceae*, because it has a suite of characters that differ from other families of *Dothideomycetes*.

Lizonia (Ces. & De Not.) De Not., Sfer. Ital.: 72 (1863)

Parasitic, foliicolous on perichaetial leaves of living mosses. Sexual morph: *Ascomata* superficial, solitary or in groups, unilocular, globose to subglobose, black, with obscure ostiole, superficial mycelium absent. *Peridium* comprising 3–4 layers of brown cells of *textura angularis*. *Hamathecium* comprising numerous, long cylindrical, unbranched, septate, hyaline pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindric-clavate, sessile or with short pedicel, apex rounded. *Ascospores* 1–2-seriate, ellipsoidal-fusiform, upper cell broader than basal cell, 1-septate. Asexual morph: Undetermined.

Type species – *Lizonia empirigonia* (Auersw.) De Not.

Notes – *Lizonia* was formally established at the generic rank by De Notaris (Cesati & De Notaris 1863) from the subgenus *Cucurbitaria*, which is typified by *Lizonia empirigonia* (Ces. & De Not.) De Not. (earlier named *Sphaeria emperichaetia* Auersw. and *Cucurbitaria emperigonia* Ces. & De Not.). The genus has been placed in the families *Cucurbitariaceae*, *Sphaeriaceae*, *Dimeriaceae* and *Parodiellaceae* by various authors (Cesati & De Notaris 1863, Hansford 1946, von Arx and Müller 1975, Döbbeler 1978, Barr 1987, Eriksson & Hawksworth 1993). *Lizonia* is presently placed in the family *Pseudoperisporiaceae* on the basis of its bryophilous habit, superficial ascomata, bitunicate asci and 1-septate, hyaline to pigmented ascospores (Hawksworth et al. 1995, Barr 1997, Döbbeler 2003, Barr 2009, Lumbsch & Huhndorf 2010, Hyde et al. 2013, Buck 2016). Stenroos et al. (2010) provided phylogenetic studies on *L. sexangularis* and showed this species to cluster with *Didymella* in the order *Pleosporales* with good support. The genus *Lizonia* shares common characters with several genera in *Pleosporales* such as parasitic, superficial, globose to subglobose, black ascomata, lacking setae, bitunicate asci, pseudoparaphyses and septate, hyaline to coloured ascospores, but it differs in its bryophilous habit. The genus is therefore treated in its family *Lizoniaceae* in the order *Pleosporales* (Stenroos et al. 2010, Döbbeler & Hertel 2013).

Lizonia empirigonia (Ces. & De Not.) De Not. [as *emperigonia*], Sfer. Ital.: 72 (1863)

≡ *Cucurbitaria emperigonia* Ces. & De Not., Comm. Soc. crittog. Ital. 1(fasc. 3): 215 (1862)

= *Sphaeria emperigonia* Auersw., Klotzschii Herb. Viv. Mycol., Edn 2: no. 850 (1858)

= *Sphaeria emperichaetia* Auersw., Comm. Soc. crittog. Ital. 1(fasc. 3): 215 (1862)

Index Fungorum number: IF145497; Facesoffungi number: FoF03679

Figs 66, 67

Parasitic, foliicolous on perichaetial leaves of living mosses of *Polytrichum commune* Hedw. Sexual morph: *Ascomata* 211–249 μm diameter \times 256.5–264 μm high, superficial, solitary or in groups, unilocular, globose to subglobose, black, with obscure ostiole, superficial mycelium absent. *Peridium* (16–)20–23 μm wide, comprising 3–4 layers of brown cells of *textura angularis*. *Hamathecium* (2.5–)3–4.5 μm wide, comprising numerous, long cylindrical, unbranched, septate, hyaline pseudoparaphyses. *Asci* 113–164 \times 20–27.5 μm (\bar{x} = 131 \times 24 μm , n = 20), 8-spored, bitunicate, cylindric-clavate, sessile or with short pedicel, apex rounded. *Ascospores* 33.5–45 \times 9–11.5 μm (\bar{x} = 38.5 \times 10.5 μm , n = 20), 1–2-seriate, ellipsoidal-fusiform, upper cell broader than basal cell, 1-septate, slightly constricted at the septum, brown, smooth-walled. Asexual morph: Undetermined.

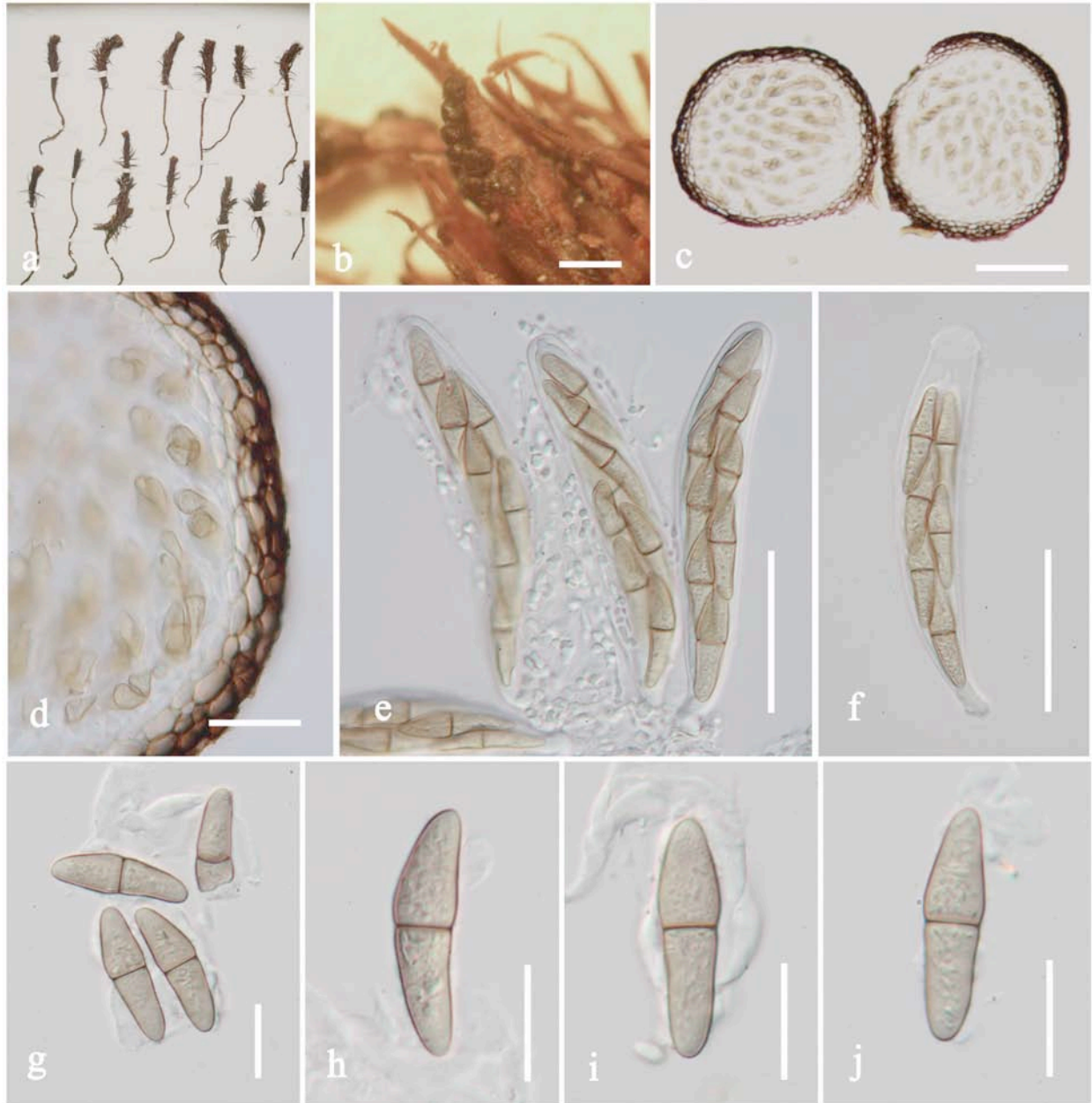


Figure 66 – *Lizonia emperigonia* (PC 0084487). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascomata. c Peridium. e Pseudoparaphyses. f Ascus. g–j Ascospores. Scale bars: b = 500 μm , c = 100 μm , d, g–j = 20 μm , e, f = 50 μm .

Material examined – ITALY, Lugano, on peduncle of *Polytrichum commune* Hedw. (*Polytrichaceae*), August 1848, V. Cesati (in Rabenh. Herb. Mycol. I. no. 850 sub *Sphaeria*

emperigonia), PC0084487; GERMANY, Rheinland -Pfalz: near Mappen Nassovia, Autumn, Fuckel, in Rabenhorst, Fungi europaei, in the syllvaticis swamps between the valley, in Fuckel, Fungi rhenani, Nr. 891, sub *Sphaeria emperigonia*, on perichaetial leaves of flowers of *Polytrichum commune*, in B collection under numbers (B 70 0014161, B 7014161 and B 70 0014163, type not mentioned).



Figure 67 – *Lizonia emperigonia* (B 70 0014162). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. c Peridium. e Hamathecium texture. f Asci. g–j Ascospores. Scale bars: b = 500 μm , c = 100 μm , d = 40 μm , e = 10 μm , f–j = 50 μm , k–n = 20 μm .

Massarinaceae Munk

The genus *Semifissispora* is placed in the family *Massarinaceae* based on phylogenetic analysis (Crous et al. 2015).

Semifissispora H.J. Swart, Trans. Br. mycol. Soc. 78(2): 259 (1982)

Parasitic on surface of dead leaves. Sexual morph: *Ascomata* immersed and becoming erumpent at maturity, solitary or gregarious, globose to subglobose. *Peridium* comprising 2 layers of hyaline to dark brown cells of *textura angularis*, rounded ostiole at the center of mature ascomata. *Hamathecium* comprising branched, septate, pseudoparaphyses, anastomosing between and above the asci, embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, cylindrical, with short, rounded pedicel, apex rounded with an ocular chamber. *Ascospores* overlapping, 1–3-seriate, ellipsoid to fusiform, uniseptate, constricted at the middle septum when immature, splitting at the middle of each cell at maturity, hyaline, smooth or slightly rough-walled. Asexual morph: Undetermined.

Type species – *Semifissispora fusiformis* H.J. Swart

Notes – *Semifissispora* was introduced in Pleosporales, with the type species *S. fusiformis* (Swart 1982) found on *Eucalyptus* leaf litter. Crous et al. (2015) established a new species *S. natalis* Crous et al. with sequence data. In their phylogenetic analysis, the placement of *Semifissispora* is shown in *Massarinaceae* (Pleosporales). However, a fresh collection with sequence data of the type species is needed to confirm the correct placement of *Semifissispora*.

Semifissispora fusiformis H.J. Swart, Trans. Br. mycol. Soc. 78(2): 259 (1982)

Index Fungorum number: IF111024; Facesoffungi number: FoF03680

Fig. 68

Parasitic on surface of dead leaves of *Eucalyptus behriana* F. Muell. Sexual morph: *Ascomata* 155–274 µm diameter × 248–288 µm high, immersed and becoming erumpent at maturity, solitary or gregarious, globose to subglobose. *Peridium* comprising 2-layers of hyaline to dark brown cells of *textura angularis*, rounded ostiole at the center of mature ascomata. *Hamathecium* comprising 3–4 µm wide, branched, septate, pseudoparaphyses, anastomosing between and above the asci, embedded in a gelatinous matrix. *Asci* 70–94 × 15–20 µm (\bar{x} = 78 × 18 µm, n = 10), 8-spored, bitunicate, cylindrical, with short, rounded pedicel, apex rounded, with an ocular chamber. *Ascospores* 30–34 × 7–8.5 µm (\bar{x} = 31 × 8 µm, n = 10), overlapping, 1–3-seriate, ellipsoid to fusiform, uniseptate, constricted at the middle septum when immature, splitting at the middle of each cell at maturity, hyaline, wall smooth or slightly rough. Asexual morph: Undetermined.

Material examined – AUSTRALIA, Djerriwarrh Creek, near town, Melton Victoria R.D. 87, on dead fallen leaves of *Eucalyptus behriana* F. Muell. (*Myrtaceae*), DA 220, 22 September 1978, H.J. Swart 78.04 (DAR 37064, holotype).

Mycosphaerellaceae Lindau

The genus *Episphaerella* which was placed in *Pseudoperisporiaceae* (Barr 1997, Hyde et al. 2013) lacks pseudoparaphyses and, therefore, can be placed in *Mycosphaerellaceae*.

Episphaerella Petr., Annales Mycologici 22: 126 (1924)

Parasitic on living leaves, superficial, with large colonies, irregular, black and with numerous ascomata. Sexual morph: *Ascomata* 70–82.5 µm diameter, superficial, solitary to gregarious, globose to subglobose, dark brown, collapsed when dry, with apical ostiole, 7–11 µm diameter, lacking superficial mycelium. *Peridium* 7.5–10 µm wide, comprising 3–4 layers of brown cells of *textura angularis*, lacking hamathecial pseudoparaphyses. *Asci* 25–55 × 12.5–17.5 µm (\bar{x} = 35 × 15.5 µm, n = 20), 8-spored, bitunicate, oblong-ovoid, sub-cylindrical, sessile, with minute ocular chamber. *Ascospores* 12.5–15 × 5 µm (\bar{x} = 13 × 5 µm, n = 20), 2–3-seriate, ellipsoidal oblong-obovoid, ends rounded, 1-septate, hyaline. Asexual morph: Undetermined.

Type species – *Episphaerella manihotis* (Henn.) Petr.

Notes – *Episphaerella* was introduced by Petrak (1924) as a monotypic genus based on *Dimerosporium manihotis* and twelve species have since been added. Petrak (1924) provided a brief German diagnosis, while Müller & von Arx (1962) revisited the genus with German descriptions of four species and provided a diagram of the infection process in *E. manihotis*, which

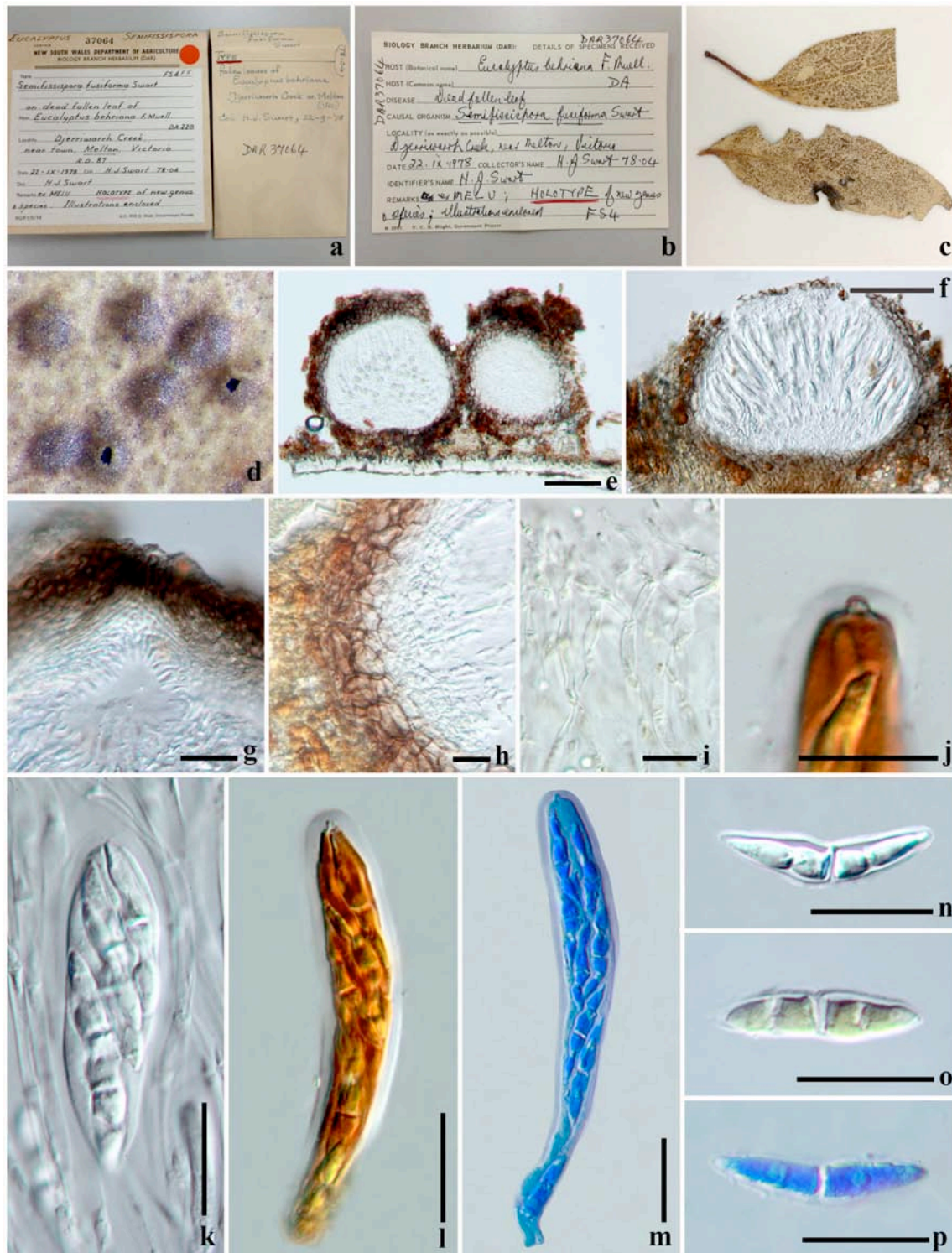


Figure 68 – *Semifissispora fusiformis* (DAR 37064, holotype). a-c Herbarium specimen, description and habit on leaves. d Appearance of ascomata in leaf tissue. e, f Sections of ascomata. g Periphyses. h Peridium. i Hamathecium. j Ocular chamber. k Ascus. l Ascus in Melzer's reagent. m Ascus in cotton blue reagent. n Ascospore. o Ascospore in Melzer's reagent. p Ascospore when immature in cotton blue reagent. Scale bars: e, f = 100 µm, g, h, j-p = 20 µm, i = 10 µm.

comprises internal mycelium with digitate processes within the leaf. Swart (1988) considered that the internal hyphae were important when transferring *Parodiella banksiae* to *Episphaerella*. Hansford (1946) questioned whether the character of internal mycelium was sufficient to separate this genus from *Eudimeriolium*. von Arx (1954) later combined *Episphaerella* with *Eudimeriolium*

as *E. manihotis* (Henn.) Arx and included the genus in *Dimeriaceae*. Barr (1997) moved the genus to the family *Pseudoperisporiaceae* based on its biotrophic characteristic, small ascomata, superficial, numerous mycelium and internal mycelium intracellular within leaf tissues. In addition, *Episphaerella* shares similarities with some genera in *Mycosphaerellaceae*, such as ascoma feature, asci shape and ascospores. The genus *Episphaerella* is therefore placed in *Mycosphaerellaceae*, which is more appropriate than *Pseudoperisporiaceae*.

Episphaerella manihotis (Henn.) Petr., Annales Mycologici 22(1/2): 126 (1924)

≡ *Dimerosporium manihotis* Henn., Hedwigia 43: 354 (1904)

= *Eudimeriolium manihotis* (Henn.) Arx, Acta Botanica Neerlandica 3: 88 (1954)

Index Fungorum number: IF270504; Facesoffungi number: FoF03681

Figs 69, 70

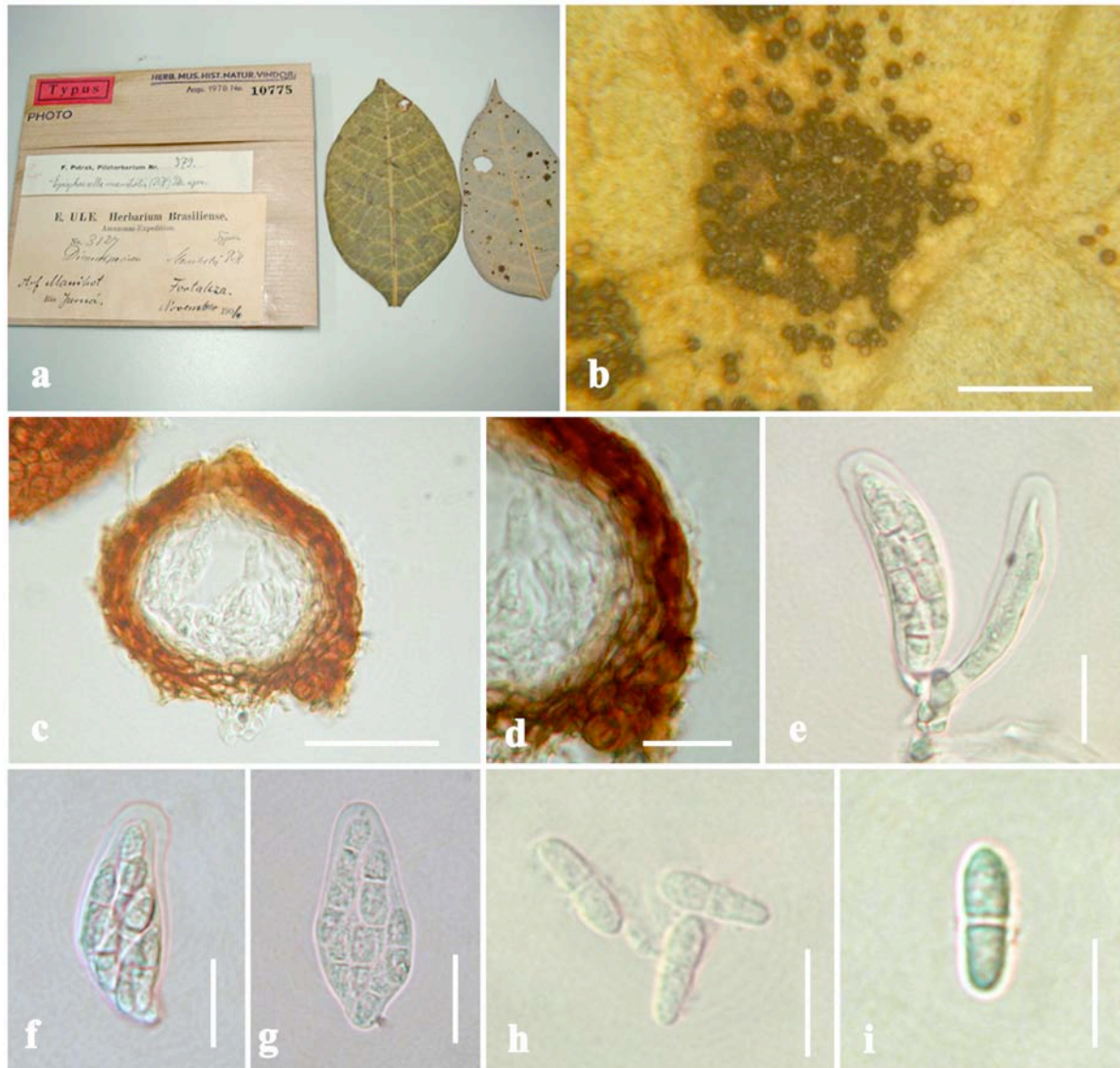


Figure 69 – *Episphaerella manihotis* (W Krypto 0010775, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Peridium. e–g Asci. h, i Ascospores. Scale bars: a, b = 500 μ m, c = 50 μ m, d–g = 20 μ m, h, i = 10 μ m.

Parasitic on living leaves of *Manihot* sp., superficial, with large colonies, irregular, black and with numerous ascomata. Sexual morph: *Ascomata* 70–82.5 μ m diameter, superficial, solitary to gregarious, globose to subglobose, dark brown, collapsed when dry, with apical ostiole, with 7–11 μ m diameter, lacking superficial mycelium. *Peridium* 7.5–10 μ m wide, comprising 3–4 layers of

brown cells of *textura angularis*, lacking hamathecial pseudoparaphyses. *Asci* 25–55 × 12.5–17.5 μm (\bar{x} = 35 × 15.5 μm, n = 20), 8-spored, bitunicate, oblong-ovoid, sub-cylindrical, sessile, with minute ocular chamber. *Ascospores* 12.5–15 × 5 μm (\bar{x} = 13 × 5 μm, n = 20), 2–3-seriate, ellipsoidal oblong-obovoid, ends rounded, 1-septate, constricted at the septum, hyaline, smooth-walled. Asexual morph: Undetermined.

Material examined – BRAZIL, Rio Juruá, Fortaleza, on living leaves of *Manihot* sp. Mill. (*Euphorbiaceae*), November 1901, E.H.G Ule No. 3127 (W Krypto 0010775, holotype); BRAZIL, Amazonas, Jura, on living leaves of *Manihot* sp. (*Euphorbiaceae*), 1901, E.H.G. Ule (BPI 612199).

Myrangiaceae Nyl.

Currently, the family *Myriangiaceae* consists of ten genera parasitic or saprobic on leaves, bark or scale insects, with multi-loculate ascostromata, lacking hypostroma, with single ascus locule and muriform, light ascospores (Hyde et al. 2013, Dissanayake et al. 2014, Wijayawardene et al. 2014). *Uleomyces* shares several characters in common with the type species *Myriangium duriaei*, such as a stromatic ascomata, a single locule, subglobose asci and muriform, hyaline to pigmented ascospores. *Uleomyces* differs from the taxa in *Cookellaceae* by its ascostromata lacking hypostroma and ascospore features. Therefore, the genus *Uleomyces* can be treated as a genus in the family *Myriangiaceae*.

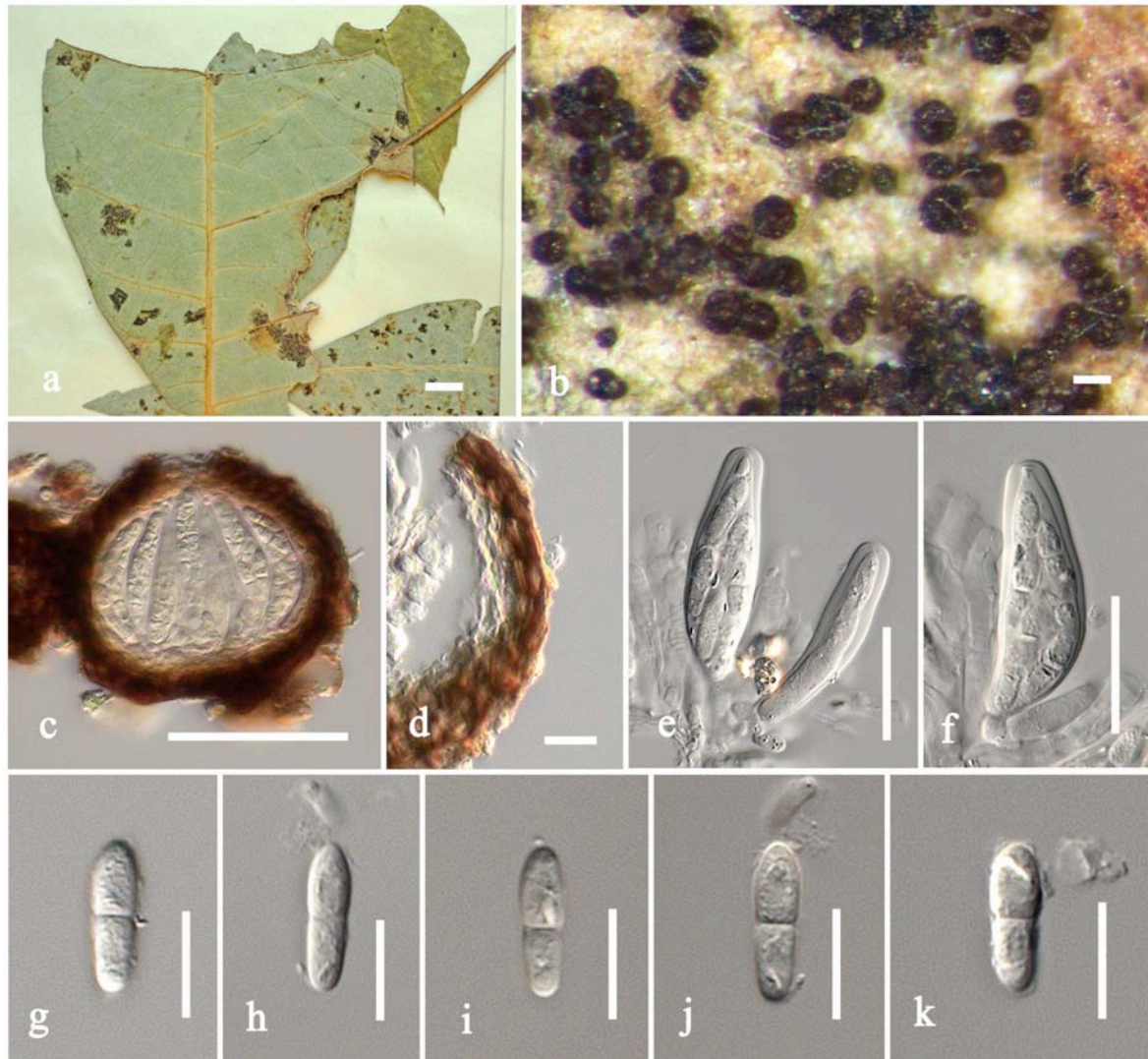


Figure 70 – *Episphaerella manihotis* (BPI 612199). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Peridium. e–f Immature and mature asci. g–k Ascospores. Scale bars: a = 100 μm, b–c = 50 μm, d, g–k = 10 μm, e, f = 20 μm.

Uleomyces Henn., Hedwigia 34: 107 (1895)

Hyperparasites, fungicolous associated with *Parmularia styracis* on living leaves. Sexual morph: *Ascostromata* irregular effuse, in parasitic matrix, crustose, raised pulvinate, hump-shaped, tuberculate, lacking hypostroma, subglobose, semi-immersed, containing locules with individual asci, lacking pseudoparaphyses, stromata context dark red, rounded. *Asci* 8-spored, bitunicate, subellipsoid to broad clavate, sessile. *Ascospores* multi-seriate, conglobate, oblong-clavate to subperiform, muriform, multi-septate, sometimes constricted at the septa, brown to dark red. Asexual morph: Undetermined.

Type species – *Uleomyces parasiticus* Henn.

Notes – *Uleomyces* was introduced by Hennings (1895) to accommodate *U. parasiticus* and was placed in the family *Hypocreaceae*. Sydow & Sydow (1917) combined five species (*Ascomycetella sanguine* Sacc, *Cookella parasitica* P. Henn., *Myriangium sanguneum* P. Henn., *Phymatosphaeria sanguine* Speg. and type species *Uleomyces parasiticus* P. Henn.), under *U. sanguineus* (Speg.) Syd. Index Fungorum (2017) lists the current name as *Uleomyces parasiticus* Henn. Moreau (1953) introduced a new family *Uleomycetaceae* (as *Uléomycétacées*) for the genus, but it was not validly published. von Arx & Müller (1975) later included *Uleomyces* in *Cookellaceae* (under *Dothideales*) based on the features of ascostroma, asci and ascospores. Barr (1997) accepted *Uleomyces* in *Cookellaceae* under (*Myriangiales*). Lumbsch & Huhndorf (2010) also listed the genus *Uleomyces* in *Cookellaceae* under *Dothideomycetes* order *incertae sedis*. The protologue of Arnaud (1925) showed that *Uleomyces sanguineus* (= *Uleomyces parasiticus*) was associated with a fungal species in *Parmulariaceae* as a large and black colony, while *Uleomyces sanguineus* was a small colony in Fig. 71 a. *Uleomyces* is characterised by being fungicolous, ascostromata that are irregular effuse, hump-shaped, tuberculate, lacking pseudoparaphyses, and muriform, multi-septate, brown to dark red ascospores. Twenty-three epithets of *Uleomyces* are listed in Index Fungorum (2017). In this study, we accept *Uleomyces* in *Myriangiaceae*, *Myriangiales* based on the characteristics of ascostromata and ascospores.

Uleomyces parasiticus Henn., Hedwigia 34: 107 (1895)

≡ *Cookella parasitica* (Henn.) Henn., Bot. Jb. 28(3): 275 (1900)

= *Phymatosphaeria sanguinea* Speg., Fungi Guarantici 2: 57 (1888)

= *Ascomycetella sanguinea* (Speg.) Sacc., Syll. fung. (Abellini) 8: 847 (1889)

= *Uleomyces sanguineus* (Speg.) Syd. & P. Syd., Annls mycol. 15(3/4): 219 (1917)

Index Fungorum number: IF166125; Facesoffungi number: FoF03682

Fig. 71

Hyperparasites, fungicolous associated with *Parmularia styracis* on living leaves of *Styrax* sp. Sexual morph: *Ascostromata* irregular effuse, in parasitic matrix, crustose, raised pulvinate, hump-shaped, tuberculate, lacking hypostroma, subglobose, semi-immersed, containing locules with individual asci, lacking pseudoparaphyses, stromata context dark red, rounded. *Asci* 60–100 × 30–50 µm, 8-spored, bitunicate, subellipsoid to broad clavate, sessile. *Ascospores* 22–32 × 11–15 µm, multi-seriate, conglobate, oblong-clavate to subperiform, muriform, multi-septate, sometime constricted at the septa, brown to dark red (from Hennings 1895). Asexual morph: Undetermined.

Nematotheciaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553836; Facesoffungi number: FoF03700

Parasitic on lower surface of living leaves. Sexual morph *Ascomata* superficial, gregarious, some solitary, with a subiculum, globose to subglobose, dark brown, with apical ostiole, covered by dark brown mycelium, with or without hyphopodia-like structures. *Peridium* comprising multi-layers of dark brown cells of *textura angularis*. *Hamathecium* comprising numerous, cylindrical, filiform, branched, septate, pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindrical-subclavate, sessile. *Ascospores* fasciculate, multi-seriate, elongate fusiform, curved or flexuous, tapering towards the acute ends, multi-septate, brown. Asexual morph: Undetermined.

Family type – *Nematothecium* Syd. & P. Syd.

Notes – The new family *Nematotheciaceae* is introduced to accommodate three parasitic genera growing on living leaves, characterized by superficial, dark pigmented ascomata, with superficial mycelia, cylindrical to subclavate, broadly ellipsoid, bitunicate asci and cylindrical to elongate fusiform, multi-septate, hyaline to light pigmented ascospores. *Nematotheciaceae* shares common characters with taxa in *Tubeufiaceae* in the features of ascomata, asci and ascospores. However, *Nematotheciaceae* differs from *Tubeufiaceae* by being parasitic and occurring on living leaves. *Nematothecium* is assigned as the type genus of the family and two genera *Nematostigma* and *Ophioparodia* are included in this family.

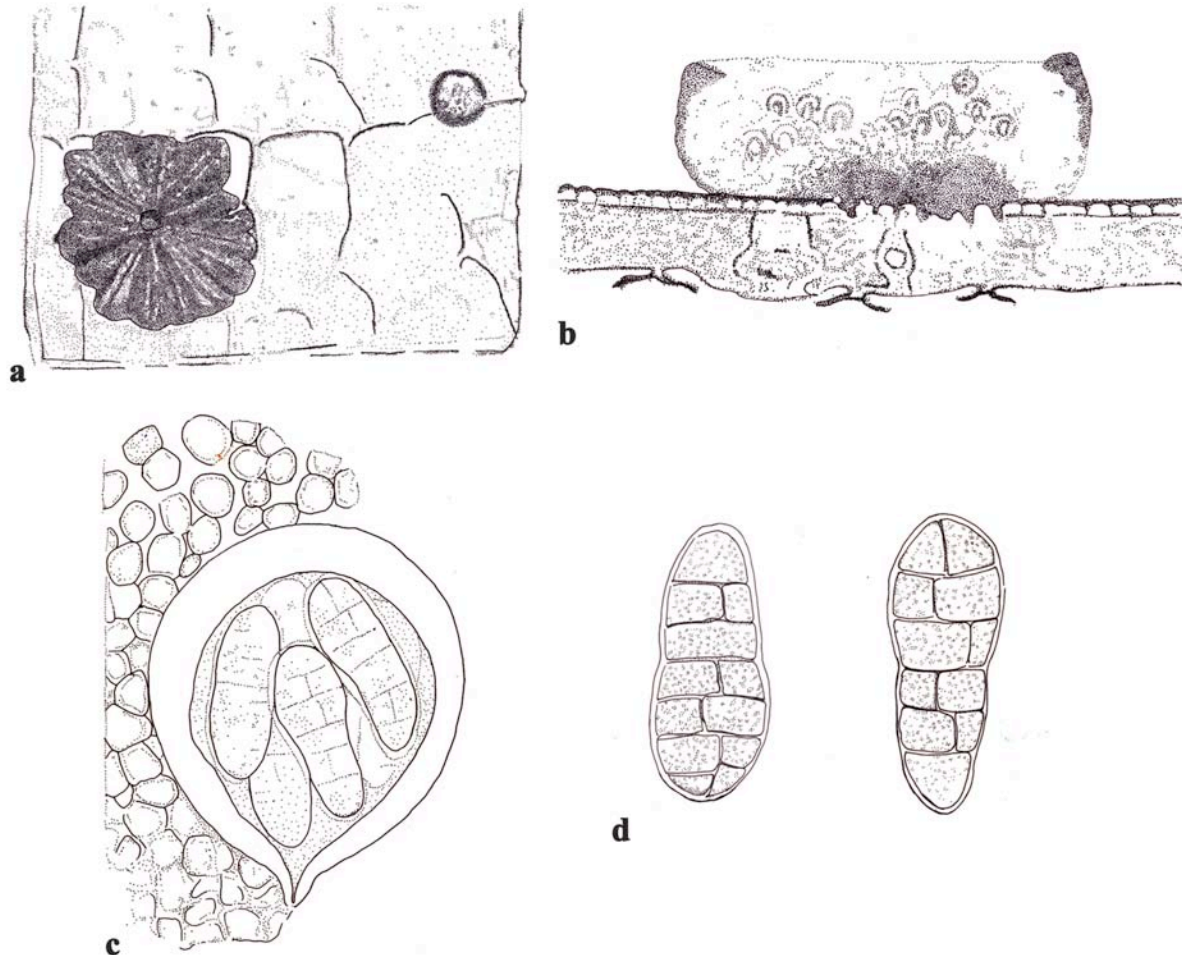


Figure 71 – *Uleomyces parasiticus* (redrawing from Plate 1 under the name *Uleomyces sanguineus*, in Arnaud 1925). a Appearance of a small ascostroma of *Uleomyces sanguineus* on leaf surface in the upper right corner and associated with a species of *Parmulariaceae* as a large and black shield-like colony in the bottom left corner. b Section of ascoma and asci. c Ascus and subglobose cells. d Ascospores.

Nematothecium Syd. & P. Syd., Leafl. of Philipp. Bot. 5: 1534 (1912)

Parasitic on lower surface of living leaves. Sexual morph *Ascomata* superficial, gregarious, some solitary, with a subiculum, globose-subglobose, dark brown, with apical ostiole, covered by dark brown mycelium. *Peridium* comprising multi-layers of dark brown cells of *textura angularis*. *Hamathecium* comprising numerous, cylindrical, filiform, branched, septate, hyaline and partly pigment pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindrical to subclavate, sessile, slightly curved. *Ascospores* fasciculate, elongate fusiform, curved or flexuous, tapering towards the acute ends, multi-septate (indistinct), hyaline when immature, brown at maturity, becoming pinkish in 5% KOH, smooth-walled. Asexual morph: Undetermined.

Type species – *Nematothecium vinosum* Syd. & P. Syd.

Notes – Sydow & Sydow (1912) described and introduced *Nematothecium* to accommodate *N. vinosum* from the Island of Palawan in the Philippines. The genus is characterized by large mycelium colonies, irregular, superficial ascomata with dark red ascomata, bitunicate asci and elongate fusiform, curved or flexuous, multi-septate, hyaline to red brown ascospores. *Nematothecium* comprises six species and has been placed in various families based on some characters (Clements & Shear 1931, Hansford 1946, von Arx and Müller 1975, Pirozynski 1977, Rossman 1987, Hawksworth et al. 1995, Barr 1997). Presently, *Nematothecium* is included in *Pseudoperisporiaceae* based on its hyperparasitic habit and bitunicate asci (Kirk et al. 2008, Lumbsch & Huhndorf 2010, Hyde et al. 2013). However, the elongate fusiform and multi-septate ascospores are typical of genera in *Tubeufiaceae*. *Nematothecium* is therefore placed in the new family *Nematotheciaceae*.

Nematothecium vinosum Syd. & P. Syd., Leaf. Philipp. Bot. 5(76): 1534 (1912)

Index Fungorum number: IF249022; Facesoffungi number: FoF03243

Figs 72, 73

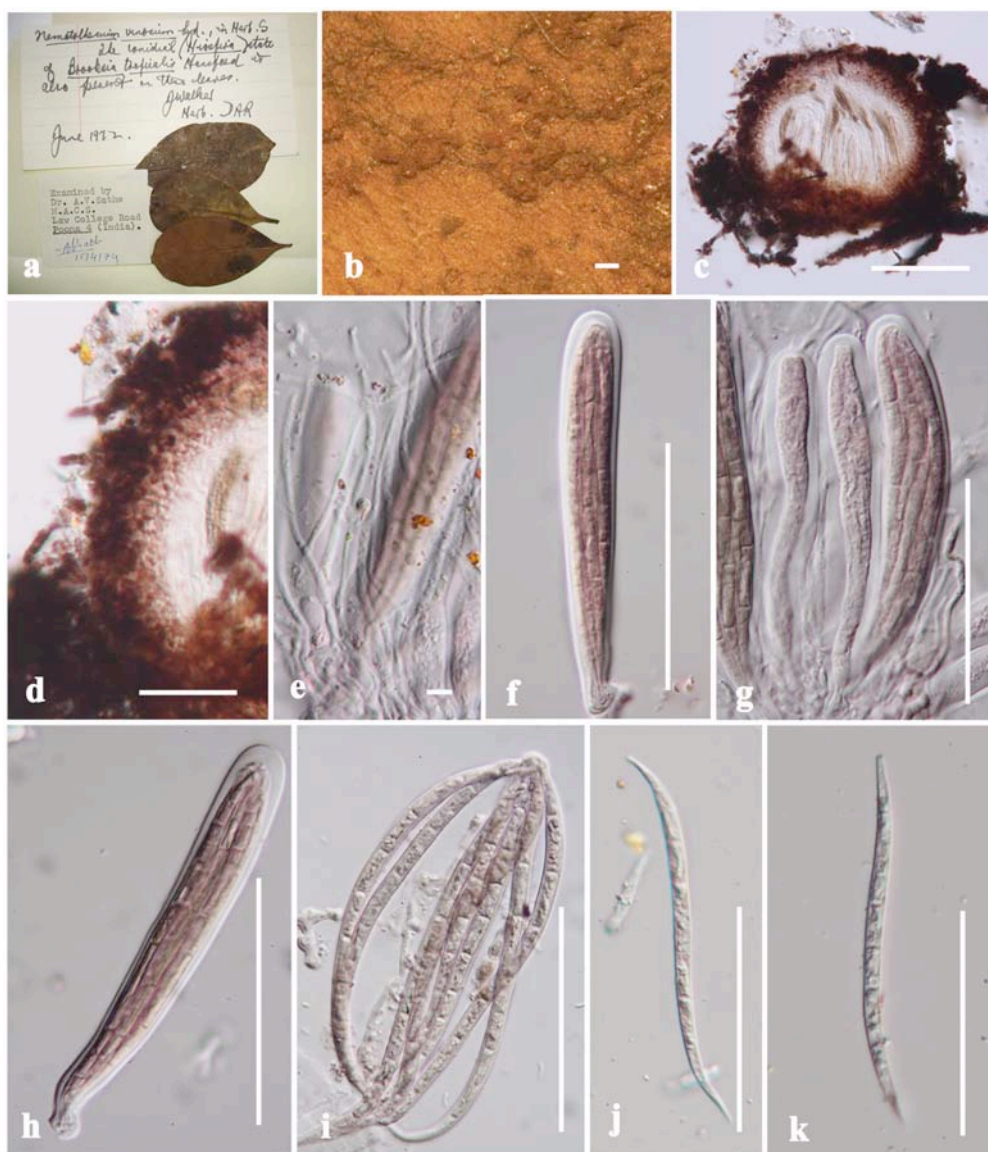


Figure 72 – *Nematothecium vinosum* (S-F10269, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Peridium. e Pseudoparaphyses. g–h Asci. i–k Ascospores. Scale bars: b = 500 μ m, c, f–k = 50 μ m, d = 40 μ m e = 5 μ m.

Parasitic on lower surface of living leaves of *Eugenia incarnata* Elmer. Sexual morph *Ascomata* 152–171(–206) μm diameter \times 165–195 μm high, superficial, gregarious, clustered, some solitary, with a subiculum, globose-subglobose, dark brown, with apical ostiole, covered by dark brown mycelium. *Peridium* 46.5–54 μm wide, comprising multi-layers of dark brown cells of *textura angularis*. *Hamathecium* 1–2 μm wide, comprising numerous, cylindrical, filiform, branched, septate, hyaline and partly pigmented pseudoparaphyses. *Asci* 81.5–94.5 \times 13–16 μm (\bar{x} = 87.5 \times 14 μm , n = 10), 8-spored, bitunicate, cylindrical-subclavate, sessile, slightly curved. *Ascospores* 74–84 \times 3–4 μm (\bar{x} = 79 \times 3 μm , n = 10), fasciculate, elongate fusiform, curved or

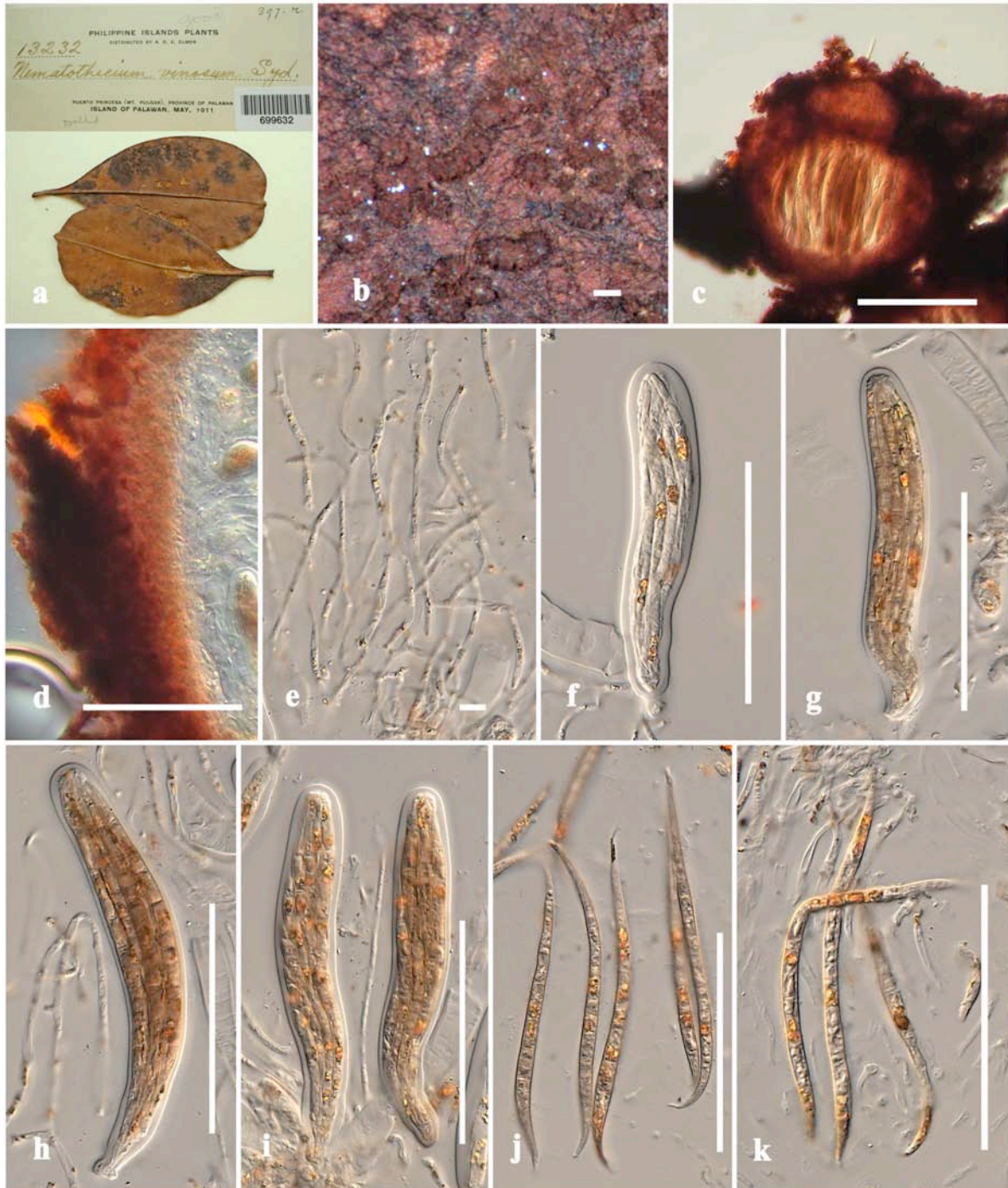


Figure 73 – *Nematothecium vinosum* (BPI 699632, lectotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Peridium. e Pseudoparaphyses. f–i Immature and mature asci. j, k Ascospores. Scale bars: b = 200 μm , c = 100 μm , d, f–k = 50 μm , e = 5 μm .

flexuous, tapering towards the acute ends, indistinctly multi-septate, not constricted at the septa, hyaline when immature, brown at maturity, becoming pinkish in 5% KOH, smooth-walled. Asexual morph: Undetermined.

Material examined – PHILIPPINES, Palawan, Island of Palawan: Puerto Princesa, Mt Pulgar, on living leaves of *Eugenia incarnata* Elmer. (*Myrtaceae*), May 1911, A.D.E. Elmer (no. 13232), (S-F10269, holotype, BPI 699632, lectotype).

Nematostigma Syd. & P. Syd., *Annls mycol.* 11(3): 262 (1913)

Parasitic on living leaves, with superficial, large colonies, irregular, mycelium appressed to cuticle of host, with outwardly radiating hyphae, 6–8 µm wide, flexuous, branched, septate, dark brown, hyphopodia-like structures present, ostiole obscure. Sexual morph: *Ascomata* superficial, globose to subglobose, grouped, unilocular, with appendage hyphae or setae, septate, dark brown, surrounded by dark brown hyphae, seated on a subiculum or hyphal pack. *Peridium* comprising dark brown cells of *textura angularis*. *Hamathecium* comprising cylindrical, branched, septate, hyaline, pseudoparaphyses. *Asci* 8-spored, bitunicate, broadly ellipsoid, oval to clavate, sessile or with short pedicel. *Ascospores* 2–3-seriate, elongate, broadly cylindrical-fusiform, slightly curved, tapering towards sub-rounded and asymmetrical ends, multi-septate, hyaline, pinkish when stained in 5% KOH, with thin gelatinous sheath, smooth to rough-walled with minute guttules. Asexual morph: Undetermined.

Type species – *Nematostigma obducens* Syd. & P. Syd.

Notes – Sydow & Sydow (1913) introduced *Nematostigma* in *Sphaeriaceae* characterized by dark brown, sparse setae, sphaerical ascomata, and hyaline, multi-septate ascospores, typified by *N. obducens*. Hansford (1946) re-examined the type specimen and illustrated the mycelium penetrating into the leaf tissues without haustoria and placed *N. obducens* in *Parodiopsidaceae* (= *Parodiellinaceae*). Based on it being parasitic on living leaves, superficial mycelial colonies, hyphae penetrating host tissues, solitary ascomata, with a subiculum, bitunicate asci and colourless to pigmented, septate ascospores, von Arx & Müller (1975) moved *Nematostigma* to *Dimeriaceae*. Eriksson & Hawksworth (1993) agreed with von Arx & Müller (1975). Hawksworth et al. (1995) included *Nematostigma* in *Pseudoperisporiaceae* and this was followed by Barr (1997), Kirk et al. (2008), Lumbsch & Huhndorf (2010) and Hyde et al. (2013). Based on its morphological characters, *Nematostigma* is included in the new family *Nematotheciaceae*.

Nematostigma obducens Syd. & P. Syd., *Annls mycol.* 11(3): 262 (1913)

Index Fungorum number: IF249044; Facesoffungi number: FoF03701

Fig. 74

Parasitic on living leaves of *Scutia indica* Brongn., with superficial, large colonies, irregular, mycelium appressed to cuticle of host, with outwardly radiating hyphae, 6–8 µm wide, flexuous, branched, septate, dark brown, 10–11 µm diameter, dark brown, hyphopodia-like structures present, ostiole obscure. Sexual morph: *Ascomata* 95–115(–179.5) µm diameter × 114–155.5(–170) µm high, superficial, globose to subglobose, grouped, unilocular, with appendage hyphae or setae, septate, dark brown, surrounded by dark brown hyphae, seated on subiculum or hyphal pack. *Peridium* 23–31 µm wide, comprising 3–4 layers of dark brown cells of *textura angularis*. *Hamathecium* 2–2.5 µm wide, comprising cylindrical, branched, septate, hyaline, pseudoparaphyses. *Asci* 83–118 × 27–45 µm (\bar{x} = 99 × 34.5 µm, n = 20), 8-spored, bitunicate, broadly ellipsoid, oval to clavate, sessile or with short pedicel. *Ascospores* 50–62 × 7–9.5 µm (\bar{x} = 56 × 8 µm, n = 20), 2–3-seriate, elongate, broadly cylindrical-fusiform, slightly curved, tapering towards sub-rounded and asymmetrical ends, 6–7-septate, hyaline, pinkish when stained in 5% KOH, with thin gelatinous sheath, smooth to rough-walled with minute guttules. Asexual morph: Undetermined.

Material examined – SOUTH AFRICA, Cape Province, Port Elizabeth, on living leaves of *Scutia indica* Brongn. (*Rhamnaceae*), 23 March 1911, E.M. Doidge (Pole Evans J.B. No. 1242), (S-F10256, holotype).

Ophioparodia Petr. & Cif., *Annl. mycol.* 30(3/4): 223 (1932)

Parasitic on the lower surface of living leaves. Sexual morph: *Ascomata* superficial, seated on a subiculum, solitary to gregarious, globose to subglobose, with apical pore, surrounded by brown mycelium. *Peridium* comprising multi-layers of brown to dark brown cells of *textura angularis*, inner layers compressed, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindrical to subclavate, sessile, slightly curved, apex rounded. *Ascospores* fasciculate, cylindrical fusiform, straight to slightly curved, multi-septate, not constricted at the septa, hyaline to pale brown, smooth-walled. Asexual morph: Undetermined.

Type species – *Ophioparodia pulchra* Petr. & Cif.

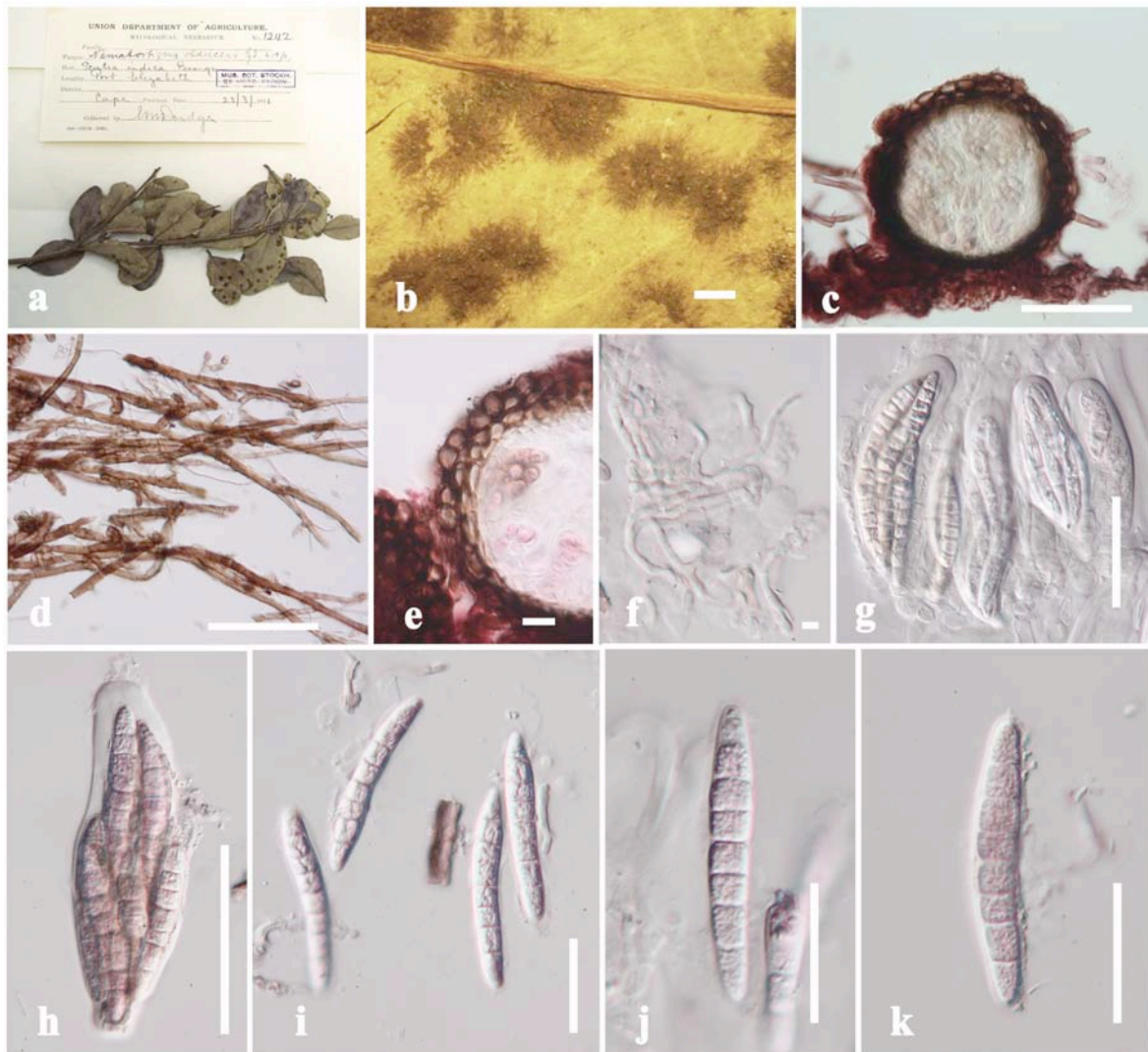


Figure 74 – *Nematostigma obducens* (S-F10256, holotype). a Herbarium specimen and habit on leaves. b Appearance of fungal colonies and ascomata on leaf surface. c Section of ascoma. d Squash mount of mycelia with hyphopodia-like structures. e Peridium. f Pseudoparaphyses. g, h Asci. i–k Ascospores. Scale bars: b = 500 μ m, c, d, g, h = 50 μ m, e, i–k = 20 μ m, f = 5 μ m.

Notes – *Ophioparodia* was introduced by Petrak & Ciferri (1932) as a monotypic genus typified by *O. pulchra* and the asexual morph was mentioned as *septoidium*. Hansford (1946) revisited the genus and placed it in *Parodiellinaceae* based on the mycelium penetrating the stomata into the plant tissues. Sivanesan (1984) re-examined the type specimen of *O. pulchra* and included the genus in the family *Parodiopsidaceae* based on its *Septoidium*-like conidia. We could not find the pseudoparaphyses in *Ophioparodia* or the asexual morph (Fig. 75). *Ophioparodia* can be distinguished from all genera in *Parodiopsidaceae* by having elongate, cylindrical, fusiform and

multi-septate ascospores. *Ophioparodia* shares common features with *Nematothecium* such as superficial, globose to subglobose, uniloculate ascomata, cylindrical asci and long, multi-septate ascospores and a hyphomycetous asexual morph. *Ophioparodia* is therefore included in *Nematotheciaceae*.

Ophioparodia pulchra Petr. & Cif. *Annls mycol.* 30(3/4): 223 (1932)

Index Fungorum number: IF275642; Facesoffungi number: FoF03702

Fig. 75

Parasitic on the lower surface of living leaves of *Tetragastris balsamifera* (Sw.) Oken. Sexual morph: *Ascomata* 187.5–235 µm diameter, superficial, seated on a subiculum, solitary to gregarious, globose to subglobose, with apical pore, surrounded by brown mycelium. *Peridium* 40–50 µm wide, comprising multi-layers of brown to dark brown cells of *textura angularis*, inner layers compressed, lacking pseudoparaphyses. *Asci* 117.5–147.5 × 15–22.5 µm (\bar{x} = 131 × 19 µm, n = 20), 8-spored, bitunicate, cylindrical to subclavate, sessile, slightly curved, apex rounded. *Ascospores* 95–145 × 5–7.5 µm (\bar{x} = 118.5 × 6 µm, n = 20), fasciculate, cylindrical fusiform, straight to slightly curved, 7-septate, not constricted at the septa, hyaline to pale brown, smooth-walled. Asexual morph: Undetermined.

Material examined – DOMINICAN REPUBLIC, Santo Domingo, Villa Altagracia, Cordillera Central, on living leaves of *Tetragastris balsamifera* (Sw.) Oken (*Burseraceae*), 18.75° – 70.5°, 7 January 1930, E.L. Ekman No. 2866 (W Krypto 1978–0005503, holotype).

Neoparodiaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553832; Facesoffungi number: FoF03683

Epiphytic or *parasitic* on living leaves. Sexual morph: *Colonies* up to 2 mm diameter, superficial, subcircular, outwardly radiating, dense, branched, septate, solitary as black spots, with dark brown mycelia. *Ascstromata* epiphyllous or hypophyllous, superficial, crustose, on a subiculum, solitary, scattered, dark brown, multi-loculate, comprising subglobose locules, thickened at the base, lacking pseudoparaphyses. *Peridium* comprising hyaline to brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, broadly clavate, oblong to obovoid, sessile or with short pedicel, apically thickened, with an acute to subacute ocular chamber. *Ascospores* overlapping 2-seriate, conglobate, broadly ellipsoid, ends rounded, each cell subglobose, 1-septate, reddish-brown to dark brown, separated by light brown regions. Asexual morph: Undetermined.

Family type – *Neoparodia* Petr. & Cif.

Notes – A new family *Neoparodiaceae* is introduced to accommodate the genus *Neoparodia* based on its morphology. The dark brown superficial, crustose and multi-loculate ascostromata of *Neoparodia ekmanii* are similar to characteristics of the genera of *Cookellaceae* and *Myriangiaceae* (Hyde et al. 2013, Dissanayake et al. 2014). *Neoparodiaceae* can be distinguished from these two families by its colonies, ascostromata, broadly clavate asci and broadly ellipsoid, 1-septate, dark brown ascospores.

Neoparodia Petr. & Cif. *Annls mycol.* 30(3/4): 219 (1932)

Epiphytic or *parasitic* on living leaves. Sexual morph: *Colonies* large up to 2 mm diameter, superficial, subcircular, with outwardly radiating, dense, branched, septate, dark brown mycelia, solitary as black spots. *Ascstromata* epiphyllous or hypophyllous, superficial, crustose, with a subiculum, solitary, scattered, dark brown, multi-loculate, comprising subglobose locules, thickened at the base, lacking pseudoparaphyses. *Peridium* comprising 2 layers of hyaline to brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, broadly clavate, oblong to obovoid, sessile or with short pedicel, apically thickened, with an acute to subacute ocular chamber. *Ascospores* overlapping 2-seriate, conglobate, broadly ellipsoid, ends rounded, each cell subglobose, 1-septate, reddish-brown to dark brown, separated by light brown regions, smooth-walled. Asexual morph: Undetermined.

Type species – *Neoparodia ekmanii* Petr. & Cif.



Figure 75 – *Ophioparodia pulchra* (W Krypto 1978–0005503, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c, d Squash mount and section of ascomata. e Close up of peridium cells. f, g Asci. h–j Ascospores. Scale bars: b = 200 μm , c, d = 100 μm , e–j = 50 μm .

Notes – *Neoparodia* was introduced by Petrak & Ciferri (1932) for a monotypic genus based on the type species *N. ekmanii*. The genus is characterized by crustose, multi-loculate ascostromata, seated on a thickened subiculum, with radial mycelia, broadly clavate asci and having conglobate, 1-septate, dark pigmented ascospores, each cell subglobose with a light brown equatorial band. Müller & von Arx (1962) placed this genus in *Perisporiopsidaceae* based on superficial structures on living leaves. Kirk et al. (2008), Lumbsch & Huhndorf (2010), Hyde et al. (2013) and Wijayawardene et al. (2014) included *Neoparodia* in *Parodiopsidaceae*. The asexual morph has been mentioned as hyphomycetous chuppia-like and sarcinella-like (Kendrick 1979, Kirk et al. 2008, Seifert et al. 2011). We observed *Neoparodia ekmanii* and its asexual morph (see Fig. 76, in

h and i). We introduce the new family *Neoparodiaceae*, because it has a suite of characters that differ from other families of *Dothideomycetes*.

Neoparodia ekmanii Petr. & Cif. *Annls mycol.* 30(3/4): 219 (1932)

Index Fungorum number: IF263814; Facesoffungi number: FoF03684

Fig. 76

Epiphytic or *parasitic* on living leaves of *Trema micrantha* (L.) Blume. Sexual morph: *Colonies* 1–1.5(–2) mm diameter, superficial, subcircular, with outwardly radiating, dense, branched, septate, dark brown mycelia, solitary as black spots. *Ascostromata* 45–187.5 µm diameter × 75–100 µm high, epiphyllous or hypophyllous, superficial, crustose, on a subiculum, solitary, scattered, dark brown, multi-loculate, comprising subglobose locules, 50–125(–140) µm diameter, each locule, thickened at the base, lacking pseudoparaphyses. *Peridium* 12.5–µm wide, comprising 2 layers of hyaline to brown cells of *textura angularis*. *Asci* 85–112.5 × 27.5–37.5 µm (\bar{x} = 99 × 32 µm, n = 10), 8-spored, bitunicate, broadly clavate, oblong to obovoid, sessile or with short pedicel, apically thickened, with acute to subacute ocular chamber. *Ascospores* 22.5–27.5 × 12.5–15 µm (\bar{x} = 26 × 13 µm, n = 10), overlapping 2-seriate, conglobate, broadly ellipsoid, ends rounded, constricted at the septum, each cell subglobose, reddish brown to dark brown, each cell subglobose with a light brown equatorial band, smooth-walled. Asexual morph: Undetermined.

Material examined – DOMINICAN REPUBLIC, Santiago, El Cerrazo, on living leaves of *Trema micrantha* (L.) Blume (*Ulmaceae*), 19.53°N, 70.62°W elev. 800 msl, 20 February 1930, P.L. Clemen No. 3518 (W Krypto 1977–0019515, holotype).

Opegraphaceae Körb. ex Stizenb. [as 'Opegrapheae'], *Ber. Tät. St Gall. naturw. Ges.*: 153 (1862) [1861–62]

Notes – The family *Opegraphaceae* was introduced by Stizenberger (1862) as 'Opegrapheae' and is typified by *Opegrapha* Ach. The family has been accepted by many mycologists, although Hawksworth et al. (1995) included the family in *Roccellaceae*. However, the family was reinstated by Ertz & Tehler (2011). The taxonomic classification of *Opegraphaceae* within *Arthoniales* has been discussed and considerably changed by various authors (Luttrell 1973, Henssen & Jahns 1974, von Arx & Müller 1975, Hawksworth & Eriksson 1986, Hawksworth et al. 1995, Ertz et al. 2009, Ertz & Tehler 2011, Frisch et al. 2014, Lücking et al. 2017). Luttrell (1973) classified *Opegraphaceae* together with *Arthoniaceae* and *Lecanactidaceae* in the order *Hysteriales* based on their ascomata having boat-shaped to linear, carbonaceous pseudothecia, opening by a longitudinal slit, somewhat similar to *Hysteriaceae* (Ertz et al. 2009). Barr (1979) agreed with Luttrell (1973) to treat *Opegraphaceae* and *Roccellaceae* in *Hysteriales*, however, she assigned *Arthoniaceae* to *Myriangiales*. von Arx & Müller (1975) accommodated *Arthoniaceae* in the order *Dothideales* but omitted the classification of *Lecanactidaceae*, *Opegraphaceae*, and *Roccellaceae*. Furthermore, Hawksworth & Eriksson (1986) introduced the new order *Opegraphales* to accommodate *Opegraphaceae* and *Roccellaceae* and accepted the species with a crustose, ecorticate thallus and lecideine ascomata in *Opegraphaceae*. However, Ertz & Tehler (2011) confirmed the taxonomic placement of *Opegraphaceae* in *Arthoniales* based on the phylogenetic analysis of a combined LSU and RPB2 sequence data. Based on phylogenetic analyses of a combined LSU, mtSSU and RPB2 dataset, Ertz et al. (2009) accepted the genera *Chiodecton*, *Enterographa*, *Erythrodictyon*, *Lecanactis*, *Opegrapha*, and *Schismatomma* in *Opegraphaceae*. Subsequently, Ertz & Tehler (2011) resurrected the genera *Combea*, *Dictyographa*, *Dolichocarpus*, *Ingaderia*, *Llimonaea flexuosa*, *Paralecanographa*, *Paraingaderia*, *Paraschismatomma*, *Pentagenella*, *Schizopelte* and *Sparria* in *Opegraphaceae*. Lücking et al. (2017) accepted 15 genera in *Opegraphaceae* viz. *Combea*, *Cresponea*, *Dictyographa*, *Dolichocarpus*, *Fouragea*, *Ingaderia*, *Llimonaea*, *Nyungwea*, *Opegrapha*, *Paraingaderia*, *Paraschismatomma*, *Pentagenella*, *Schizopelte*, *Sclerophyton* and *Sparria*.

Opegrapha Ach., *K. Vetensk-Acad. Nya Handl.* 30: 97 (1809)

= *Kalaallia* Alstrup & D. Hawksw., *Meddr Grønland, Biosc.* 31: 38 (1990)

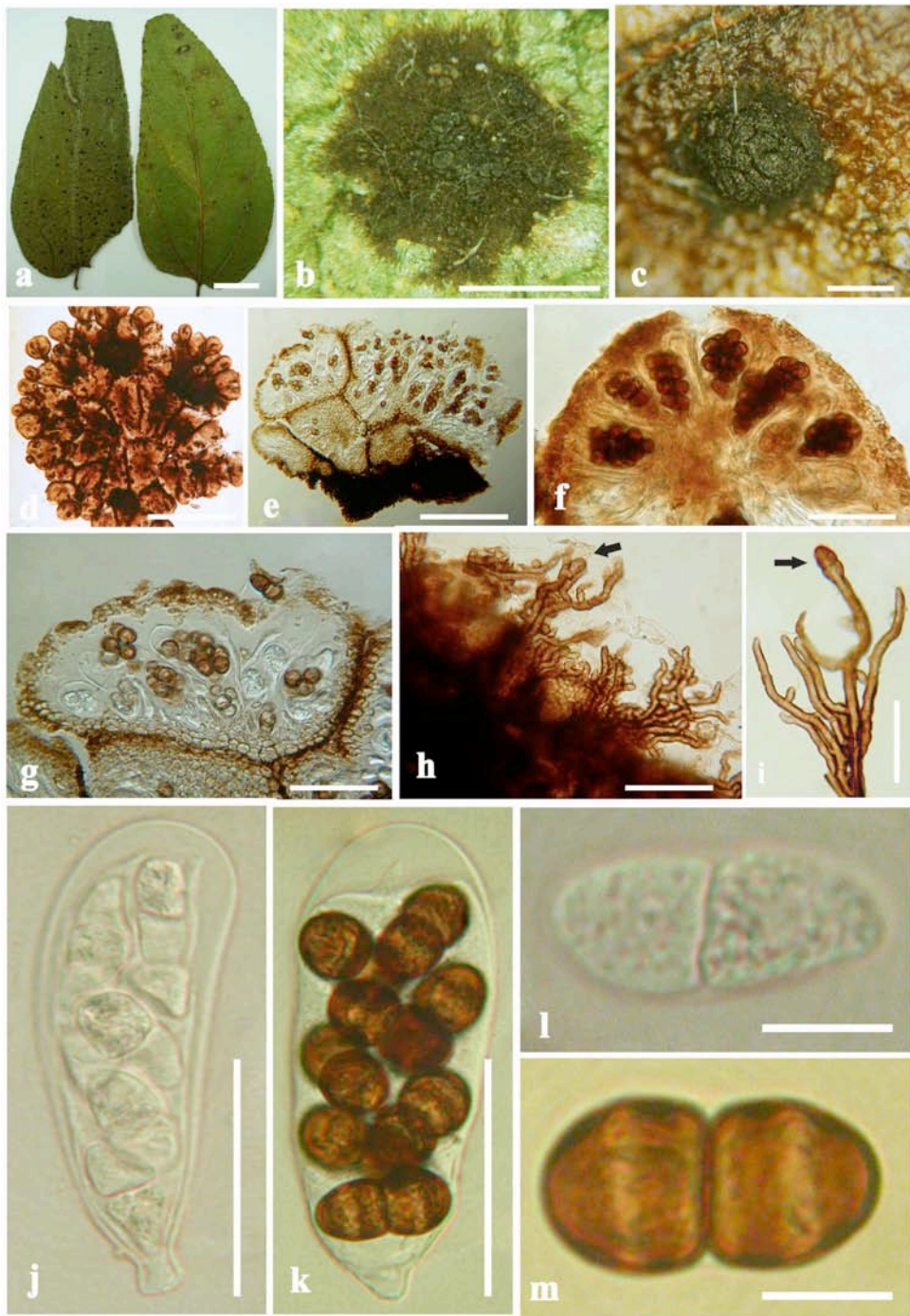


Figure 76 – *Neoparodia ekmanii* (W Krypto 1977–0019515, holotype). a Herbarium specimen and habit on leaves. b Appearance of colony and ascostromata seated on mycelium. c Close up of ascostroma. d Squash mount of ascostroma. e Section of ascomal locules. f, g Close up of ascomal locules. h Mycelium radiating outwardly and apical conidia-like structures (arrow). i Anastomosing and branched mycelium and apical conidium-like spores. j, k Immature and mature asci. l, m Immature and mature ascospores. Scale bars: a = 5 mm, b = 1 mm, c–g = 100 μ m, h–k = 50 μ m, l, m = 10 μ m.

Lichenicolous on *Hymenelia lacustris*. Sexual morph: *Ascomata* perithecial, arising in loose groups, forming patches up 0.2 mm diameter, black, immersed to erumpent on the host thallus, globose to subglobose, clustered, gregarious, ostiole discrete to gaping, with apical pore. *Peridium* unequally thick, comprising apically thickened, loose hyphae of brown to dark brown pseudoparenchymatous cells, somewhat olivaceous in 5% KOH, arranged in a *textura porrecta*.

Hamathecium comprising dense, branched, distinctly septate, anastomosed, cellular pseudoparaphyses, with I⁺, pale blue centrum. *Asci* 8-spored, bitunicate, clavate to cylindrical-clavate, with short pedicel, apex rounded, with a well-developed ocular chamber, apically thickened. *Ascospores* overlapping 2–3-seriate, hyaline or yellowish when stained by Lugol's iodine, ellipsoidal to fusiform, with round to acute ends, 1–3-septate, sometimes constricted at the septa, smooth-walled. Asexual morph: Undetermined.

Type species – *Opegrapha vulgata* (Ach.) Ach.

Notes – *Opegrapha* was introduced by Acharius (1809) to accommodate taxa forming, oblong-elongate, membranaceous apothecia, which are black at the apex, and pseudoparenchymatous cells, making up a crustaceous thallus. *Opegrapha* is a large and cosmopolitan genus comprising more than 1600 epithets and with over 361 species of lichenized and lichenicolous species (Kirk et al. 2008, Joseph & Sinha 2012, Index Fungorum 2017). The genus is polyphyletic with several species nested in all the major clades identified within *Arthoniales* (Ertz et al. 2009, Ertz & Tehler 2011). The polyphyletic status of *Opegrapha* can only be partly explained by morphological characters and this led to the problem for choosing the morphological character reflecting monophyletic groups (Ertz et al. 2009). However, *Opegrapha sensu stricto* based on the type species, *O. vulgata* formed a well-resolved lineage with other related genera within *Opegraphaceae* (Ertz & Tehler 2011). To resolve the polyphyly of *Opegrapha*, new genera need to be designated for *Opegrapha* species *sensu lato* (Ertz et al. 2009, Ertz & Tehler 2011).

Kalaallia was introduced by Alstrup & Hawksworth (1990) as a monotypic genus to accommodate the lichenicolous species *K. reactiva* Alstrup & D. Hawksw., which was collected from *Hymenelia lacustris* (*Hymeneliaceae*) in Greenland. The genus was placed in *Dothideales*, but was unusual in that the apex of the internal apical asci were J⁺, with a cylindrical annulus (Alstrup & Hawksworth 1990). Therefore, Alstrup & Hawksworth (1990) tentatively placed the genus in *Dacampiaceae* based on its cellular pseudoparaphyses. Etayo & Sancho (2008) treated *Kalaallia* as a synonym of *Opegrapha* and thus a new combination, *Opegrapha reactiva* was proposed, despite the presence of perithecia. The species is distributed in Chile, Greenland, UK and Luxembourg (Coste 2014).

Opegrapha reactiva (Alstrup & D. Hawksw.) Etayo & Diederich, *Bibliotheca Lichenol.* 98: 159 (2008)

≡ *Kalaallia reactiva* Alstrup & D. Hawksw., *Meddr Grønland, Biosc.* 31: 39 (1990)

Index Fungorum number: IF536940; Facesoffungi number: FoF03685

Fig. 77

Lichenicolous on *Hymenelia lacustris* (With.) M. Choisy. Sexual morph: *Ascomata* 70–200 µm diameter × 110–150 µm high, [Alstrup & Hawksworth (1990): (50–)60–100 µm diameter], perithecial, arising in loose groups, forming patches up 0.2 mm diameter, black, immersed to erumpent on the host thallus, globose to subglobose, gregarious, ostiole discrete to gaping, with apical pore. *Peridium* 6–25 µm wide, unequally thick, apically thickened [Alstrup & Hawksworth 1990: reaching to 40 µm diameter], loose hyphae of brown to dark brown pseudoparenchymatous cells, somewhat olivaceous in 5% KOH, arranged in a *textura porrecta*. *Hamathecium* comprising 1–2 µm wide, dense, branched, distinctly septate, anastomosed, cellular pseudoparaphyses, with I⁺, pale blue centrum. *Asci* (57–)60–76 × (9–)10–12(–14) µm (\bar{x} = 65 × 11 µm, n = 10) [Alstrup & Hawksworth (1990): 55–65 × 10–12 µm], 8-spored, bitunicate, clavate to cylindrical-clavate, with short pedicel, apex rounded, with well-developed ocular chamber, apically thickened. *Ascospores* (8–)9–13(–14) × 2.5–3.5(–4) µm (\bar{x} = 11 × 3 µm, n = 15) [Alstrup & Hawksworth (1990): (17.5–)20–24 × 5–7 µm], overlapping 2–3-seriate, hyaline or yellowish when stained by Lugol's iodine, ellipsoidal to fusiform, with round to acute ends, 1–3-septate, sometimes constricted at the septa, smooth-walled. Asexual morph: Undetermined.

Material examined – GREENLAND, Norssay District, Alangorssuaq, altitude 70 m., on *Hymenelia lacustris* (With.) M. Choisy (*Hymeneliaceae*), 3 August 1980, V. Alstrup 801282 (IMI331017, ex herb. = K (M) 177966 slide, holotype).



Figure 77 – *Opegrapha reactiva* (K (M) 177966, holotype). a Label of specimen. b, c Sections of ascomata. d Peridium. e Pseudoparaphyses. f–h Ascospores. i, j Asci. Scale bars: b, c = 100 μm , d, e, i, j = 10 μm , f–h = 5 μm .

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

In their phylogenetic analysis, *Parmularia* species represented a monophyletic clade outside *Asterinales sensu stricto* (Hyde et al. 2016). However, more sequence data are needed to confirm the placement of this family.

Inocyclus Theiss. & Syd., Anns mycol. 13(3/4): 211 (1915)

Epifoliar on surface of living leaves. Sexual morph: *Ascstromata* superficial, appearing as black circular domes, solitary to clustered, globose to subglobose, comprising multi-locules, dark brown to black. *Peridium* comprising 2 layers of dark brown cells of *textura oblita*, outer layer composed thick and pigmented, inner layer thin and hyaline. *Asci* 8-spored, bitunicate, cylindrical to obovoid with short and rounded pedicel, with ocular chamber. *Ascospores* 1-septate, ovoid with upper cell broader and longer, slightly constricted and pale brown to brown at the septum, surface of spore smooth, hyaline when immature and pale brown to brown at maturity. Asexual morph: Undetermined.

Type species – *Inocyclus psychotriae* (Syd. & P. Syd.) Theiss. & Syd.

Notes – *Inocyclus* was introduced by Theiss and Sydow (1915), with the type species *I. psychotriae*. The genus was accepted in *Parmulariaceae* based on morphological characters (Guatimosim et al. 2014). *Inocyclus* differs from *Polycyclus* in having a gelatinous ascal layer with a strong amyloid reaction, and irregularly or radially arranged locules. Inácio and Cannon (2008) designated specimens of *I. psychotriae* in K as lectotype, and in NY as isolectotype because the type material has not been seen. Guatimosim et al. (2015) used sequence data of *I. angularis* in their phylogenetic tree and concluded that the phylogeny of *Inocyclus* in *Parmulariaceae* is

unresolved because sequence data of type species is unavailable. The morphology of *I. psychotriae* (Fig. 78) differs from *I. angularis* by having hypophyllous, with verrucous surface ascostromata, uniseptate at the lower part of ascospores, while *I. angularis* has amphigenous ascostromata, locules arranged in one-two rings, with an undulated surface, uniseptate at the centre of the ascospores. *Inocyclus angularis* is quite different from other species in *Inocyclus* (Inácio and Cannon 2008), and it might be not a species in this genus. *Inocyclus* is somewhat similar to *Mendogia* Racib., it however differs from *Mendogia* in having superficial external ascostromata, with radiating cells, uniseptate ascospores. *Mendogia* has carbonaceous ascostromata, muriform ascospores (Dai et al. 2017). Phylogenetic analysis in Hyde et al. (2016) indicated that *I. angularis* strains were within *Asterinales sensu stricto* and sister to *Asterotexis* species. Base on the morphological differences between *I. angularis* and type species, and unavailability of sequence data of type species, we therefore suggest the placement of *Inocyclus* in *Parmulariaceae*. However, a fresh collection of *I. psychotriae* (type species) is needed to clarify the correct placement of this genus.

Inocyclus psychotriae (Syd. & P. Syd.) Theiss. & Syd. 1915

≡ *Hysterostomella psychotriae* Syd. & P. Syd., Philipp. J. Sci., C, Bot. 8(4): 275 (1913)

= *Dielsiella psychotriae* (Syd. & P. Syd.) Hansf., Mycol. Pap. 15: 170 (1946)

Index Fungorum number: IF174208; Facesoffungi number: FoF03712

Fig. 78

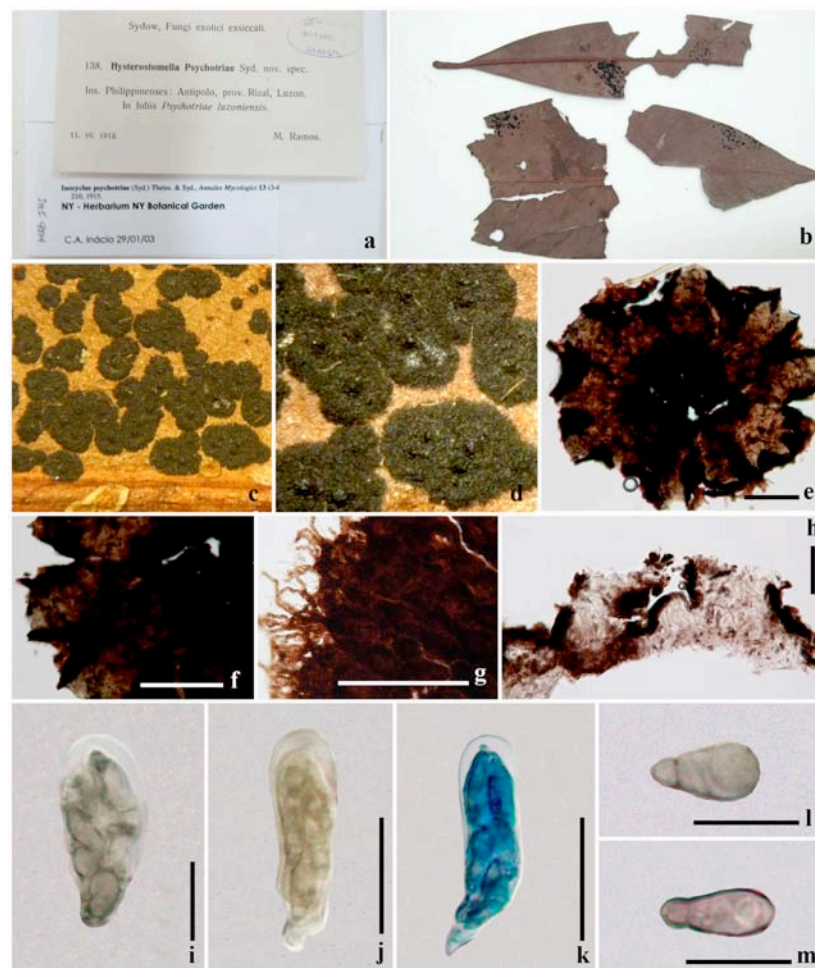


Figure 78 – *Inocyclus psychotriae* (NY 01840454, isolectotype). a, b Herbarium specimen and habit on leaves. c, d Appearance of ascostromata with locules at the center on leaf surface. e Squash mount of ascostromata. f, g Structure of ascostromata from above and below. h Section of ascostromata. i Asci at maturity. j Asci in Melzer's reagent. k Asci in Cotton blue reagent. l Ascospore in Melzer's reagent. m Ascospore in 70% Lactic acid. Scale bars: e–g = 100 μ m, h = 50 μ m, i–k = 20 μ m, l, m = 10 μ m.

Epifoliar on surface of living leaves of *Psychotria luconiensis* (Cham. & Schltdl.) Fern.-Vill. Sexual morph: *Ascostromata* 78–87 µm diameter × 520–579 µm high, superficial, appearing as black domes, solitary to clustered, globose to subglobose, comprising multi-locules, dark brown to black. *Peridium* comprising 2 layers of dark brown cells of *textura oblita*, outer layer thick and pigmented, inner layer thin and hyaline. *Asci* 28–38 × 8–10 µm (\bar{x} = 32 × 9 µm, n = 10), 8-spored, bitunicate, cylindrical to obovoid, with short and rounded pedicel, with ocular chamber. *Ascospores* 9–11 × 3–4 µm (\bar{x} = 10 × 3 µm, n = 10), uniseptate, ovoid with upper cell broader and longer, slightly constricted and pale brown to brown at the septum, surface of spore smooth, hyaline when immature and pale brown to brown at maturity. Asexual morph: Undetermined.

Material examined – PHILIPPINES, Luzon, Rizal, Antipolo, on leaves of *Psychotria luconiensis* (Cham. & Schltdl.) Fern.-Vill. (*Rubiaceae*), 11 October 1912, M. Ramos, no. 138 (NY 01840454, isoelectotype).

Perisporiopsidaceae E. Müll. & Arx ex R. Kirschner & T.A. Hofm.
(= *Parodiopsidaceae* Toro)

Parasitic on living leaves of various plants. Sexual morph: *Ascomata* superficial, gregarious, solitary, seated on a subiculum, globose to subglobose, obovoid, brown, with apical ostiole. *Peridium* relatively thick-walled, comprising dark brown cells of *textura angularis*. *Hamathecium* comprising 4–5 µm, branched, septate, anastomosed, hyaline pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, broadly ellipsoid, apically thickened, with an ocular chamber, short pedicellate. *Ascospores* 2–3-seriate, ellipsoidal-oblong or fusiform, slightly curved and tapering toward the ends, 1-septate, hyaline, sometimes pale-yellow brown, with granulate cells, smooth-walled. Asexual morph: Undetermined.

Family type – *Perisporiopsis* Henn.

Notes – *Perisporiopsidaceae* comprises species occur on living leaves, with superficial ascomata with surrounding mycelia, and ellipsoidal oblong, 1 or more septate, hyaline ascospores (Hyde et al. 2013). We accept three genera *Chevalieropsis*, *Parodiellina* and *Perisporiopsis* in the family.

Parodiellina P. Henn. ex G. Arnaud, Annals d'École National d'Agric. de Montpellier, Série 2 16(1-4): 21 (1918) [1917]

Parasitic on the lower surface of living leaves. *Colonies* large, superficial, circular to subcircular, comprised of numerous ascomata, on brown to dark brown spots. Sexual morph: *Ascomata* superficial, seated on subiculum, unilocular, globose to subglobose, thick at the base, solitary to gregarious, dark brown to black, pore central, surrounded by dark brown setae, septate, sometimes branched at the base. *Peridium* compressed, comprising dark brown cells of *textura angularis*. *Hamathecium* comprising wide, septate, hyaline to pale brown, sparse pseudoparaphyses. *Asci* 8-spored, bitunicate, broadly obovoid to subclavate, thick-walled, pedicellate. *Ascospores* oval to ellipsoid, obovoid-clavate, aseptate, hyaline to light brown, smooth-walled. Asexual morph: hyphomycetous, sporodochial, with phragmosporous conidia. *Colonies* large, superficial, circular to subcircular, clustered, comprised of numerous sporodochia, as dark brown spots. *Sporodochia* superficial, pulvinate, cushion-like, clustered, dark brown, with erect setae, branched at the base, septate, dark brown. *Conidiophores* erect, mononematous, macronematous, thick-walled, unbranched, septate, hyaline, pale brown to dark brown, smooth-walled, arranged in the sporodochia in a palisade manner. *Conidiogenous cells* ellipsoid, pale to moderately brown, holoblastic to annellidic, with conspicuous annellations. *Conidia* solitary, ellipsoidal to clavate, truncate at the base, apex rounded, hyaline, becoming brown to red brown when mature, 2-euseptate, constricted at the septa, smooth-walled.

Type species – *Parodiellina manaosensis* (Henn.) G. Arnaud

Notes – *Parodiellinaceae* and *Parodiellina* were introduced by Arnaud (1918) to accommodate a species distinguished from the genus *Parodiella* Henn. The genus is typified by *Parodiellina manaosensis* (= *Parodiella manaosensis* Henn.) which was described by Hennings

(1904). The genus is characterized by oval to ellipsoid, obovoid-clavate, aseptate ascospores and a conspicuous sporodochial asexual morph. Aseptate ascospores and conidial features differ from all genera in *Perisporiopsidaceae* (= *Parodiopsidaceae*). *Parodiellina* has been placed in various families and orders based on characters of ascomata, ascospores and the asexual morph (Gäumann & Dodge 1928, Hansford 1946, Müller & von Arx 1950). The proposed family name *Parodiellinaceae* is invalid (ICBN Art. 32.1(c) and Art. 36.1, Index Fungorum 2017). Luttrell (1955) re-visited the type species of *Parodiellina* (*P. manaosensis*) and placed the genus in the family *Perisporiopsidaceae* based on its bitunicate asci. Lumbsch & Huhndorf (2010) included *Parodiellina* in the family *Parodiopsidaceae* (current name *Perisporiopsidaceae*). However, *Parodiellina* has dark ascomata, broadly obovoid to subclavate, thick-walled asci and aseptate, oval to ellipsoid, hyaline ascospores. Therefore, *Parodiellina* can be placed in the family *Perisporiopsidaceae*.

Parodiellina manaosensis (Henn.) G. Arnaud, Annals d'École National d'Agric. de Montpellier, Série 2 16(1-4): 21 (1918) [1917]

≡ *Parodiella manaosensis* Henn., Hedwigia 43: 358 (1904)

= *Parodiopsis manaosensis* (Henn.) Arnaud, Bull. Soc. Mycol. France: 23 (1915)

= *Auerswaldiella manaosensis* (Henn.) Arx & E. Müll., Beiträge zur Kryptogamenflora der Schweiz 11 (1): 67 (1954)

Index Fungorum number: IF222829; Facesoffungi number: FoF03686

Figs 79, 80

Parasitic on the lower surface of living leaves of *Solanaceae*. *Colonies* large, superficial, circular to subcircular, comprised of numerous ascomata, on brown to dark brown spots. Sexual morph: *Ascomata* 200–250 µm diameter, superficial, seated on a subiculum, unilocular, globose to subglobose, thick at the base, solitary to gregarious, dark brown to black, pore central, surrounded by dark brown setae, 88(–137)–255 µm long × 5–8 µm wide, septate, sometimes branched at the base. *Peridium* 40–50 µm wide, comprising dark brown cells of *textura angularis*. *Hamathecium* comprising wide, septate, hyaline to pale brown, obscure pseudoparaphyses. *Asci* 137–158.5 × 33–47 µm (\bar{x} = 148 × 37 µm, n = 10), 8-spored, bitunicate, broadly obovoid to subclavate, thick-walled, pedicellate. *Ascospores* 38–52 × 13–16 µm (\bar{x} = 43 × 14 µm, n = 10), oval to ellipsoid, obovoid-clavate, aseptate, hyaline to light brown, smooth-walled. Asexual morph: hyphomycetous. *Colonies* large, superficial, circular to subcircular, clustered, comprised of numerous sporodochia, on dark brown spots. *Conidiomata* sporodochial, 600–985(–1,330) µm diameter, superficial, cushion-like, clustered, dark brown, with erect setae, 110–278 µm long × 6–8.5 µm wide, branched at the base, septate, dark brown. *Conidiophores* 34–56 µm × 8–8.5 µm (\bar{x} = 42 × 8 µm, n = 10), erect, mononematous, macronematous, thick-walled, unbranched, septate, hyaline, pale brown to dark brown, smooth-walled, arranged in the sporodochia in a palisade manner. *Conidiogenous cells* ellipsoid, pale to moderately brown, holoblastic to annellidic, with conspicuous annellations. *Conidia* 49–60 × 14–18 µm (\bar{x} = 55 × 17 µm, n = 10), solitary, ellipsoidal to clavate, truncate at the base, apex rounded, hyaline, becoming brown to red brown when mature, 2-euseptate, constricted at the septa, smooth-walled.

Material examined – BRAZIL, Amazonas, Manaus (= Manáos), Rio Negro, on living leaves of *Solanaceae* Juss., January 1901, E.H.G. Ule No. 3027 (PC0084489, holotype = B700014750, syntype).

Perisporiopsis Henn. Hedwigia 43(2): 83 (1904)

Parasitic on living leaves. Sexual morph: *Ascomata* superficial, solitary to gregarious, seated on a subiculum, globose to subglobose, obovoid, brown, with apical ostiole. *Peridium* relatively thick-walled, comprising dark brown cells of *textura angularis*. *Hamathecium* comprising branched, septate, anastomosed, hyaline, pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, broadly ellipsoid, with short pedicel, apically thickened, with an ocular chamber. *Ascospores* 2–3-seriate, ellipsoidal-oblong or fusiform, slightly curved and tapering toward the ends, 1-septate,

hyaline, sometimes pale-yellow brown, with granulate cells, smooth-walled. Asexual morph: Undetermined. (Kirk et al. 2008, Seifert et al. 2011).

Type species – *Perisporiopsis struthanthi* Henn.



Figure 79 – *Parodiellina manaosensis* (PC0084489, holotype). a Appearance of colonies on lower leaf surface, ascomata and habit on leaf. b Setae. c Section of ascoma. d Peridium. e Obscure pseudoparaphyses. f–h Asci. i Ascospores. j Conidiophores. k, l Close up of conidiophores and conidia. m Conidia. Scale bars: a = 500 μm , b, d, f–h, l = 50 μm , c = 100 μm , e = 5 μm , i–k, m = 20 μm .

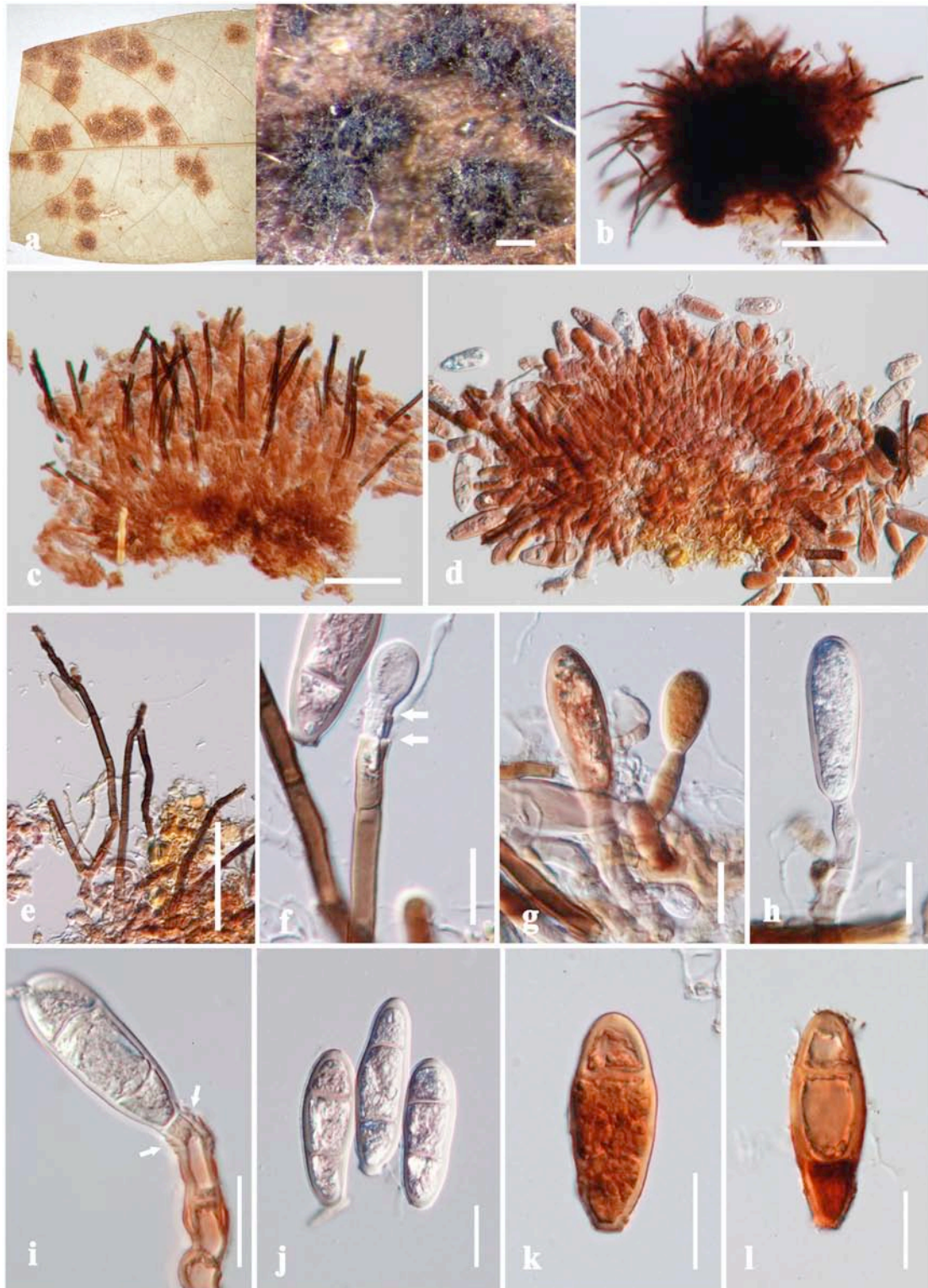


Figure 80 – Asexual morph of *Parodiellina manaosensis* (B700014750, syntype). a Appearance of colonies and sporodochia on lower leaf surface. b Squash mount of sporodochium. c–d Section of sporodochium. e Setae. f Conidiogenous cell with annellations and developing conidium at the apex. g, h Immature conidia. i Detail of apical conidiophore and conidium (annellation as arrows). j–l Conidia. Notes: Conidia and tissues changed to pinkish in 5% KOH (in Figs f and j). Scale bars: a, b = 200 μ m, c–e = 100 μ m, f–l = 20 μ m.

Notes – Hyde et al. (2013) examined, illustrated and described the holotype specimen of *Perisporiopsis struthanthi* Henn. (PC0084481) and used the family name *Perisporiopsidaceae*

following Kirschner et al. (2010), while *Parodiellinaceae* and *Parodiopsisaceae* were suggested to be synonyms of *Perisporiopsisaceae*. The genus is characterized by superficial dark ascomata, lacking hyphopodia, indistinct pseudoparaphyses, broadly clavate asci and ellipsoidal oblong, septate, hyaline ascospores. Currently, Index Fungorum (2017) lists 20 epithets under *Perisporiopsis*. The asexual morph was referred to the genus *Septoidium* (Eriksson 1981, Kirk et al. 2008, Seifert et al. 2011), but we could not find the asexual morph on the type specimen. Epitypification and molecular sequence data are needed to determine the phylogenetic placement of the family in *Dothideomycetes*.

Perisporiopsis struthanthi Henn., Hedwigia 43: 83 (1904)

= *Parodiopsis struthanthi* (Henn.) G. Arnaud, Anns Épiphyt. 7: 54 (1921)

= *Perisporina struthanthi* (Henn.) Hansf., Proc. Linn. Soc. London 157: 144 (1946)

Index Fungorum number: IF216818; Facesoffungi number: FoF03687

Fig. 81

Parasitic on living leaves of *Struthanthus* sp. Sexual morph: *Ascomata* 263.5–272 µm diameter × 257–267.5(–366.5) µm high, superficial, solitary to gregarious, seated on a subiculum, globose to subglobose, obovoid, brown, with apical ostiole. *Peridium* (34–)40–46 µm wide, relatively thick-walled, comprising dark brown cells of *textura angularis*. *Hamathecium* 4–5 µm, comprising branched, septate, anastomosed, hyaline, pseudoparaphyses. *Asci* (121–)141–157(–171) × 32–45(–49) µm (\bar{x} = 145 × 41 µm, n = 10), 8-spored, bitunicate, fissitunicate, broadly ellipsoid, with short pedicel, apically thickened, with an ocular chamber. *Ascospores* 52.5–62 × 9–13 µm (\bar{x} = 56 × 12 µm, n = 10), 2–3-seriate, ellipsoidal-oblong or fusiform, slightly curved and tapering toward the ends, 1-septate, hyaline, sometimes pale-yellow brown, with granulate cells, smooth-walled. Asexual morph: Undetermined. Notes: The asexual morph as described in Eriksson (1981) was not observed.

Material examined – BRAZIL, Rio de Janeiro, Estado de Rio de Janeiro, Serra dos Orgaos, on leaves of *Struthanthus* sp. (*Apocynaceae*), August 1899, E.H.G. Ule No. 2631 (S-F9814, holotype).

Chevalieropsis G. Arnaud, Anns Épiphyt. 9: 2 (1923)

Parasitic on living leaves. Sexual morph: *Stromata* up to 1 mm diameter, comprising more than 10 ascomata, clustered to solitary, semi-immersed and thick at the base, asexual morph possibly associated with dark brown conidiophores, minutely multi-denticulate, with subglobose and hyaline, septate, unbranched conidia, pale at the apex, and darkened and wider at the base. *Ascomata* superficial, grouped, subglobose, uniloculate, dark brown, formed in a stroma, with a subiculum, slightly substipitate, thickened base. *Peridium* comprising hyaline to dark brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, obovoid, obpyriform to clavate, sessile or with short pedicel, thick-walled and multi-layer at the apex, with small ocular chamber. *Ascospores* 2–3-seriate, obovoid, apex wider, narrower towards the lower and pointed base, 1–4-septate, slightly constricted at the septum, hyaline to pale brown or reddish-brown, sometimes guttulate, slightly verruculose. Asexual morph: *Septoidium* sp.

Type species – *Chevalieropsis ctenotricha* (Pat. & Har.) G. Arnaud

Notes – Arnaud (1923) introduced the monotypic genus *Chevalieropsis* with the type species *C. ctenotricha* which is recognized by superficial ascostromata, with thick-walled asci and 1–4-septate, hyaline to pale brown ascospores. Moreau & Moreau (1955) described two types of asexual conidia associated with *C. ctenotricha* on leaves of *Daniella oliveri* (*Detarioideae*), which were similar to species in the genus *Septoidium*. Sivanesan (1984) re-examined and described *C. ctenotricha* and its asexual conidia, and found this species differed from *Perisporiopsis lophirae* in the number of septa. Eriksson (1999) included *Chevalieropsis* in *Parodiopsisaceae* and treated it as order *incertae sedis*. Hyde et al. (2013) revised the family which is characterized by “occurrence on living leaf surfaces as mycelium with superficial ascomata”, therefore the genus should be placed in *Perisporiopsisaceae* (= *Parodiopsisaceae*).

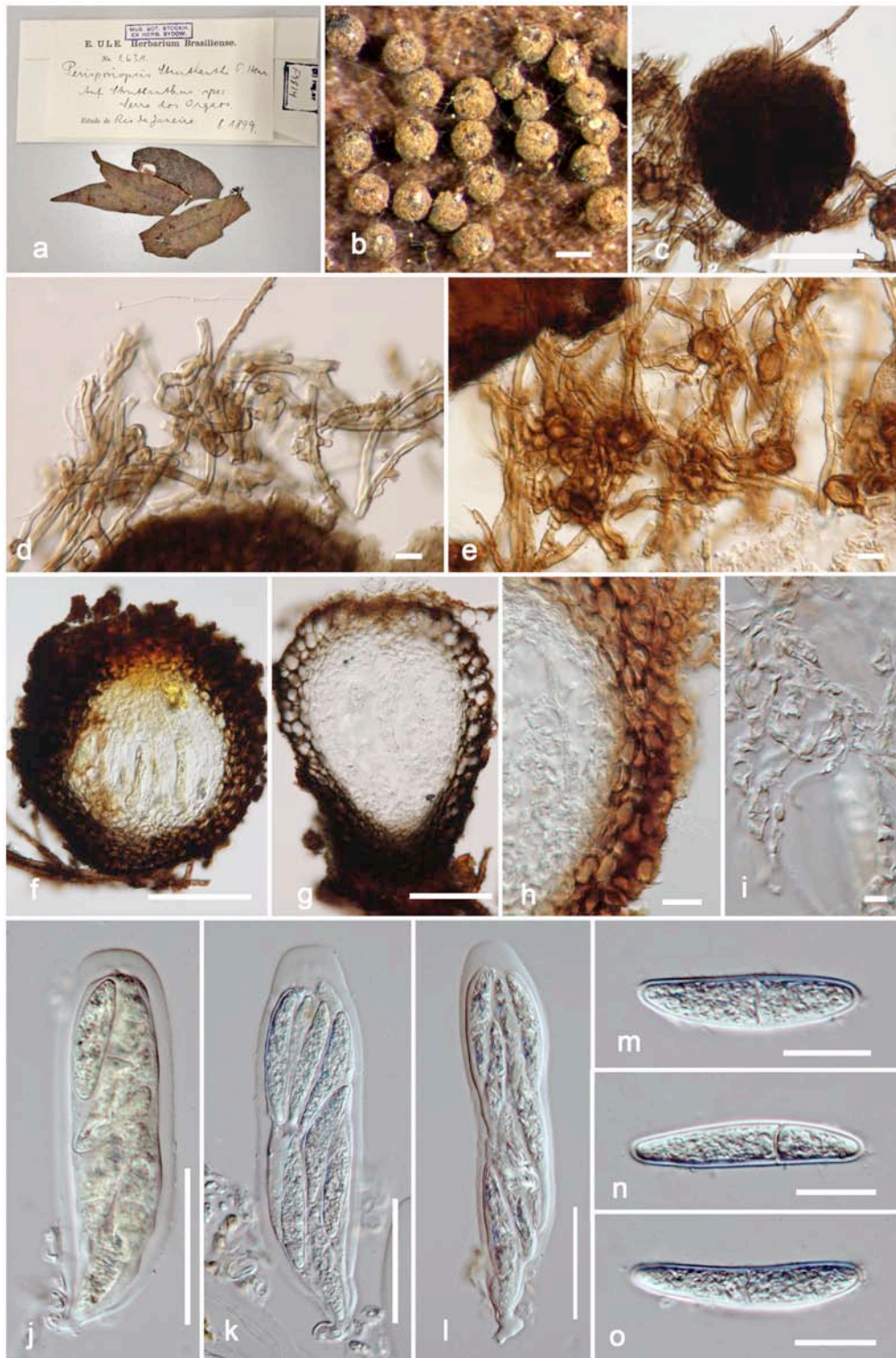


Figure 81 – *Perisporiopsis struthanthi* (S-F9814, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c–e Squash mount of ascoma and mycelium. f–g Sections of ascoma. h Peridium. i Pseudoparaphyses. j–l Asci. m–o Ascospores. Scale bars: b = 200 μ m, c, f, g = 100 μ m, d, e = 10 μ m, h, m–o = 20 μ m, j–l = 50 μ m.

Chevalieropsis ctenotricha (Pat. & Har.) G. Arnaud, *Annls Épiphyt.* 9: 2 (1923)
 ≡ *Dimerosporium ctenotrichum* Pat. & Har., *J. Bot.*, Paris 14: 242 (1900)
 ≡ *Phaeodimeriella ctenotricha* (Pat. & Har.) Speg., *Revta Mus. La Plata* 15(2): 13 (1908)
 ≡ *Chevalieria ctenotricha* (Pat. & Har.) G. Arnaud, *C. r. hebd. Séanc. Acad. Sci.*, Paris 170: 203 (1920) Index Fungorum number: IF251673; Facesoffungi number: FoF03688 Fig. 82

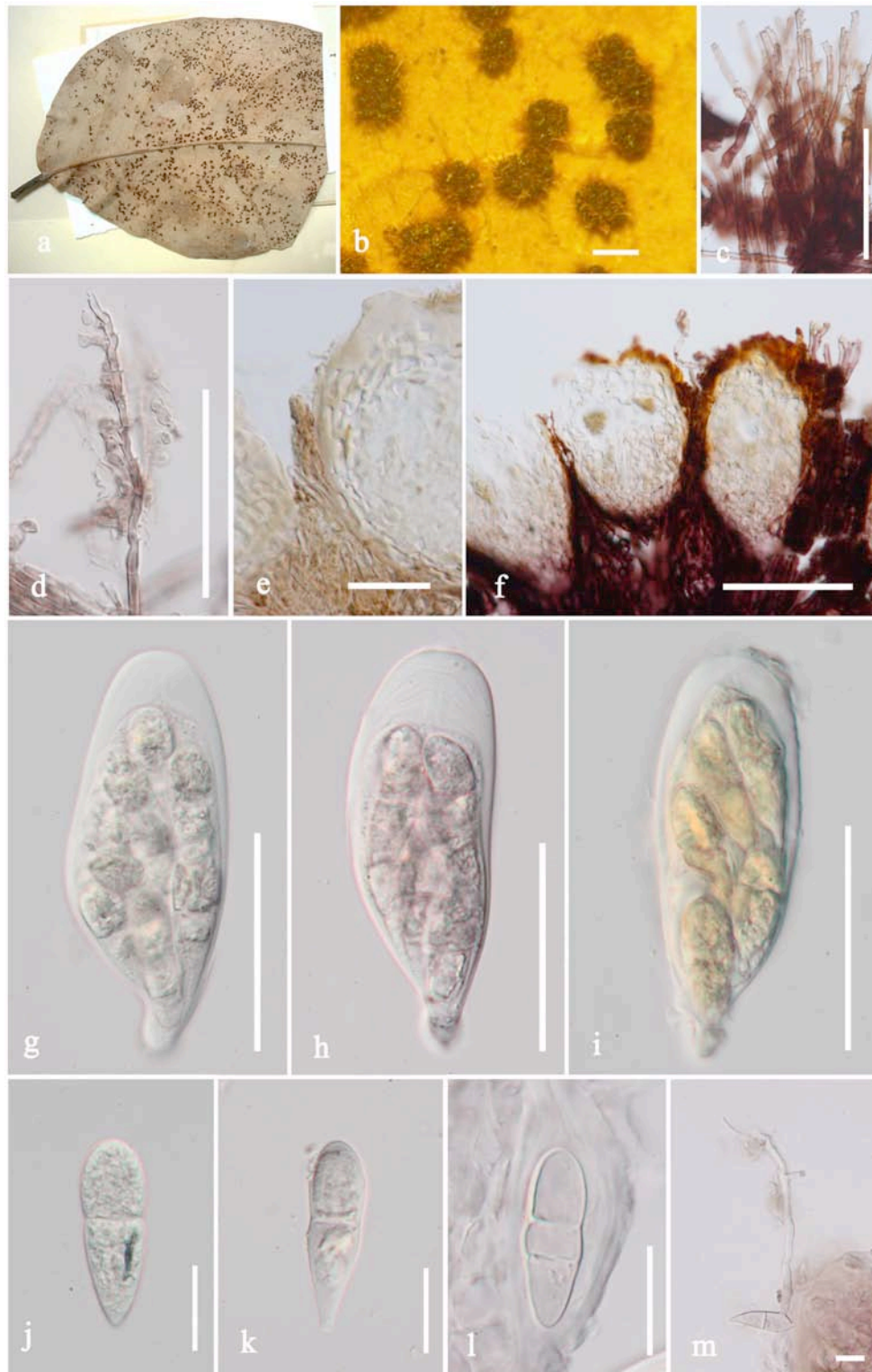


Figure 82 – *Chevalieropsis ctenotricha* (PC0084492, holotype). a Herbarium specimen and habit on leaf. b Appearance of ascostromata on leaf surface. c. Conidiophores. d Conidiophore and conidia. e Peridium. f Section of ascostroma. g–i. Asci. j–l. Ascospores. m Germ tube of ascospore. Scale bars: b = 500 μ m, c, d, f = 100 μ m, e, g–i = 50 μ m, j–m = 20 μ m.

Parasitic on living leaves of *Bignonia* sp. Sexual morph: *Ascostromata* up to 1 mm diameter, comprising more than 10 ascomata, clustered to solitary, semi-immersed and thick at the base, asexual morph possibly associated with dark brown conidiophores, 5–7(–15) μ m diameter \times 160–236(–355) μ m long, minutely conidia, multi-denticulate, subglobose and hyaline, 4–5.5 μ m diameter, septate, unbranched, pale at the apex, darkened and base wider. *Ascomata* 169–187(–197)

µm diameter × (149–)155–180(–198) µm high, superficial, grouped, subglobose, uniloculate, dark brown, formed in a stroma, with a subiculum, slightly substipitate, thick at the base. *Peridium* 20.5–32 µm wide, comprising 3–4 layers of hyaline to dark brown cells of *textura angularis*. *Asci* 82–100(–115) × 34–40(–49) µm (\bar{x} = 95 × 40 µm, n = 10), 8-spored, bitunicate, obovoid, obpyriform to clavate, sessile or with short pedicel, thick-walled and multi-layered at the apex, with small ocular chamber. *Ascospores* 34–46.5 × 12.5–15 µm (\bar{x} = 41 × 13.5 µm, n = 10), 2–3-seriate, obovoid, apex wider, narrowing towards the lower and pointed base, 1–4-septate, slightly constricted at the septum, hyaline to pale brown or reddish-brown, sometimes guttulate, slightly verruculose. Asexual morph: *Septoidium* sp.

Material examined – SENEGAL, Casamance, Fogny, on leaves of *Bignonia* sp. (*Bignoniaceae*), 1898/1900, A. Chevalier (MNHN-PC-PC0084492, holotype, FH00301204, ex 7588, isotype).

Phaeodimeriaceae Boonmee, Mapook & K.D. Hyde, fam. nov.

Index Fungorum number: IF553833; Facesoffungi number: FoF03689

Epiphytes on living leaves, or associated with other fungi on leaves. Sexual morph: *Ascomata* superficial, solitary or scattered, coriaceous, globose to subglobose, dark brown, surrounded by brown to dark brown mycelium at the base, with apical ostiole, with hook-like and dark brown setae. *Peridium* comprising brown to dark brown cells of *textura angularis*. *Hamathecium* comprising rather wide, cylindrical to filiform, branched, septate, pseudoparaphyses. *Asci* 8-spored, bitunicate, oval to ellipsoidal, apex rounded, short pedicellate, with a small ocular chamber. *Ascospores* 2–3-seriate, hyaline when immature and pale brown to brown at maturity, oblong to broadly fusiform, with a mucilaginous sheath. Asexual morph: Coelomycetous. *Conidiomata* pycnidial, superficial, globose to subglobose, with long, hook-like, aseptate, dark brown setae, with blunt apex. *Peridium* comprising brown cells of *textura angularis*. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous* cells enteroblastic, monophialidic. *Conidia* fusiform, hyaline, aseptate, guttulate.

Family type – *Phaeodimeriella* Speg.

Notes – *Phaeodimeriaceae* is introduced to accommodate *Phaeodimeriella parvula*, *P. dilleniae* and *P. cissampeli*, which are characterised by dark brown ascomata, with dark brown, hook-like setae and 1-septate, brown ascospores, connected to a coelomycetous asexual morph. *Phaeodimeriella* clustered in a strongly supported clade among the families in *Dothideomycetes* (see Fig. 1 in Mapook et al. 2016).

Phaeodimeriella Speg., Revta Mus. La Plata 15(2): 13 (1908)

≡ *Dimerosporium occultum* Racib., Parasit. Alg. Pilze Java's (Jakarta) 3: 32 (1900)

The genus was lectotypified by *Phaeodimeriella occulta* (Theissen 1912). Hansford (1946) synonymised *P. occulta* under *P. parvula* based on description following Cooke's type specimens of *Dimerosporium parvulum* Cooke. Mapook et al. (2016) introduced two new species based on morphological comparisons with the type material and multi-gene phylogenetic analyses. The phylogenetic tree showed that *P. dilleniae* and *P. cissampeli* clustered with the clade of *Lentitheciaceae* with moderate support. *Phaeodimeriella* differs from genera in *Lentitheciaceae* in having life mode as epiphytes on living leaves, superficial ascomata, hook-like setae and 1-septate, sometimes guttulate, rough-walled ascospores. For a detailed morphological description see Mapook et al. (2016).

Type species – *Phaeodimeriella parvula* (Cooke) Hansf., Mycol. Pap. 15: 64 (1946)

Index Fungorum number: IF289280; Facesoffungi number: FoF03690

Fig. 83

Phaeosphaeriaceae M.E. Barr

The classification follows Phookamsak et al. (2014), Ariyawansa et al. (2015), Liu et al. (2015), Hyde et al. (2016), Li et al. (2016) and Tibpromma et al. (2017).

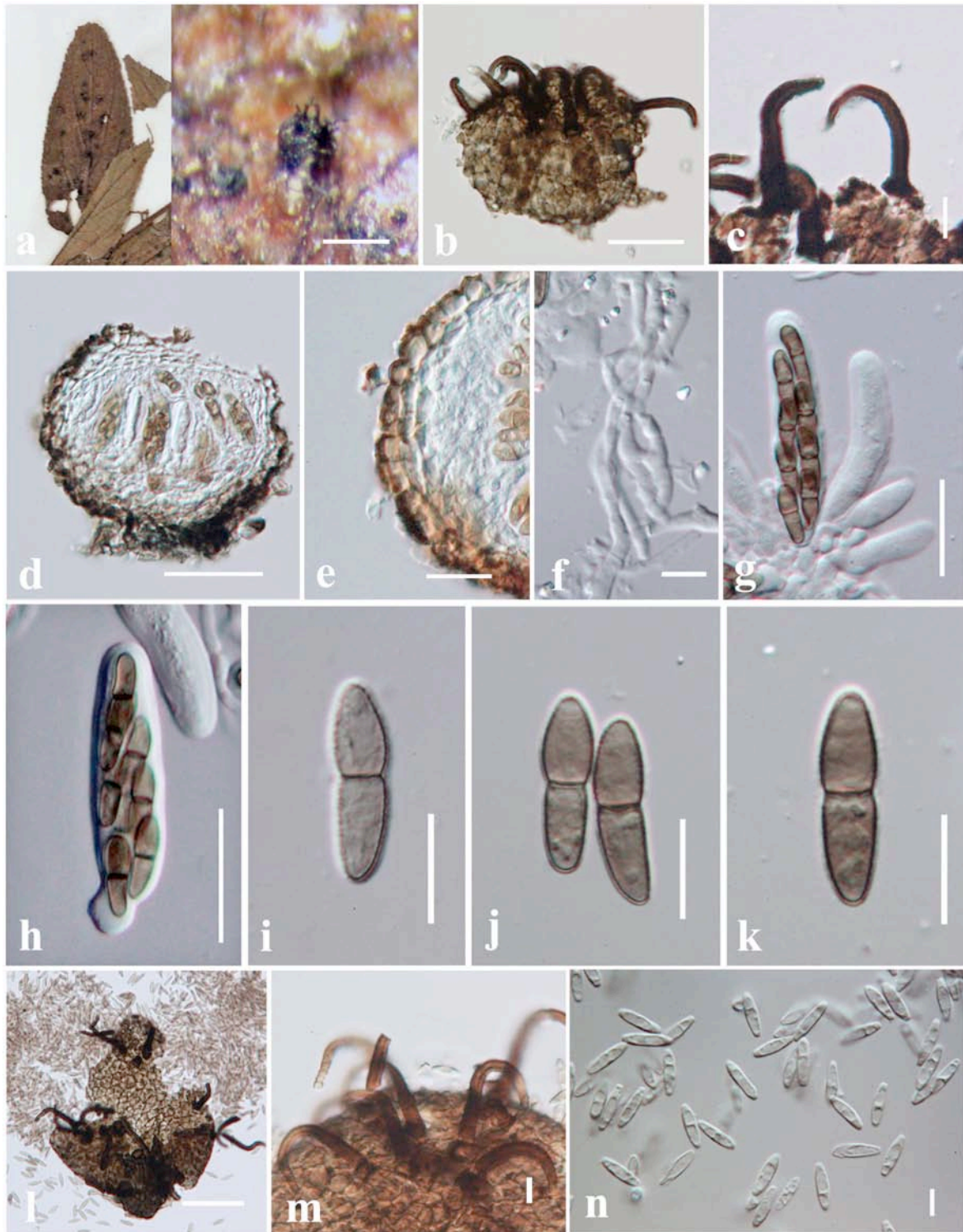


Figure 83 – *Phaeodimeriella parvula* (modified from Figures 2 and 3 in Mapook et al. 2016). a Herbarium specimen and habit on leaves. b Appearance of ascoma on leaf surface. c Setae. d Section of ascoma. e Peridium. f Hamathecium of pseudoparaphyses. g, h Asci. i–k Ascospores. l Section of conidioma. m Setae. n Conidia. Scale bars: a = 100 μm , b, d, m = 40 μm , c, e, i–k = 10 μm , f, n = 5 μm , g, h = 20 μm , l = 50 μm .

Aphanostigme Syd., Anns mycol. 24(5/6): 368 (1926)

Parasitic on surface of living leaves. Sexual morph: *Ascomata* superficial, globose to subglobose, solitary, seated on dark brown hyphae, covered by dark brown setae, tapering towards subacute apex, septate, with apical ostiole. *Peridium* comprising 2–3 layers of dark brown cells of

textura angularis. *Hamathecium* comprising numerous, branched, septate, hyaline, cylindrical to filiform pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, oblong to cylindrical to clavate, with minute ocular chamber, pedicellate. *Ascospores* 2-seriate, cylindrical fusiform, 3-septate, constricted at septum, hyaline, surrounded by thin sheath, smooth-walled. Asexual morph: Undetermined.

Type species – *Aphanostigme solani* Syd.

Notes – Sydow (1926) introduced the genus *Aphanostigme* to accommodate a foliicolous fungus, *A. solani* Syd., as its type and was placed in *Dothideaceae*. Hansford (1946) placed the genus *Aphanostigme* in the unitunicate family, *Sphaeriaceae* (*Sphaeriales*, *Sordariomycetes*) based only on ascomata form and ascospore features without considering the asci characters. von Arx & Müller (1975) separated *Aphanostigme* from *Sphaeriaceae* based on its bitunicate asci and placed the genus in *Dimeriaceae*. Eriksson et al. (2001), Kirk et al. (2008) and Lumbsch & Huhndorf (2010) listed this genus in *Pseudoperisporiaceae*, but in an uncertain position. Currently, the genus includes 22 epithets (Index Fungorum 2017). *Aphanostigme* is characterized by being parasitic on living leaves, having superficial, sphaerical, solitary ascomata, seated on hyphae, with an apical ostiole, oblong to cylindrical, bitunicate asci and cylindrical fusiform, 3-septate, hyaline ascospores, with a thin gelatinous sheath. *Aphanostigme* shares common characters similar with genera in *Phaeosphaeriaceae* (Phookamsak et al. 2014). The genus *Aphanostigme* is therefore placed in the family *Phaeosphaeriaceae*.

Aphanostigme solani Syd., *Annls mycol.* 24(5/6): 368 (1926)

Index Fungorum number: IF278342; Facesoffungi number: FoF03691

Fig. 84

Parasitic on surface of living leaves of *Solani* cfr. *lamifolii*. Sexual morph: *Ascomata* 120–162 µm diameter × 120.5–154 µm high, superficial, globose to subglobose, solitary, seated on dark brown hyphae, covered by dark brown setae, 17–55 µm long × 3–4.5 µm wide, tapering towards subacute apex, septate, with apical ostiole, 23–33 µm diameter. *Peridium* 6–9.5 µm wide, comprising 2–3 layers of dark brown cells of *textura angularis*. *Hamathecium* 0.5–1 µm wide, comprising numerous, branched, septate, hyaline, cylindrical to filiform pseudoparaphyses. *Asci* 59.5–80 × 7–10 µm (\bar{x} = 69.5 × 8.5 µm, n = 10), 8-spored, bitunicate, fissitunicate, oblong to cylindrical clavate, with minute ocular chamber, pedicellate. *Ascospores* (14–)15.5–21.5 × 4–5 µm (\bar{x} = 16 × 4 µm, n = 15), 2-seriate, cylindrical fusiform, 3-septate, constricted at the septa, hyaline, surrounded by thin sheath, smooth-walled. Asexual morph: Undetermined.

Material examined – COSTA RICA, Alajuela, San Pedro de San Ramon, on surface of living leaves of *Solani* cfr. *lamifolii* Mill. (*Solanaceae*), 2 February 1925, H. Sydow No. 56a (S-F7065, holotype).

Pododimeriaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553834; Facesoffungi number: FoF03692

Parasitic on living coniferous leaves. Sexual morph: *Ascomata* superficial, with or without hypostroma, solitary, scattered, easily removed, black, with apical ostiole. *Peridium* comprising multi-layers of brown cells of *textura angularis*. *Hamathecium* comprising dense, branched, septate, pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindrical to broadly clavate or ellipsoid, sessile or with knob-like pedicel, apex rounded, with an ocular chamber. *Ascospores* 2–3-seriate, irregularly arranged, ellipsoid-fusiform to subclavate, rounded at both ends, constricted at the septum, upper cell wider than lower cell, septum suprmedian, olivaceous-brown. Asexual morph: Undetermined.

Family type – *Pododimeria* E. Müll.

Notes – The family *Pododimeriaceae* is introduced to accommodate two genera *Chaetoscutula* and *Pododimeria* which occurs on living leaves of conifers. The family is characterized by being parasitic on coniferous plants with superficial, dark pigmented ascomata, saccate bitunicate asci and 1-septate, pigmented ascospores. As there are no families suited to accommodate these genera, a new family is introduced here.

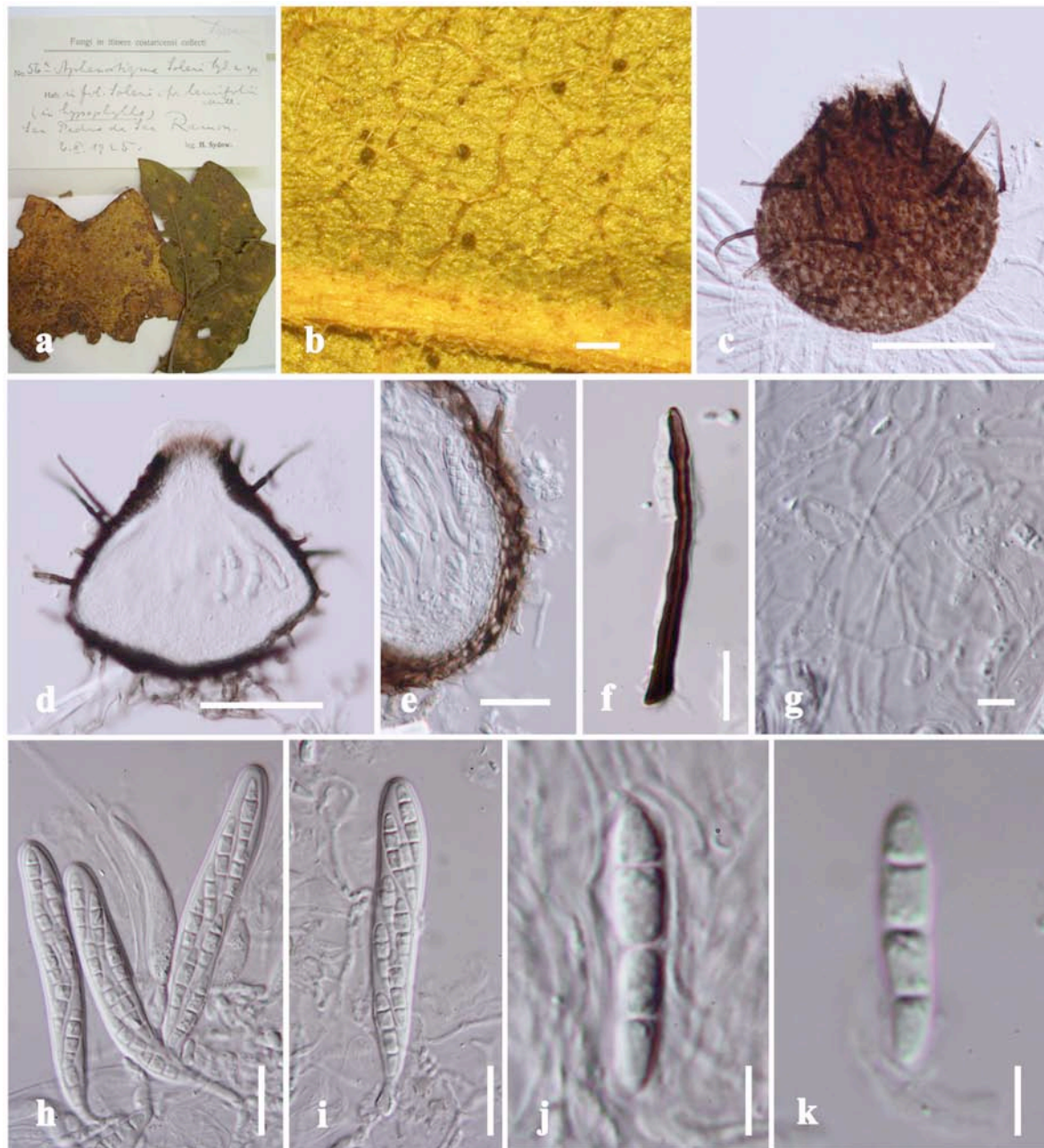


Figure 84 – *Aphanothymus solani* (S-F7065, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c, d Squash mount and section of ascomata. e Peridium. f Seta. g Pseudoparaphyses. h–j Asci. j, k Ascospores. Scale bars: b = 200 μm , c, d = 50 μm , e, h–j = 20 μm , f = 10 μm , g, k = 5 μm .

Pododimeria E. Müll., Sydowia 12(1-6): 193 (1959) [1958]

Parasitic on living coniferous leaves. Sexual morph: *Ascomata* superficial, globose to subglobose, forming a basal hypostromatic stalk, with dark hyphal stands, solitary, scattered, easily removed, black, with apical ostiole. *Peridium* comprising multi-layers of brown cells of *textura angularis*. *Hamathecium* comprising dense, branched, septate, hyaline pseudoparaphyses, constricted at the septa. *Asci* 8-spored, bitunicate, cylindrical to broadly clavate or ellipsoid, sessile or with knob-like pedicel, apex rounded with an ocular chamber. *Ascospores* 2–3-seriate, irregularly arranged, ellipsoid-fusiform to subclavate, rounded at both ends, 1-septate, constricted at the septum, upper cell wider than lower cell, septum supramedian, olivaceous brown, with minutely verruculose walls. Asexual morph: Undetermined.

Type species – *Pododimeria gallica* E. Müll.

Notes – *Pododimeria* was introduced by Müller (1958) for the single species *P. gallica*. *Pododimeria* has been included in the families *Capnodiaceae*, *Dimeriaceae* and *Parodiellaceae* based on its epiphytic habit and the features of ascomata and ascospores (Gäumann 1964, von Arx and Müller 1975, Barr 1987, Jaklitsch et al. 2002). The genus is characterized by spherical, superficial, stalked ascomata, with apical ostiole, cylindrical to broadly clavate, bitunicate asci and 1-septate, olivaceous brown, verruculose ascospores. Hawksworth et al. (1995) included *Pododimeria* in *Pseudoperisporiaceae*, as did Kirk et al. (2008), Lumbsch & Huhndorf (2010), Hyde et al (2013) and Wijayawardene et al. (2014). The genus comprises four species, *P. andina* Butin, *P. gallica* E. Müll., *P. gelatinosa* Luttr. & M.E. Barr and *P. juniperi* (Bat. & Peres) Luttr. & M.E. Barr and all species are found on living leaves of coniferous plants (Müller 1958, Butin 1973, Luttrell & Barr 1978). *Pododimeria* differs from the species in *Pseudoperisporiaceae* in the features of ascomata and ascospores. Thus, a new family *Pododimeriaceae* is introduced to accommodate two genera found on conifers.

Pododimeria gallica E. Müll., Sydowia 12(1-6): 195 (1959) [1958]

Index Fungorum number: IF304077; Facesoffungi number: FoF03693

Fig. 85

Parasitic on living, scale-like leaves of *Juniperus phoenicea* L. Sexual morph: *Ascomata* 133–143 µm diameter × 129.5–157.5 µm high, superficial, globose to subglobose, forming a basal hypostromatic stalk, with dark hyphal strands, solitary, scattered, easily removed, black, with apical ostiole. *Peridium* 13–21 µm wide, comprising multi-layers of brown cells of *textura angularis*. *Hamathecium* comprising ca. 3 µm wide, dense, branched, septate, hyaline pseudoparaphyses, constricted at the septa. *Asci* 63–98 × 19–30 µm (\bar{x} = 79 × 23 µm, n = 15), 8-spored, bitunicate, cylindrical to broadly clavate or ellipsoid, sessile or with knob-like pedicel, apex rounded with an ocular chamber. *Ascospores* 21–26.5 × 8.5–10 µm (\bar{x} = 24 × 9 µm, n = 20), 2–3-seriate, irregularly arranged, ellipsoid-fusiform to subclavate, rounded at both ends, 1-septate, constricted at the septum, upper cell wider than lower cell, septum suprmedian, olivaceous brown, minutely verruculose. Asexual morph: Undetermined.

Material examined – FRANCE, Province Gorges du Verdon, above the bridge over the Artuby River, on living leaves of *Juniperus phoenicea* L. (*Cupressaceae*), 24 June 1956, E. Müller 22813/11 (Z 33992, holotype).

Chaetoscutula E. Müll., Sydowia 12(1-6): 190 (1959) [1958]

Parasitic or *saprobic* on living and dead leaves. Sexual morph: *Ascomata* solitary, scattered, superficial on the leaves and easily removed, globose to subglobose, black, sometimes with long and brown setae, with inconspicuous ostiole. *Peridium* comprising 2–3 layers of brown cells of *textura angularis*. *Hamathecium* comprising cylindrical, branched or simple, septate, cellular, hypha-like pseudoparaphyses, encircling the asci and embedded in a gelatinous matrix. *Asci* 8-spored, bitunicate, cylindrical to broadly clavate or ellipsoid, with short pedicel, without a conspicuous ocular chamber. *Ascospores* 2-seriate, ellipsoid to fusiform, 1-septate, with dark septum, ends rounded, upper cell wider, lower cell narrow and longer, hyaline, becoming brown at senescence, minutely verruculose. Asexual morph: Undetermined.

Type species – *Chaetoscutula juniperi* E. Müll.

Notes – Tian et al. (2014) re-examined the specimen of *Chaetoscutula*, *C. juniperi* from S (F 225899) and included the genus in the family *Pseudoperisporiaceae*. *Chaetoscutula juniperi* shares similar characters of asci and ascospores and is also on the same host substrate with *Pododimeria*. Müller (1958) placed *Chaetoscutula* as a separate genus with *Pododimeria* based on ascomatal features in having a basal subiculum, hemispherical, with long brown setae and thickened wall, while *Pododimeria* forms basally hypostromatic stalked ascomata (see Illustrations 1–3 in Müller 1958). We include *Chaetoscutula* in *Pododimeriaceae* based on the hosts and the features of asci and ascospores. Molecular data may show these genera to synonymous.

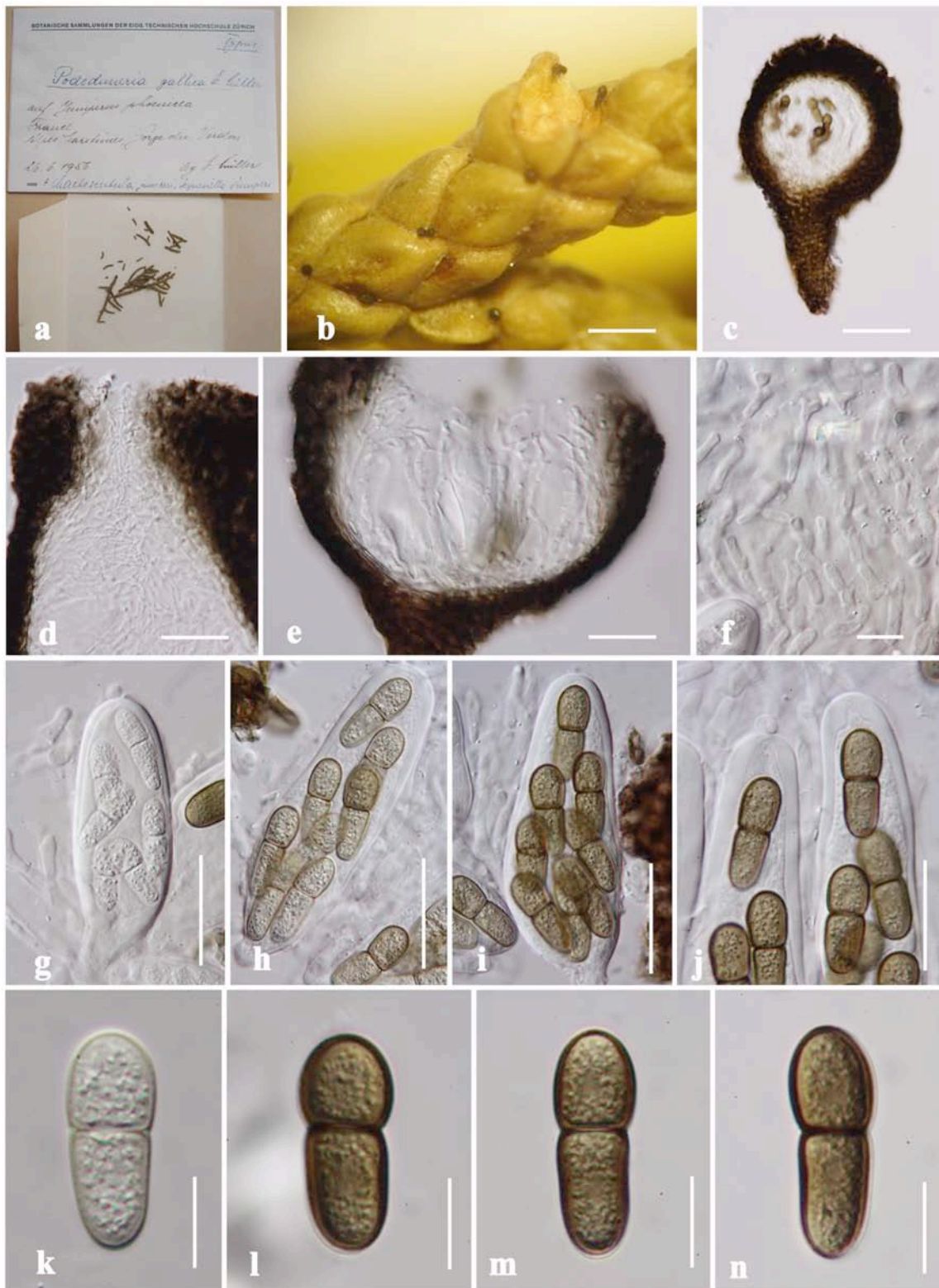


Figure 85 – *Pododimeria gallica* (Z 22813/11, holotype). a Herbarium specimen and habit on coniferous leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Close up of apical ostiole. e Peridium. f Pseudoparaphyses. g–i Asci. j Close up of ocular chamber in asci. k–n Ascospores. Scale bars: b = 500 μ m, c = 100 μ m, d, e, g–j = 40 μ m, f = 5 μ m, k–n = 10 μ m.

Chaetoscutula juniperi E. Müll., Sydowia 12(1-6): 191 (1959) [1958]

Index Fungorum number: IF294737; Facesoffungi number: FoF03694

Notes – For a detailed morphological description see in Tian et al. (2014).

Fig. 86

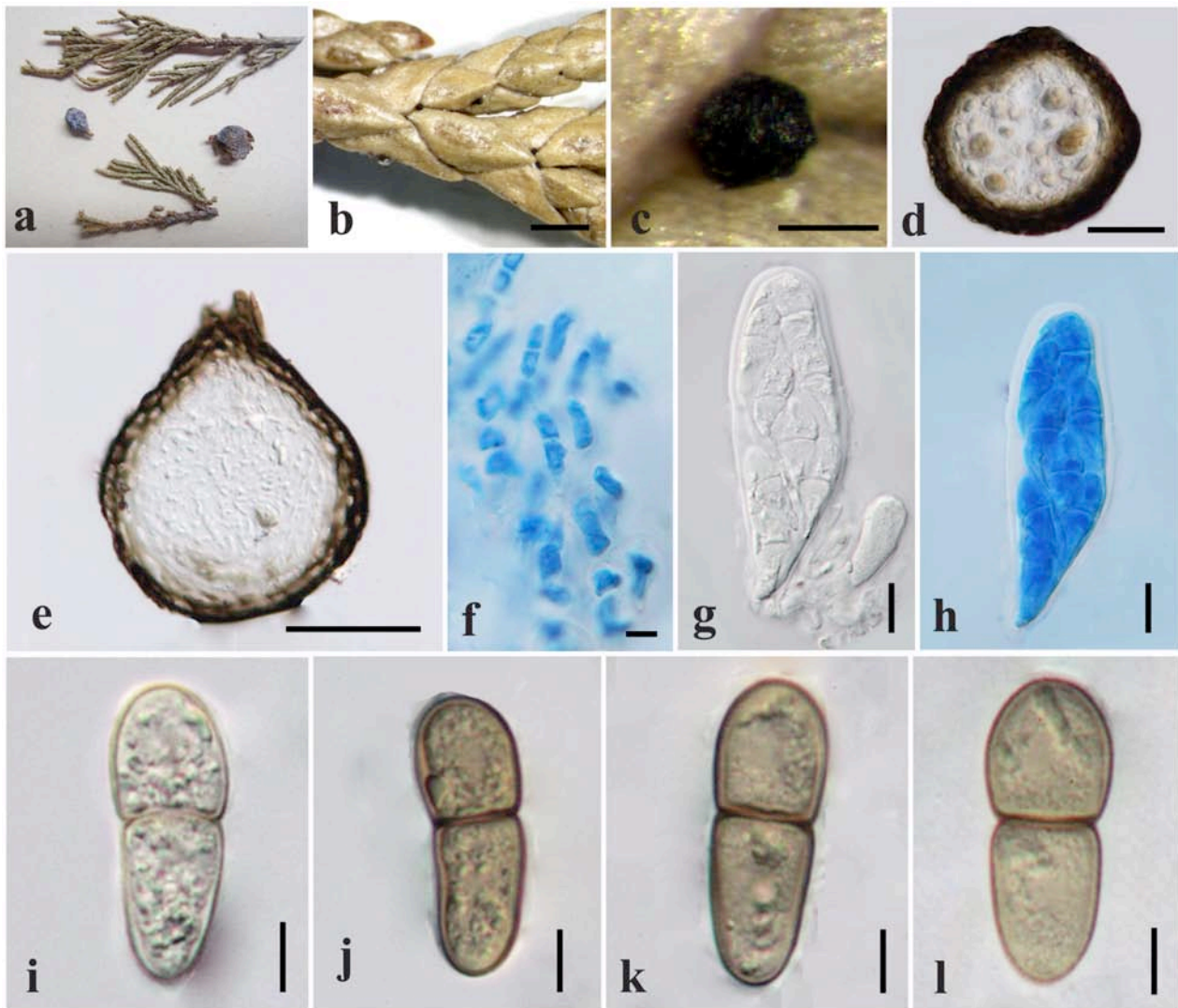


Figure 86 – *Chaetoscutula juniperi* (Modified from Fig. 1 in Tian et al. 2014). a Herbarium specimen and habit on coniferous leaves. b, c Appearance of ascomata on leaf surface. d, e Section of ascoma and peridium. f Pseudoparaphyses. g, h Asci. i–l Ascospores. Scale bars: b = 1000 µm, c = 100 µm, d, e = 50 µm, f, i–l = 5 µm, g, h = 10 µm.

Polyclypeolinaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553835; Facesoffungi number: FoF03695

Saprobic, epiphyllous on dried leaves. Sexual morph: *Ascomata* epiphyllous, superficial, thyriothecial, irregular, scattered to loosely clustered, dark brown to black, slightly shield-like or shallow-convex, composed of epithecium membranaceous cells, edge entire, with apical ostiole. *Peridium* comprising multi-layers of dark brown cells of *textura angularis*. *Hamathecium* comprising branched, septate, pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, saccate, cylindric-clavate, pedicellate. *Ascospores* ellipsoid to fusiform, narrowly obovoid, 1-septate, upper cell wider, tapering towards narrow end, hyaline. Asexual morph: Undetermined.

Family type – *Polyclypeolina* Bat. & I.H. Lima

Notes – *Polyclypeolinaceae* is introduced to accommodate the genus *Polyclypeolina* based on its ascomata characteristics to separate it from *Aulographaceae*. *Polyclypeolinaceae* is characterized by epiphyllous, superficial, irregular thyriothecial ascomata, cylindric-clavate, fissitunicate asci and ellipsoid to fusiform, 1-septate and hyaline ascospores. *Polyclypeolinaceae* is based on the type species *P. brideliae* and differs from *Aulographaceae* by its branched colonies, irregular thyriothecial ascomata and the features of asci and ascospores.

Polyclypeolina Bat. & I.H. Lima

Saprobic, epiphyllous on dried leaves. Sexual morph: *Ascomata* epiphyllous, superficial, thyriothecial, irregular, scattered to loosely clustered, dark brown to black, slightly shield-like or shallow-convex, composed of epithecium membranaceous cells, edge entire, with apical ostiole. *Peridium* comprising multi-layers of dark brown cells of *textura angularis*. *Hamathecium* comprising branched, septate, hyaline, pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, saccate, cylindric-clavate, pedicellate. *Ascospores* ellipsoid to fusiform, narrowly obovoid, 1-septate, constricted at the septum, upper cell wider, tapering towards narrow end, hyaline, smooth-walled. Asexual morph: Undetermined.

Type species – *Polyclypeolina brideliae* (Hansf.) Bat.

Notes – *Polyclypeolina* was introduced by Batista (1959) to accommodate the monotypic species *P. brideliae* and is poorly studied. The genus is based on the earlier name *Polyclypeolum brideliae* Hansf. (Hansford 1945). The genus is characterised by superficial, epiphyllous, dark pigmented thyriothecia, lacking penetrating hyphae. Luttrell (1973) included the genus in the family *Aulographaceae* based on branched colonies, superficial, irregular, multi-loculate ascomata, with opening slit on the top and 1-septate, hyaline ascospores. Based on the thyriothecium and ascospore features, we introduce the family *Polyclypeolinaceae*.

Polyclypeolina brideliae (Hansf.) Bat., Publções Inst. Micol. Recife 56: 457 (1959)

≡ *Polyclypeolum brideliae* Hansf., Publções Inst. Micol. Recife 56: 458 (1945) [1944-45]

Index Fungorum number: 304116; Facesoffungi number: FoF03696

Fig. 87

Saprobic, epiphyllous on dried leaves of *Bridelia micranthae* (Hochst.) Baill. *Ascomata* 57.5–73(–83) μm high \times 225–259.5 μm diameter, epiphyllous, thyriothecial, superficial, irregular, scattered to loosely clustered, dark brown to black, slightly shield-like or shallow-convex, composed of epithecium membranaceous cells, edge entire, with apical ostiole, 21–26 μm diameter. *Peridium* 21–27 μm wide, comprising multi-layers of dark brown cells of *textura angularis*. *Hamathecium* comprising branched, septate, hyaline, pseudoparaphyses. *Asci* 47.5–64 \times 11–13 μm (\bar{x} = 54 \times 12 μm , n = 15), 8-spored, bitunicate, fissitunicate, saccate, cylindric-clavate, with long pedicel. *Ascospores* 11.5–15 \times 3–4 μm (\bar{x} = 13 \times 3 μm , n = 15), narrowly obovoid, subclavate, with 4–6(–14) μm long pedicel, 1-septate, constricted at the septum, upper cell wider, tapering towards narrow end, hyaline, without guttules.

Material examined – UGANDA, Entebbe, on dried leaves of *Bridelia micranthae* (Hochst.) Baill. (*Euphorbiaceae*), 1945, G.C. Hansford 3309 (K (M) 177972, holotype).

Pseudoperisporiaceae Toro

Hyde et al. (2013) revised the family *Pseudoperisporiaceae* and its type genus *Lasiostemma* Theiss., Syd. & P. Syd. based on type species *Lasiostemma melioloides*. All genera in *Pseudoperisporiaceae* are parasitic or saprobic associated with leaf substrates that have relatively large colonies, superficial, sphaerical, uniloculate, pigmented ascomata, surrounded by hyphae, with an apical pore, with or without setae, bitunicate asci and hyaline to coloured, septate ascospores (Hyde et al. 2013). We presently accept three genera *Eudimeriolum*, *Lasiostemma* and *Nematostoma* in *Pseudoperisporiaceae*.

Eudimeriolum Speg., Anal. Mus. nac. Hist. nat. B. Aires 23: 36 (1912)

Saprobic on dead leaves. Sexual morph: *Ascomata* superficial, solitary, irregularly, dehiscent, globose to subglobose, membranaceous, with coarse context, parenchymatous, olivaceous. *Asci* 8-spored, bitunicate, cylindrical to clavate, narrow towards the base, short pedicellate, apex rounded, with filiform pseudoparaphyses. *Ascospores* 1–2-seriate, fusoid to subclavate, upper cell wider, basal cell with acute base, 1-septate, hyaline when immature, becoming pale green when mature. Asexual morph: Undetermined.

Type species – *Eudimeriolum elegans* Speg.

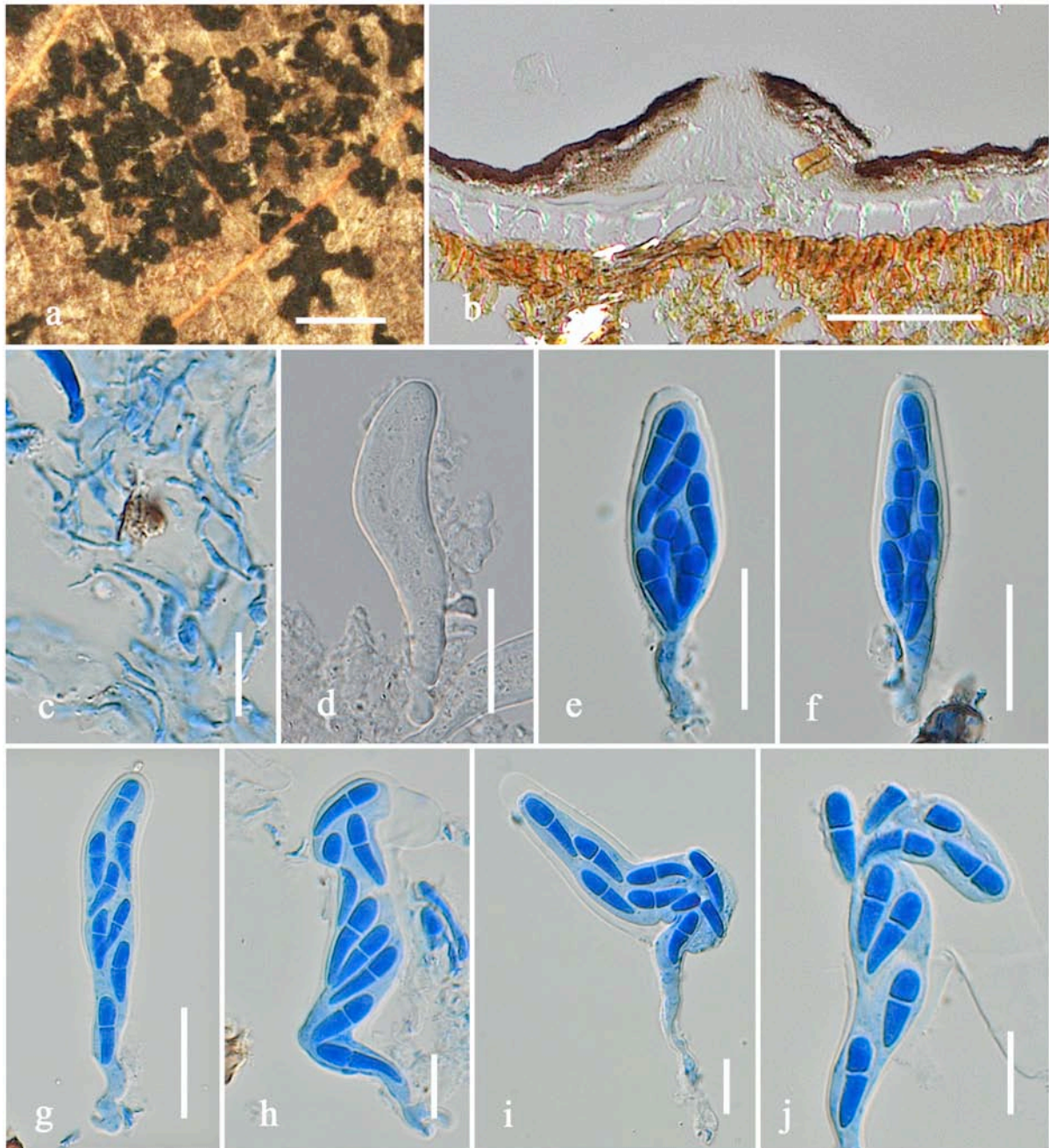


Figure 87 – *Polyclypeolina brideliae* (K (M) 177972, holotype). a Herbarium specimen and habit on leaf. b Section of ascoma. c Pseudoparaphyses. d–g Immature and mature asci. h–j Ascospores released from asci. Scale bars: a = 2 mm, b = 100 μ m, c, h–j = 10 μ m, d–g = 20 μ m.

Notes – *Eudimeriolium* was introduced by Spegazzini (1912) as a monotypic genus with *E. elegans* as the type. The genus is characterized by superficial ascomata, spherical, membranaceous, olivaceous, 8-spored asci and 1-septate and hyaline ascospores. Hansford (1946) placed *Eudimeriolium* in *Sphaeriaceae* based on the glabrous ascomata without appendaged mycelia. von Arx and Müller (1975) transferred it to *Dimeriaceae* based on saprobic characters, mainly growing on leaves, superficial mycelium and glabrous ascomata. Barr (1997) reviewed several dimeriaceous taxa and accepted *Eudimeriolium* in the family *Pseudoperisporiaceae*. Currently, the genus comprises 20 species epithets (Index Fungorum 2017). We provide a brief description of *Eudimeriolium elegans* to represent the genus based on the protologue of Spegazzini (1912). All species share common features with other genera in *Pseudoperisporiaceae* such as superficial, spherical, uniloculate ascomata, with or without superficial mycelia, bitunicate asci,

septate and hyaline to pigmented ascospores. Hence, we maintain this genus in *Pseudoperisporiaceae* (Barr 1997, Eriksson 1999, Reynolds & Gilbert 2005, Kirk et al. 2008, Lumbsch & Huhndorf 2010, Hyde et al. 2013, Wijayawardene et al. 2014, 2017).

Eudimeriolum elegans Speg., Anal. Mus. nac. Hist. nat. B. Aires 23: 36 (1912)

Index Fungorum number: IF249821; Facesoffungi number: FoF03697

Fig. 88

Saprobic on dead leaves of *Lueheae divaricatae* (*Tiliaceae*). Sexual morph: *Ascomata* 120–180 µm diameter, superficial, solitary, irregular, dehiscent, globose to subglobose, membranaceous, with coarse context, parenchymatous, olivaceous. *Asci* 60–70 × 8–10 µm, 8-spored, bitunicate, cylindrical to clavate, narrow towards the base, short pedicellate, apex rounded, with filiform paraphyses. *Ascospores* 14–15 × 4–5 µm, 1–2-seriate, fusoid to subclavate, upper cell wider, basal cell narrower with acute base, 1-septate, not constricted at the septum, hyaline when immature, becoming pale green when mature (from Spegazzini 1912). Asexual morph: Undetermined.

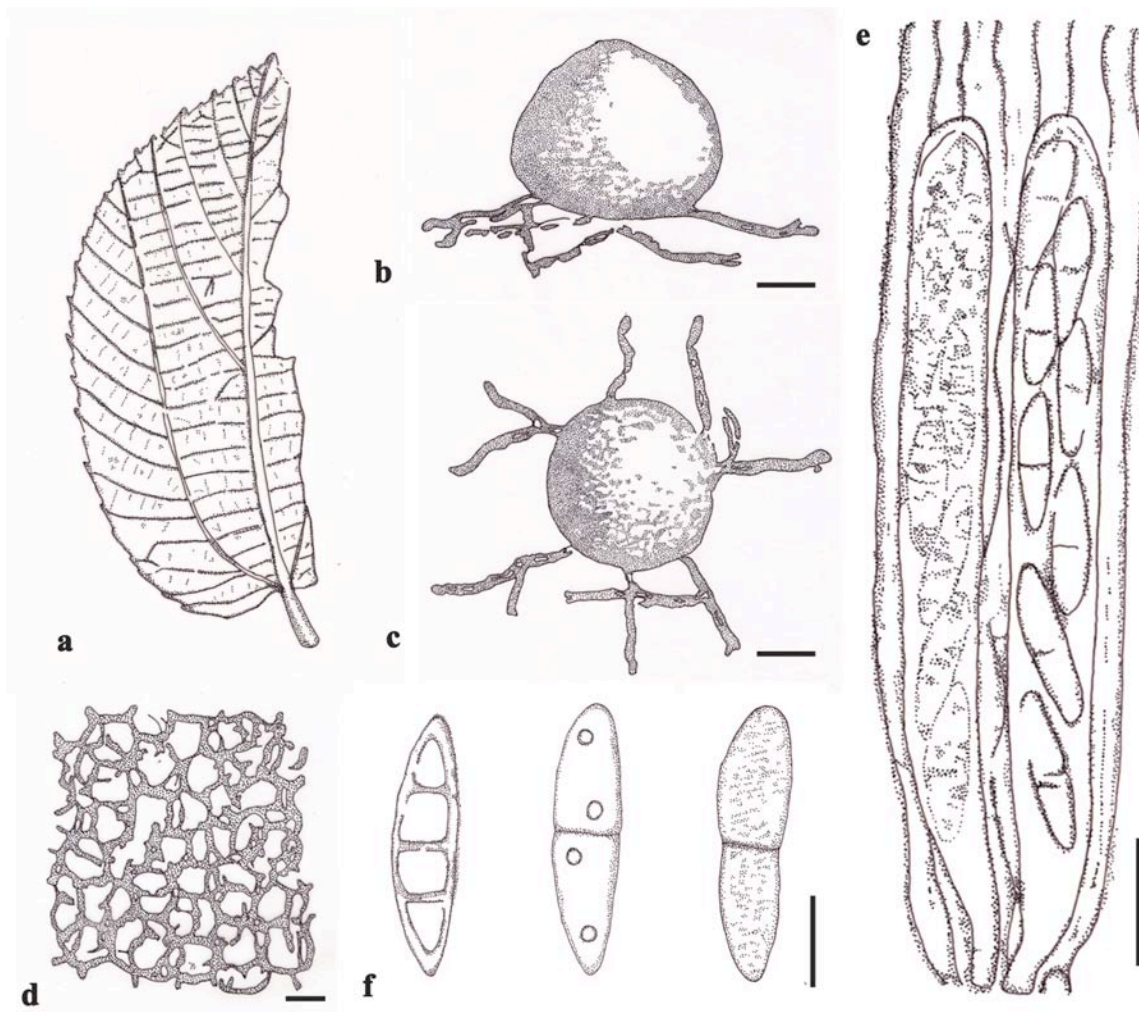


Figure 88 – *Eudimeriolum elegans* (redrawn from Spegazzini 1912, Fig. 82). a Leaf substrate with ascomata. b, c Ascomata. d Hyphal colony. e Asci. f Ascospores. Scale bars: b, c = 50 µm, d, f = 5 µm, e = 5 µm.

Lasiostemma Theiss., Syd. & P. Syd., Annls mycol. 15(3/4): 218 (1917)

Parasitic on leaves of *Erigeron bonariensis* in tropical regions. Sexual morph: *Ascomata* superficial, solitary to gregarious, scattered, globose to subglobose, with brown mycelium at the base, with apical ostiole, collapsing when dry, surrounded by brown setae, septate, tapering to subacute apex. *Peridium* comprising reddish-brown cells of *textura angularis* to *subglobosa*.

Hamathecium comprising branched, septate, hyaline pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, oblong-clavate, sessile or with knob-like pedicel, slightly curved, apically thickened, with small ocular chamber. *Ascospores* 2-seriate in the ascus, fusoid-ellipsoid, rounded and subacute ends, 1-septate, septum submedian, slightly constricted at the septum, hyaline, becoming brownish at maturity, minutely verrucose. Asexual morph: coelomycetous, known as *Chaetosticta* (Kirk et al. 2008).

Type species – *Lasiostemma melioides* (Berk. & Ravenel) Theiss. et al.

Notes – Hyde et al. (2013) examined, illustrated and described a specimen of *Lasiostemma melioides* (BPI699548) to represent the family *Pseudoperisporiaceae*. The genus is characterized by superficial, red brown to dark pigmented ascomata, with long hyphae, oblong-clavate asci and fusoid-ellipsoid, 1-septate, light brown ascospores. Currently, eight species epithets are listed in the genus *Lasiostemma* (Index Fungorum 2017).

Lasiostemma melioides (Berk. & Ravenel) Theiss., Syd. & P. Syd., *Annls mycol.* 15(3/4): 218 (1917)

≡ *Dimeriella melioides* Berk. & Ravenel

Index Fungorum number: IF102249; Facesoffungi number: FoF03698

Fig. 89

Parasitic on leaves of *Erigeron bonariensis* in tropical regions. Sexual morph: *Ascomata* (94–)102.5–116 µm diameter, superficial, solitary to gregarious, scattered, globose to subglobose, with brown mycelium at the base, with apical 14–18(–20) µm diameter ostiole, collapsing when dry, surrounded by brown setae, 71–111(–140) µm long, septate, tapering to subacute apex. *Peridium* comprising reddish-brown cells of *textura angularis* to *subglobosa*. *Hamathecium* comprising ca. 2 µm wide, branched, septate, hyaline pseudoparaphyses. *Asci* 36–40 × 7–10 µm (\bar{x} = 39 × 9 µm, n = 10), 8-spored, bitunicate, fissitunicate, oblong-clavate, sessile or with knob-like pedicel, slightly curved, apically thickened, with small ocular chamber. *Ascospores* 11–13 × 3–4 µm (\bar{x} = 12 × 4 µm, n = 10), 2-seriate in the ascus, fusoid-ellipsoid, with rounded to subacute ends, 1-septate, septum submedian, slightly constricted at the septum, hyaline, becoming brownish at maturity, minutely verrucose. Asexual morph: coelomycetous, known as *Chaetosticta*.

Nematostoma Syd. & P. Syd., *Annls mycol.* 12(2): 161 (1914)

Parasitic on living leaves. Sexual morph: *Ascomata* superficial, globose to subglobose, dark brown, with apical ostiole, surrounded by long, septate, dark brown setae, tapering to acute at the apex. *Peridium* comprising 2–3 layers of dark brown cells of *textura angularis*. *Hamathecium* comprising numerous cylindrical, filiform, branched, septate, anastomosed, hyaline, pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindrical-clavate, sessile or with short pedicel, apically thickened and rounded. *Ascospores* 2-seriate, ellipsoid to fusiform, upper part wider, slightly curved, multi-septate, constricted at the septa, hyaline to light brown, smooth-walled. Asexual morph: Undetermined.

Type species – *Nematostoma artemisiae* Syd. & P. Syd.

Notes – *Nematostoma* was described and introduced in *Sphaeriaceae* by Sydow & Sydow (1914) to accommodate the parasitic type *N. artemisiae*. *Nematostoma artemisiae* shares similar morphological features with *Acanthostigmella* Höhn., but it differs in lifestyle as a plant parasite. *Nematostoma* comprises 20 epithets (Hansford 1946, Petrak 1949, 1950, 1952, 1955, Batista et al. 1967, Rossmann 1987, Sivanesan 1987, Barr 1968, 1997, Pande 2008). von Arx & Müller (1975) included *Nematostoma* in *Dimeriaceae* as it is parasitic on leaves. Barr (1997) revised and accepted *Nematostoma* in *Pseudoperisporiaceae* and subsequent studies by Kirk et al. (2008) and Hyde et al. (2013) followed this placement. The type species *N. artemisiae* is characterized by being parasitic on leaf hairs, with a subiculum bearing ascomata, ostioles surrounded by long setae, bitunicate asci and 3-septate, light brown ascospores. Therefore, we maintain the genus *Nematostoma* in *Pseudoperisporiaceae*.

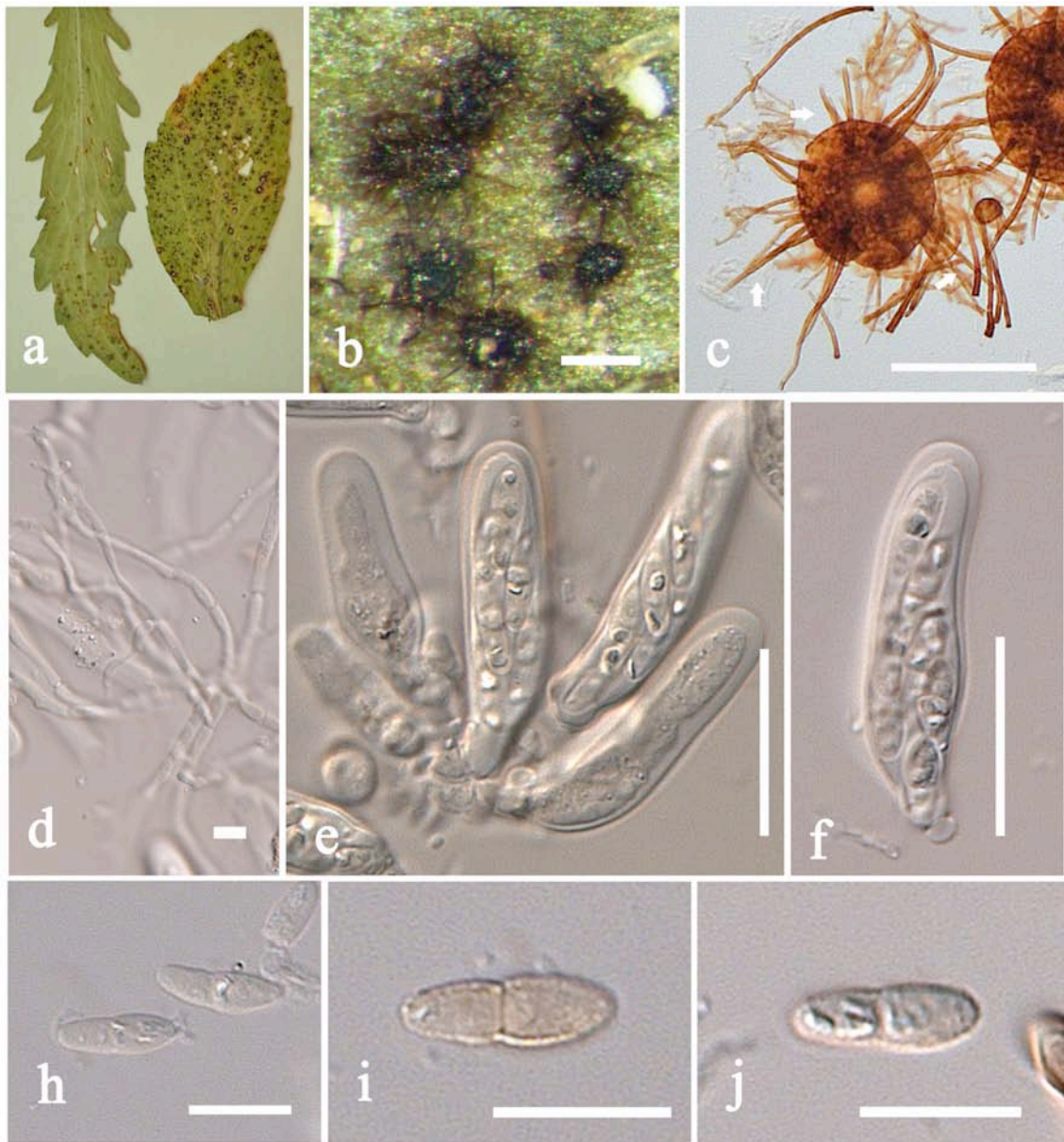


Figure 89 – *Lasiostemma melioloides* (modified from Fig. 108 in Hyde et al. 2013). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Squash mount of ascoma. d Pseudoparaphyses. e, f Asci. h–j Ascospores. Scale bars: b, c = 100 μm , d = 5 μm , e, f = 20 μm , h–j = 10 μm .

Nematostoma artemisiae Syd. & P. Syd., *Annls mycol.* 12(2): 161 (1914)

Index Fungorum number: IF249201; Facesoffungi number: FoF03699

Fig. 90

Parasitic on leaf hairs on lower surface of living leaves of *Artemisia vulgaris* var. *indica*. Sexual morph: *Ascomata* 140–160 μm diameter, superficial, globose to slightly subglobose, dark brown, or with poorly developed subiculum, with apical ostiole, surrounded by long setae, 150–250 μm long \times 3–5 μm wide, slightly curved, tapering to acute at the apex, septate, dark brown. *Peridium* 6.5–9 μm wide, comprising 2–3 layers of dark brown cells of *textura angularis*. *Hamathecium* 1–2 μm wide, comprising numerous, cylindrical, filiform, branched, septate, anastomosed, hyaline, pseudoparaphyses. *Asci* 50–65 \times 7–9.5 μm (\bar{x} = 56.5 \times 8 μm , n = 20), 8-spored, bitunicate, cylindrical-clavate, sessile or with short pedicel, apically thickened and rounded. *Ascospores* 14–17 \times 3–5 μm (\bar{x} = 15 \times 4 μm , n = 20), 2-seriate, ellipsoid to fusiform, upper part wider, slightly curved, regular 3-septate, constricted at the septa, hyaline to light brown, smooth-walled. Asexual morph: Undetermined.

Material examined – JAPAN, Hokkaido, Maruyama, on living leaves of on *Artemisia vulgaris* var. *indica*. (Willd.) Hassk. (*Asteraceae*), 24 September 1907, M. Miura No. 550 (S-F10261, holotype).

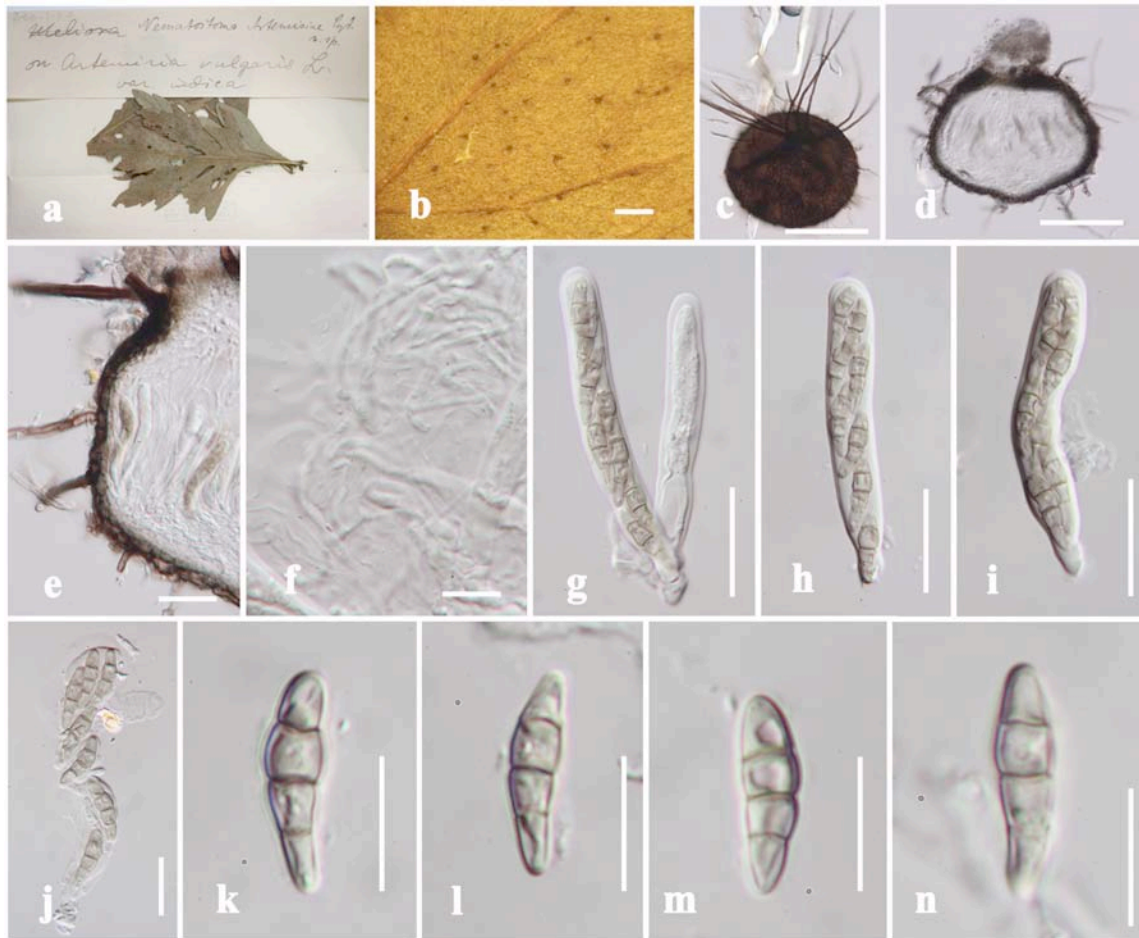


Figure 90 – *Nematostoma artemisiae* (S-F10261, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c, d Squash mount oozing mass of ascospores and section of ascomata with long apical setae and ostiole. e Peridium. f Pseudoparaphyses. g–i Asci. j–n Ascospores. Scale bars: b = 500 μ m, c, d = 100 μ m, e, g–i = 20 μ m, f, j–n = 10 μ m.

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

Schizothyriaceae was introduced by Saccardo (1928) as “*Schizothyrieae*” based on von Höhnel (1917). The family was introduced to accommodate epiphytic fungi which were originally described as “exciple depressed on cuticle, superficial, membranous, irregular fringed when mature” (Saccardo 1928, Phookamsak et al. 2016). The family is poorly studied and contained various ambiguous genera, mostly confused with the genera in *Micropeltidaceae* (Müller & von Arx 1962, von Arx & Müller 1975, Phookamsak et al. 2016). Phookamsak et al. (2016) re-circumscribed the genera in *Schizothyriaceae* based on morphological study of generic types and accepted only five genera in this family viz. *Hexagonella*, *Lecideopsella*, *Mycerema*, *Plochmopeltis* and *Schizothyrium*. *Schizothyriaceae* has unique characters of membranous, multi-loculate ascostromata, with each ascus forming in a locule, which is a “cell” in a network-like structure and in lacking ostioles (Phookamsak et al. 2016).

Schizothyrium Desm., Annl. Sci. Nat., Bot., sér. 3 11: 360 (1849)

Pathogenic on leaves, stems, or other parts of various dicotyledonous vascular plants such as *Acer* and *Quercus*. Sexual morph: *Ascomata* scattered, solitary to gregarious, superficial, flattened,

circular to ellipsoid, light brown or dark brown to black, sphaerical or orbicular, glabrous, uniloculate, membranous, opening by splitting of the upper wall. *Peridium* thin-walled, poorly-developed at the base, comprising irregular meandering arrangement of dark brown, compact cells, membranous, in vertical section arranged in *textura angularis* to *globulosa*. *Hamathecium* comprising broad, septate, network-like structure. *Asci* 8-spored, bitunicate, globose to subglobose, or ovoid, sessile, apex rounded, with an indistinct ocular chamber. *Ascospores* irregularly seriate, hyaline, oblong to clavate, 1-septate, slightly constricted at the septum, thick, rough-walled, with small guttules. Asexual morph: hyphomycetous, see notes below.

Type species – *Schizothyrium acerinum* Desm.

Notes – *Schizothyrium* was introduced by Desmazières (1849) and is typified by *S. acerinum* which was collected from *Acer negundo*. *Schizothyrium* has been reported on leaves, stems, or other parts of various vascular plants such as *Acer*, *Artocarpus*, *Bambusa*, *Crataegus*, *Gaultheria*, *Ilex*, *Malus*, *Phyllostachys*, *Pinus* and *Quercus* and is widespread in temperate and tropical regions (Eriksson 1981, Phookamsak et al. 2016, Farr & Rossman 2017). These reports however need confirmation with molecular data. Sixty-nine epithets of *Schizothyrium* are listed in Index Fungorum (2017). Most species of the genus lack molecular data to confirm their phylogenetic affinities and the generic type has not yet been recollected and its phylogenetic position clarified (Hyde et al. 2013, Phookamsak et al. 2016). Molecular data is only available for *S. pomi* and its asexual morph (Batzer et al. 2005, 2008, Crous et al. 2009, Ma et al. 2010, Phookamsak et al. 2016).

Schizothyrium pomi was introduced by von Arx (1959) based on a combination of *Labrella pomi* Mont. & Fr. and synonymized under *Microthyriella rubi* Petrak (Williamson & Sutton 2000). The species is well-known as a pathogen causing sooty blotch and flyspeck disease on apple and various angiosperms (Williamson & Sutton 2000, Batzer et al. 2005, 2008, Farr & Rossman 2017). *Schizothyrium pomi* is similar to *S. acerinum* in forming superficial, thyriothecial, dimidiate, circular to ellipsoid, membranous ascomata, opening by splitting of the upper wall, globose to subglobose, or ovoid, sessile asci and hyaline, oblong to clavate, or ellipsoidal, 1-septate, thick, and rough walled ascospores (Hyde et al. 2013, Phookamsak et al. 2016). However, *S. pomi* differs from *S. acerinum* in forming a hamathecium with septate, broadly pseudoparaphysoid-like filaments, while *S. acerinum* forms multi-loculate ascostromata, with each ascus forming in a locule, which is a “cell” in a network-like structure (Phookamsak et al. 2016). Therefore, whether *S. pomi* and *S. acerinum* are congeneric is still questionable.

The asexual morph of *Schizothyrium pomi* has been reported as hyphomycetous in the genus *Zygophiala* which was characterized by scattered, 3–4-septate, subcylindrical, flexuous conidiophores, consisting of a hyaline to subhyaline supporting cell, with a smooth, dark brown stipe, finely verruculose at apex, with a medium brown apical cell, giving rise to two (rarely three), doliiform to ellipsoid or subcylindrical, polyblastic conidiogenous cells. Scars are prominent, apically darkened, thickened and somewhat refractive, with 1(–2) per conidiogenous cell and conidia solitary, fusiform to obclavate, hyaline, smooth and thick-walled, 1(–7) septa, constricted at the septa, with a subtruncate base, and a darkened, thickened hilum (Batzer et al. 2005, 2008, Kirk et al. 2008, Ma et al. 2010, Hyde et al. 2013, Wijayawardene et al. 2012, 2014). The connection between *Schizothyrium pomi* and *Zygophiala jamaicensis* was first reported by Durbin et al (1953) and confirmed by Batzer et al. (2005). However, Batzer et al. (2008) later considered *Z. jamaicensis* as a distinct species from *S. pomi*, but these two genera were still congeneric in phylogenetic studies (Ma et al. 2010, Gao et al. 2014). Therefore, Rossman et al. (2015) proposed *Schizothyrium* over *Zygophiala* as *Schizothyrium* was the older name.

Schizothyrium pomi (Mont. & Fr.) Arx, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 62: 336 (1959)

≡ *Labrella pomi* Mont. & Fr., in Montagne, Anns Sci. Nat., Bot., sér. 2 1: 347 (1834)

Index Fungorum number: IF338878; Facesoffungi number: FoF03703

Figs 91, 92

Pathogenic on apple, pear and *Prunus* fruits causing sooty blotch and flyspeck disease and on various other flowering plants (Farr & Rossman 2017). Sexual morph: *Ascomata* 170–330 μm diameter \times 15–30 μm high [type: 160–290 μm diameter \times 20–35 μm high], scattered, solitary to gregarious, superficial, flattened, circular to ellipsoid, light brown or dark brown to black, spherical or orbicular, glabrous, uni-loculate, membranous, opening by splitting of the upper wall. *Peridium* 4–10 μm wide [type: 4–10 μm wide], thin-walled, poorly-developed at the base, comprising irregular meandering arrangement of dark brown, compact cells, membranous, in vertical section arranged in *textura angularis* to *globulosa*. *Hamathecium* comprising septate, broadly pseudoparaphysoid-like filaments. *Asci* 20–25(–30) \times 15–20(–23) μm (\bar{x} = 24 \times 18 μm , n = 20), 8-spored, bitunicate, globose to subglobose, or ovoid, sessile, apex rounded, with an indistinct ocular chamber. *Ascospores* (10–)11–14(–15) \times 3–5 μm (\bar{x} = 13 \times 5 μm , n = 25), irregularly seriate, hyaline, oblong to clavate, 1-septate, slightly constricted at the septum, thick, and rough walled, with small guttules. Asexual morph: See notes above.

Material examined – FRANCE, Paris, on mature apple, C.P. Hussenot No. 847 (MNHN-PC-PC0723481, holotype of *Labrella pomi*); CZECH REPUBLIC, Mähr.-Weisskirchen, Podhorn, on branches of *Rubus idaeus* (*Rosaceae*), 15 May 1922, F. Petrak (S-F7200, isotype of *Microthyriella rubi*).



Figure 91 – *Schizothyrium pomi* (MNHN-PC-PC072348, holotype). a Herbarium specimen and habit on mature apple. b Appearance of ascomata. c Squash mount of ascoma. d Sections of ascoma. e Peridium structure visualized from above. f Section of peridium g Paraphysoids-like filaments. Scale bars: b = 500 μm , c = 100 μm , d = 50 μm , e–g = 20 μm .

Stomatogeneaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553837; Facesoffungi number: FoF03703

Parasitic on living leaves of *Asparagaceae* and mosses, superficial, colonies large, subcircular, irregular, with numerous dark brown mycelium, radiating outwards, flexuous, septate. Sexual morph: *Ascomata* superficial, semi-immersed at the base, with a basal hypostroma developing in the host tissue, gregarious, or solitary, black, with apical pore, surrounded by dark

brown mycelium. *Peridium* comprising 3–4 layers of dark pigmented cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, subglobose, broadly ovoid to subclavate, apically thickened, with an ocular chamber, pedicel knob-like. *Ascospores* multi-seriate, ellipsoidal oblong, upper cell slightly broader and shorter than lower cell, 1-septate, hyaline when immature and brown at maturity, verruculose, verrucose or smooth-walled. Asexual morph: Undetermined.

Family type – *Stomatogene* Theiss.



Figure 92 – *Schizothyrium pomi* (S-F7200, isotype of *Microthyriella rubi*). a Herbarium specimen and habit on branches. b, c Appearance of ascomata on branch. d Squash mount of ascoma. e Sections of ascoma. f Peridium. g, h Paraphysoids-like filaments. i–k Asci. l–p Ascospores. q Ascospores stained in Congo red. Scale Bars: d, e = 50 μ m, f = 20 μ m, i–k = 10 μ m, g, h, l–q = 5 μ m.

Notes – The family *Stomatogeneaceae* is introduced to accommodate four species from living leaves of *Asparagaceae* plants based on the type genus *Stomatogene*, while *S. lycopodii* was found on stems and leaves of *Lycopodium cernuum* (moss). The family is characterized by being parasitic, with dark superficial colonies, uniloculate, dark ascomata, subglobose, bitunicate asci and septate, hyaline to pigmented ascospores. The family differs from *Pseudoperisporiaceae* and other families in *Dothideomycetes* by its colonies, ascomata, asci and ascospore features.

Stomatogene Theiss., *Annls mycol.* 14(6): 406 (1917) [1916]

Parasitic on living leaves, superficial, with large colonies, subcircular, irregular, with numerous dark brown mycelium, radiating outwards, flexuous, septate. Sexual morph: *Ascomata* superficial, semi-immersed at the base, with a basal hypostroma developing in the host tissue, gregarious, solitary, globose to subglobose, black, with apical pore, surrounded by dark brown mycelium. *Peridium* comprising 3–4 layers of dark pigmented cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, subglobose, broadly ovoid to subclavate, apically thickened, with an ocular chamber, pedicel knob-like. *Ascospores* multi-seriate, ellipsoidal oblong, upper cell slightly broader and shorter than lower cell, 1-septate, hyaline when immature and brown at maturity, with granulate cells, verruculose, verrucose or smooth-walled. Asexual morph: Undetermined.

Type species – *Stomatogene agaves* (Ellis & Everh.) Theiss.

Notes – The genus *Stomatogene* was introduced by Theissen (1916) with the type species *S. agaves* on the basis of earlier name *Asterina agaves* Ellis & Everh (1900). Theissen (1916) placed *Stomatogene* in *Perisporiaceae*. The genus is characterized by large colonies, superficial ascomata, with a basal hypostroma, broadly ovoid to subclavate, thick-walled asci and ellipsoidal oblong, septate, brown ascospores; an asexual morph has not been reported for this genus. The genus was later placed in the family *Parodiopsidaceae* by Eriksson et al. (2001), Kirk et al. (2008), Lumbsch & Huhndorf (2010) and Hyde et al. (2013). Based on morphological characters, the new family *Stomatogeneaceae* is introduced for the genus *Stomatogene*.

Stomatogene agaves (Ellis & Everh.) Theiss., *Annls mycol.* 14(6): 406 (1918) [1917]

≡ *Asterina agaves* Ellis & Everh., *Bull. Torrey bot. Club* 27: 571 (1900)

≡ *Dimerium agaves* (Ellis & Everh.) Rehm, *Annls mycol.* 12(2): 170 (1914)

Index Fungorum number: IF121867; Facesoffungi number: FoF03705

Fig. 93

Parasitic on living leaves of *Agave* sp., superficial, with large colonies, subcircular, irregular, with numerous dark brown mycelium, radiating outwards, flexuous, septate. Sexual morph: *Ascomata* 80.5–104 µm diameter × 75–93 µm high, superficial, semi-immersed at the base, with a basal hypostroma developing in the host tissue, gregarious, or solitary, globose to subglobose, black, with apical pore 17–23 µm diameter, surrounded by dark brown mycelium, 62–137 µm long × 4.5–5 µm wide. *Peridium* 14–18 µm wide, comprising 3–4 layers of dark cells of *textura angularis*, outer layer dark brown cells, inner layer pine green cells, lacking pseudoparaphyses. *Asci* 45–66 × 23.5–32.5 µm (\bar{x} = 57 × 28 µm, n = 10), 8-spored, bitunicate, fissitunicate, subglobose, broadly ovoid to subclavate, apically thickened, with an ocular chamber, 1–2(-3) µm diameter, pedicel knob-like. *Ascospores* 21.5–28 × 6–8.5 µm (\bar{x} = 24 × 7 µm, n = 10), overlapping 3–4-seriate, ellipsoidal oblong, upper cell slightly broader and shorter than lower cell, 1-septate, constricted and dark pigmented at the septum, hyaline when immature and brown at maturity, with granulate cells. Asexual morph: Undetermined.

Material examined – MEXICO, Sonora, in the vicinity of Álamos, on living leaves of *Agave* sp. L (*Asparagaceae*), March 1910, J.N. Rose No.13063 (NY 02977047).

Notes – We were unable to examine the holotype specimen, therefore, the description and illustration herein, is from an authentic specimen of *Stomatogene agaves* (NY 02977047).

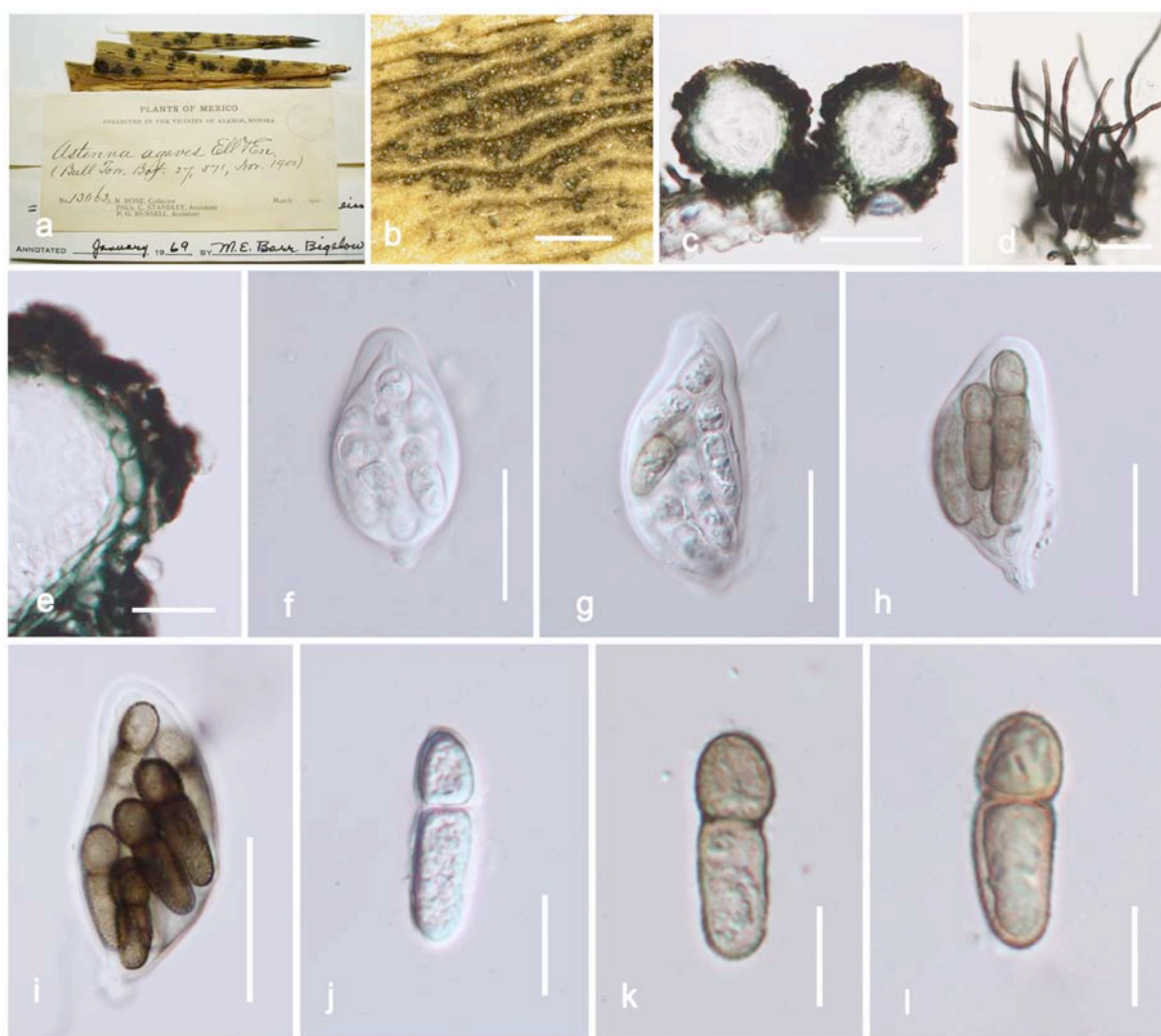


Figure 93 – *Stomatogene agaves* (NY 02977047). a Herbarium specimen and habit on leaves. b Appearance of ascomata. c Section of ascomata on leaf surface. d Mycelium. e Peridium. f–i Immature and mature asci. j–l Ascospores. Scale bars: b = 500 μ m, c, d = 50 μ m, e–i = 20 μ m, j–l = 10 μ m.

Stomatogene yuccae Hansf., Sydowia 11(1-6): 68 (1958) [1957]

Index Fungorum number: IF306516; Facesoffungi number: FoF03706

Fig. 94

Parasitic on living leaves of *Yucca mohavensis* Sarg., superficial, with large colonies, dark brown, subcircular, irregular, lacking superficial hyphae. Sexual morph: *Ascomata* 139.5–178 μ m diameter \times 135–152 μ m high, superficial, seated on a subiculum, thickened at the base, gregarious, solitary, globose to subglobose, black, with apical ostiole, 25–29 μ m diameter, lacking a hypostroma. *Peridium* 16–26 μ m wide, comprising 3–4(–5) layers of dark brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 52–88 \times 30–46 μ m (\bar{x} = 69.5 \times 37.5 μ m, n = 20), 8-spored, bitunicate, fissitunicate, subglobose, broadly ovoid to subclavate, apically thickened, with minute and thin ocular chamber, pedicel 6–12.5 μ m long \times 6–8 μ m wide, sometimes knob-like. *Ascospores* 27–35 \times 8–9 μ m (\bar{x} = 30 \times 9 μ m, n = 20), 3–4-seriate, ellipsoidal oblong, upper cell slightly broader and shorter than lower cell, 1-septate when immature, becoming 3-septate at maturity, slightly constricted at the septa, hyaline to light brown, with granulate cells, verruculose or verrucose. Asexual morph: Undetermined.

Material examined – USA, California, Camp Kearny, Sonora, on living leaves of *Yucca mohavensis* Sarg. (*Asparagaceae*), altitude 400 feet, 17 February 1929, H.E. Parks No. 3379 (Calif. Fungi 576), (NY 01047119, isotype).

Notes – *Stomatogene yuccae* was introduced as a new species by Hansford (1958) [1957] and shares morphological features with the type species *S. agaves*. However, *S. yuccae* differs in lacking setae and having 1–3-septate, verruculose ascospores.



Figure 94 – *Stomatogene yuccae* (NY 01047119, isotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Peridium. e, f Immature and mature asci. g, h Ascospores. Scale bars: b = 200 μ m, c = 50 μ m, d–f = 20 μ m, g, h = 10 μ m.

***Teratosphaeriaceae* Crous & U. Braun**

The genus *Placocrea* which was placed in *Mycosphaerellaceae* (Lumbsch & Huhndorf 2007, 2010, Hyde et al. 2013, Wijayawardene et al. 2014), based on anastomosing pseudoparaphyses, therefore, *Placocrea* can be placed in *Teratosphaeriaceae*.

***Placocrea* Syd., Anns mycol. 37(4/5): 380 (1939)**

Parasitic associated with living leaves. Sexual morph: *Ascstromata* superficial, easily removed from the host surface, orange-brown to black, flattened to slightly raised, pad-like, circular to undulate, or orbicular, yellowish to orange around the ascostromata, gregarious or

solitary, fleshy, soft when rehydrated by water, easily cracking when dry, stromatal structure composed of palisade- to globular, orangish cells. *Ascomata* semi-immersed to superficial, orange-yellowish to orange-brown, globose to subglobose, or ovoid, soft and fleshy, scattered, gregarious, with apical ostiole, with thick, septate, hairy ostiole, surrounded by loose, hyphae. *Peridium* comprising 4–7 layers of orange-yellowish, pseudoparenchymatous cells, arranged in a *textura angularis* to *prismatica*. *Hamathecium* comprising dense, anastomosed, cellular pseudoparaphyses branched at the apex. *Asci* 8-spored, bitunicate, fissitunicate, cylindrical to cylindric-clavate or ampulliform, subsessile, apex rounded, with an indistinct ocular chamber. *Ascospores* overlapping 2–3-seriate, hyaline to subhyaline, becoming pale yellowish in mass, oblong to fusiform, 1-septate, upper cell larger than lower cell. Asexual morph: Undetermined.

Type species – *Placocrea pulchella* Syd.

Notes – *Placocrea* was introduced by Sydow & Sydow (1939) as a monotypic genus to accommodate an epiphytic taxon occurring on *Sarcorhachis sydowii*. The genus was characterized by “ascostromata thinly crustaceous, more or less orbicular, definitely acute, with numerous ascomata in the ascostroma penetrating the leaves, dense, gregarious, globose to ovoid, light-coloured perithecial ascomata; 8-spored, clavate to cylindric-clavate asci, with paraphyses, mucilaginous; ascospores 2-celled, hyaline” (Sydow & Sydow 1939). *Placocrea* is a poorly known genus and lacks a modern taxonomic description or molecular data to clarify its natural placement. Since Sydow & Sydow (1939) introduced the genus, which was re-described by Petrak (1952), the genus has never been re-visited. Sydow & Sydow (1939) mentioned that the genus was closely related to *Nectria* based on its ascostromal characteristics. However, Petrak (1952) disagreed with Sydow & Sydow (1939) and concluded that the genus was typical of *Mycosphaerella*. Therefore, *Placocrea* has been listed in *Mycosphaerellaceae* by subsequent authors (von Arx & Müller 1975, Kirk et al. 2001, 2008, Lumbsch & Huhndorf 2007, 2010, Hyde et al. 2013, Wijayawardene et al. 2014). Hyde et al. (2013) re-circumscribed the genera in *Mycosphaerellaceae* and noted that the taxonomic position of *Placocrea* was unproven and its placement was questionable in *Mycosphaerellaceae*. In this study, we examine the type specimens of *Placocrea pulchella* from BPI and S herbaria. Based on morphological examination, *P. pulchella* formed branched, anastomosing cellular pseudoparaphyses, which is different from the original description as Sydow & Sydow (1939) mentioned its pseudoparaphyses were represented by a mucilaginous matrix. *Mycosphaerellaceae* is defined by small ascomata, bitunicate, cylindrical to cylindric-clavate to ampulliform, subsessile asci, lacking pseudoparaphyses and hyaline to subhyaline, fusiform, oblong to ellipsoidal, ascospores (Crous et al. 2009, Hyde et al. 2013). *Placocrea* can be distinguished from other genera in *Mycosphaerellaceae* by the presence of pseudoparaphyses. *Placocrea* is therefore treated in *Teratosphaeriaceae* based on its life mode as parasites and anastomosing pseudoparaphyses (Hyde et al. 2013).

Placocrea pulchella Syd., Anns mycol. 37(4/5): 380 (1939)

Index Fungorum number: IF275600; Facesoffungi number: FoF03717

Fig. 95

Parasitic associated with living leaves of *Sarcorhachis sydowii* Trel. Sexual morph: *Ascostromata* 1.5–3 mm diameter × 1.5–4.5 mm long, superficial, easily removed from the host surface, orange-brown to black, flattened to slightly raised, pad-like, a circular to undulate area, or orbicular, with yellowish to orangish around the ascostromata, clustered or solitary, gregarious, fleshy, soft when rehydrated by water, easily cracking when dry, stromatal structure composed of palisade- to globular, orangish cells. *Ascomata* 70–110 µm diameter × 70–120 µm high, semi-immersed to superficial, orange-yellowish to orange-brown, globose to subglobose, or ovoid, soft and fleshy, scattered, gregarious, with apical ostiole, with thick, septate hairy ostiole, surrounded by loose hyphae. *Peridium* 7–23 µm wide, comprising 4–7 layers of orange-yellowish, pseudoparenchymatous cells, arranged in a *textura angularis* to *prismatica*. *Hamathecium* 1–2 µm wide, comprising dense, apically branched, anastomosed, cellular pseudoparaphyses. *Asci* (32–)35–45(–50) × 8–10(–12) µm (\bar{x} = 39.5 × 10 µm, n = 25), 8-spored, bitunicate, fissitunicate, cylindrical to cylindric-clavate or ampulliform, subsessile, apex rounded, with an indistinct ocular chamber.

Ascospores 10–13(–15) × 3–4 μm (\bar{x} = 12.5 × 3.5 μm, n = 30), overlapping 2–3-seriate, hyaline to subhyaline, becoming pale yellowish in mass, oblong to fusiform, with rounded to acute ends, 1-septate, constricted at the septum, smooth and thick-walled, upper cell larger than lower cell. Asexual morph: Undetermined.

Material examined – ECUADOR, Pichincha Province, near Mindo, alt. m. 1200–1300, on *Sarcorrhachis sydowii* Trel. (*Convolvulaceae*), 28 October 1937, H. Sydow 252 (S-F44505, syntype); *ibid.* on leaves of *Sarcorrhachis sydowii*, 6 November 1937, H. Sydow (BPI 631051, holotype).

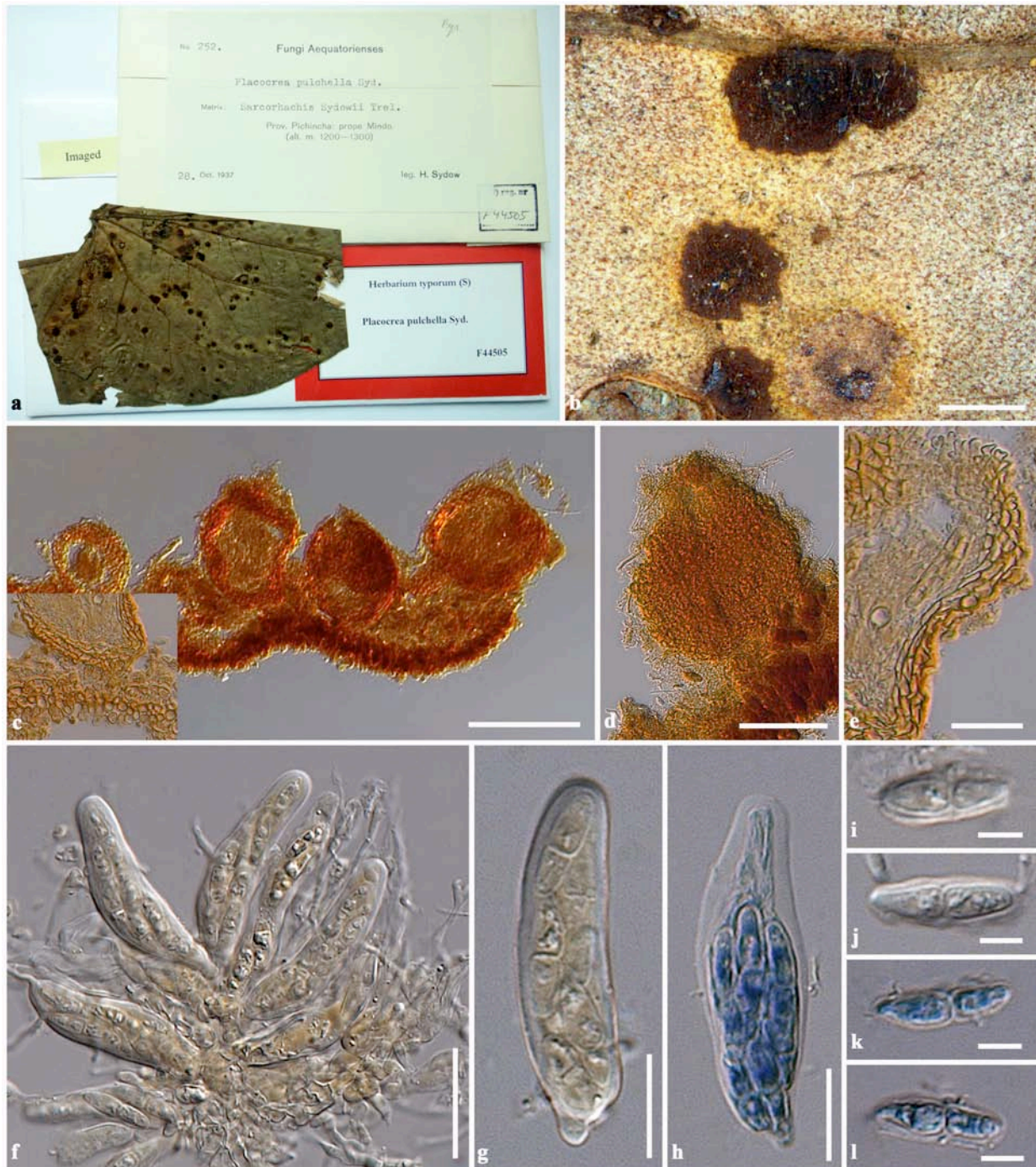


Figure 95 – *Placocrea pulchella* (S-F44505, syntype). a Herbarium specimen and habit on leaves. b Appearance of ascostromata on leaf surface. c Section of ascostroma. d Squash mount of ascoma. e Peridium. f Asci with pseudoparaphyses. g Ascus. h Ascus stained in cotton blue. i–l Ascospores stained in cotton blue. Scale bar: b = 2000 μm, c = 100 μm, d–f = 20 μm, i–l = 5 μm.

Toroaceae Boonmee & K.D. Hyde, fam. nov.

Index Fungorum number: IF553838; Facesoffungi number: FoF03708

Saprobic on dried leaves. Sexual morph *Ascomata* superficial, globose to subglobose, solitary to gregarious, scattered, black, with a subiculum, collapsing when dry, with apical ostiole. *Peridium* comprising red brown to dark brown cells of *textura angularis*. *Asci* 4-spored, bitunicate, oblong-ellipsoid to ovoid, sessile, apically thickened. *Ascospores* 2-seriate, ellipsoid-fusiform, narrow towards the ends, pale brown to orange brown, light at both ends, smooth-walled. Asexual morph Undetermined.

Family type – *Toroa* Syd.

Notes – *Toroaceae* is introduced to accommodate the genus *Toroa* based on the type species *Toroa dimerosporioides*. The family is characterised by superficial, sphaerical, dark brown, ascomata with setae, 4-spored per asci, and multi-septate, pigmented ascospores. *Toroa* differs from other families in the *Dothideomycetes* by having only four ascospores in the ascus and a combination of other characters.

Toroa Syd., in Toro, J. Dept. Agric. Porto Rico 10(2): 19 (1926)

Saprobic on dead leaves. Sexual morph: *Ascomata* superficial, globose to subglobose, solitary to gregarious, scattered, black, with a subiculum, collapsing when dry, with apical ostiole. *Peridium* comprising red brown to dark brown cells of *textura angularis*. *Asci* 4-spored, bitunicate, oblong-ellipsoid to ovoid, sessile, apically thickened. *Ascospores* 2-seriate, ellipsoid-fusiform, narrow towards the ends, 2–3-septate, constricted at the septa, pale brown to orange brown, light at both ends, smooth-walled. Asexual morph: Undetermined.

Type species – *Toroa dimerosporioides* (Speg.) Syd. [as 'dimerosporoides']

Notes – Sydow (in Toro 1926) revised five taxa on the same host family *Bromeliaceae*, *Asteridium dimerosporioides*, *Zukalia dimerosporioides*, *Gibberella dimerosporoides*, *Perisporium bromeliae* and *Chaetosphaeria bromeliae* and found that all are the same fungus. Therefore, Sydow (1926) introduced the genus *Toroa* to accommodate this fungus under the name *Toroa dimerosporioides*, as type species. (type species) and separated it from the genera *Asteridium*, *Chaetosphaeria*, *Gibberella*, *Perisporium* and *Perisporium* (Spegazzini 1888, Saccardo 1891, von Höhnelt 1907, Stevens 1917, González Frago & Ciferri 1925, Toro 1926). Hansford (1946) reexamined three specimens *Asteridium dimerosporioides* (no. 4059, holotype), *Perisporium bromeliae* (no. 136) and *Chaetosphaeria bromeliae* (no 7034), and confirmed that all taxa are the same fungus. Furthermore, *Toroa saurauiae* (Basionym: *Meliolina saurauiae* Stev. & Rold.) was added to the genus, but its basionym was invalid (Art. 39.1, Melbourne). Barr (1997) included *Toroa* in the family *Pseudoperisporiaceae*. The genus is characterized by superficial ascomata, bitunicate asci, lacking pseudoparaphyses, four spores per asci and 2–3-septate, pale brown to orange brown ascospores which are light at both ends. These characters can distinguish *Toroa* from other genera in *Pseudoperisporiaceae* and other families in the *Dothideomycetes*. The genus is therefore placed in its own family *Toroaceae*.

Toroa dimerosporioides (Speg.) Syd. [as 'dimerosporoides'], J. Dept. Agric. Porto Rico 2: 20 (1926)

≡ *Asteridium dimerosporioides* Speg., Anal. Soc. cient. argent. 26(1): 19 [no. 50] (1888)

= *Zukalia dimerosporioides* (Speg.) Sacc., Syll. fung. (Abellini) 9: 434 (1891)

= *Gibberella dimerosporoides* (Speg.) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 116: 617 (1907)

= *Botryosphaeria dimerosporoides* (Speg.) Weese, Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 128: 708 (1919)

= *Perisporium bromeliae* F. Stevens, Trans. Ill. St. Acad. Sci. 10: 168 (1917)

= *Chaetosphaeria bromeliae* Gonz. Frag. & Cif., Boln Real Soc. Españ. Hist. Nat., Biologica 25: 449 (1925)

Index Fungorum number: IF263219; Facesoffungi number: FoF03245

Figs 96, 97

Saprobic on dead leaves of *Bromelia pinguin*. Sexual morph: *Ascomata* 99–119 μm diameter \times 111–122 μm high, superficial, globose to subglobose, solitary to gregarious, scattered, black, with a subiculum, collapsing when dry, with apical ostiole. *Peridium* 14.5–20 μm wide, comprising 3–4 layers of red brown to dark brown cells of *textura angularis*. *Asci* (59.5–)67–72(–75) \times (22–)26–30(–33) μm (\bar{x} = 68 \times 28 μm , n = 10), 4-spored, bitunicate, oblong-ellipsoid to ovoid, sessile, apically thickened. *Ascospores* (32–)35–38(–75) \times (9.5–)10–12 μm (\bar{x} = 35 \times 11 μm , n = 10), 2-seriate, ellipsoid-fusiform, narrow ends, 2–3-septate, constricted at the septa, pale brown to orange brown, light both ends, smooth-walled. Asexual morph: Undetermined.

Material examined – PARAGUAY, Paraguari, on leaves of *Bilbergia* / *Pitcarinia* sp. (*Bromeliaceae*), October 1893, B. Balansa, BAFC / LPS673 under the name *Zukalia dimerosporioides* (Speg.) Sacc. and PUERTO RICO, La Vega, on dried leaves *Bromelia pinguin* L. (*Bromeliaceae*), 19 March 1919, Kern and R.A. Toro (No. 207 / No. I.T.A 5413, BPI 692120)

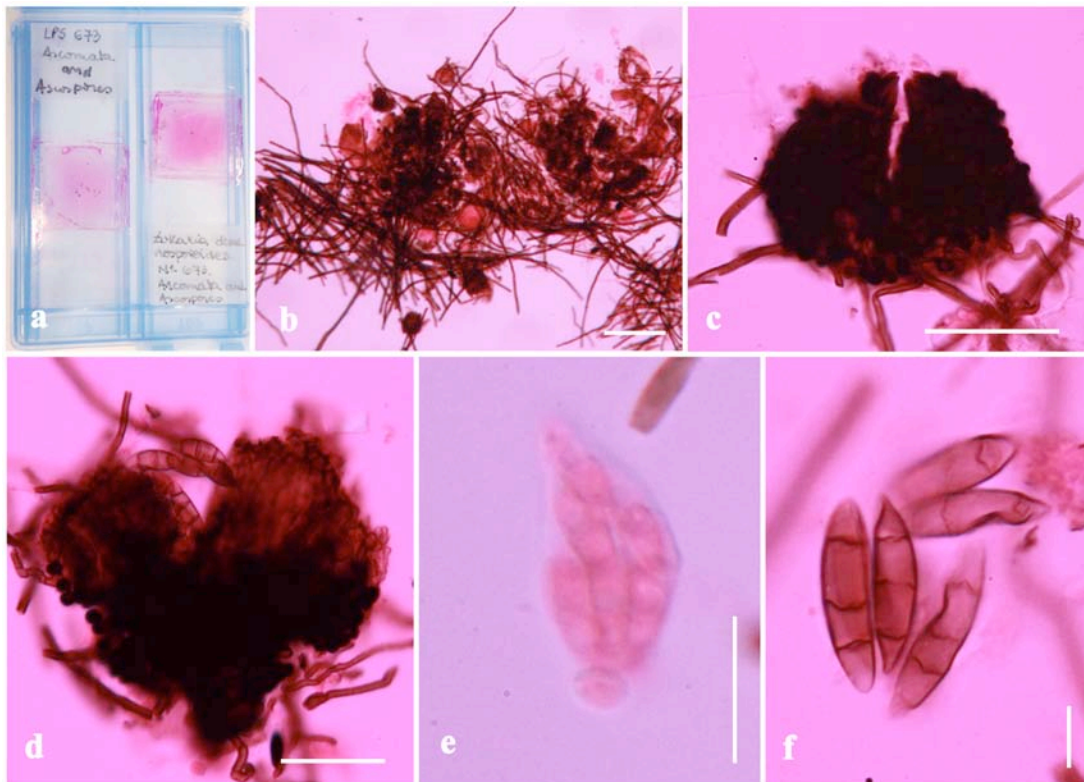


Figure 96 – *Toroa dimerosporioides* (BAFC / LPS673). a Slide specimens. b Squash mount of ascomata with aerial hyphae. c, d Squash mount of ascomata. e Ascus. f Ascospores. Scale bars: a = Specimen, b = 100 μm , c, d = 50 μm , e = 20 μm , f = 10 μm .

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

Three genera *Dimeriella* and *Neocoleroa* are placed in the family *Venturiaceae* based on features of ascomata and ascospores (Zhang et al. 2011, Hyde et al. 2013).

Dimeriella Speg., Revta Mus. La Plata 15(2): 12 (1908)

Saprobic on dead leaves. Sexual morph: *Ascomata* superficial, solitary, scattered, globose to subglobose, black, covered by hyaline mycelium, with sparse setae, olivaceous to dark brown, tapering towards the subacute apex, septate. *Peridium* 10–13 μm wide, comprising dark brown cells of *textura angularis*, inner layers reddish-brown, lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, ovoid-subclavate, sessile, apically thickened. *Ascospores* 2-seriate, 1-septate, constricted at the septum, hyaline, becoming brownish at maturity, smooth-walled. Asexual morph: Undetermined.

Type species – *Dimeriella hirtula* Speg.



Figure 97 – *Toroa dimerosporioides* (BPI 692120). a Herbarium specimen and habit on leaf. b Appearance of ascomata on leaf surface. c Section of ascoma. d Peridium. e Cells of hamathecium in gelatinous matrix. f, g Asci. h–j Ascospores. Scale bars: a = Material label, b = 100 μm , c, f, g = 50 μm , d, h–j = 20 μm , e = 10 μm .

Notes – Spegazzini (1908) introduced the genus *Dimeriella* based on the type species *D. hirtula* which he separated from *Dimerosporium*. Typically, the ascomata are small, subglobose, darkly pigmented, with sparse dark brown and short setae and lack pseudoparaphyses. The genus *Dimeriella* and its type species, *D. hirtula*, have been re-examined and compared with several genera and families based on some similar morphology (Theissen & Sydow 1917, Toro 1939, Hansford 1946, Müller & von Arx 1962, Farr 1963, 1965). Farr (1979) re-examined and described several didymosporous dimeriaceous fungi on the host family *Asteraceae*, and he excluded the genus *Dimeriella* from the family *Dimeriaceae* based on the centrum structure of the type species, *D. hirtula*. Hyde et al. (2013), included *Dimeriella* in the family *Perisporiopsidaceae* (= *Parodiellinaceae* G. Arnaud) based on its habitat and characteristics. *Dimeriella* shares several characters in common with genera in *Venturiaceae* such as superficial, dark pigmented, sparse, short setae, and 1-septate, hyaline to brown ascospores.

Dimeriella hirtula Speg. Revta Mus. La Plata 15(2): 12 (1908)

Index Fungorum number: IF168238; Facesoffungi number: FoF03709

Fig. 98

Saprobic on dead leaves of *Baccharis brevifolia* DC. Sexual morph: *Ascomata* 80–82 μm diameter \times 80–86.5 μm high, superficial, solitary, scattered, globose to subglobose, black, covered by hyaline mycelium, with sparse setae, 21–39(–43) μm long, olivaceous to dark brown, tapering towards the subacute apex, septate. *Peridium* 10–13 μm wide, comprising dark brown cells of *textura angularis*, inner layers reddish-brown, lacking pseudoparaphyses. *Asci* (32–)35–46(–49) \times 14–19.5(–20.5) μm (\bar{x} = 40 \times 17 μm , n = 10), 8-spored, bitunicate, fissitunicate, ovoid-subclavate, sessile, apically thickened. *Ascospores* (13–)15–18 \times 5–8 μm (\bar{x} = 15 \times 6 μm , n = 20), 2-seriate, 1-septate, constricted at the septum, hyaline, becoming brownish at maturity, smooth-walled. Asexual morph: Undetermined.

Material examined – BRAZIL, Sierra de Itatiaya, on leaves of *Baccharis brevifolia* DC. (*Asteraceae*), June 1902, P. Dusen Nr. 662 (FH, isotype).



Figure 98 – *Dimeriella hirtula* (Nr. 662 (FH), isotype). a Herbarium specimen and habitat on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Seta. e Peridium. f–h Asci. i, j Ascospores. Scale bars: b = 100 μm , c = 50 μm , d, f–h = 20 μm , e, i, j = 10 μm .

Neocoleroa Petr., Hedwigia 74: 39 (1934)

Saprobic on dead branches of dicotyledons. Sexual morph: *Ascomata* superficial, solitary, or scattered, uniloculate, on sparse subiculum, dark brown to black, globose to subglobose, surrounded by dark brown and stiff setae, septate, tapering towards an acute apex, short papillate, with apical ostiole, 20–25 µm diameter. *Peridium* comprising dark brown cells of *textura angularis*. *Hamathecium* comprising numerous, cylindrical, filiform, septate, hyaline pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindrical-subclavate, saccate to narrowly clavate, sessile or with short pedicel. *Ascospores* biseriate, narrow ellipsoid-fusiform, oblong to obovate, 1-septate, hyaline. Asexual morph: Undetermined.

Type species – *Neocoleroa sibirica* Petr.

Notes – *Neocoleroa* was established by Petrak (1934) to accommodate a single species *N. sibirica* and is characterized by ascomata covered by numerous stiff setae, bitunicate asci and 1-septate, hyaline ascospores. von Arx & Müller (1975) synonymised *Neocoleroa* under *Wentomyces* in the family *Dimeriaceae*. Barr (1997) later placed it in the family *Pseudoperisporiaceae*. The genus comprises eleven epithets, but only three species are presently recognized in the genus, while the other eight taxa having superficial ascomata, with dark brown setae, bitunicate asci and 1-septate, hyaline ascospores were placed in *Wentomyces* (Index Fungorum 2017). *Neocoleroa metrosideri* (KU131677) was classified with phylogenetic analysis of LSU data and placed in the family *Symptoventuriaceae* (Johnston & Park 2016). Johnston & Park (2016) introduced a species *Neocoleroa metrosideri* based on the characteristics of setae which Barr (1997) described. The recent illustration of the type specimen *Neocoleroa sibirica* from W (Krypto 1978–0007650) show ascomata, asci, ascospores and setae as morphology different from *N. metrosideri* and the description in Barr (1997). Based on morphological characters of the type specimen, *Neocoleroa sibirica* differs from the taxa in *Symptoventuriaceae*. Therefore, we suggest that *Neocoleroa* should be placed in *Venturiaceae* rather than *Symptoventuriaceae*, however the type species needs recollecting and sequencing to confirm this.

Neocoleroa sibirica Petr., Hedwigia 74: 38 (1934)

= *Wentomyces sibiricus* (Petr.) E. Müll., in Müller & von Arx 1962

Index Fungorum number: IF278078; Facesoffungi number: FoF03707

Fig. 99

Saprobic on dead branches of *Vaccinium myrtillus* L. Sexual morph: *Ascomata* 114–143 µm diameter × 105–117.5 µm high, superficial, solitary, scattered, uniloculate, with sparse subiculum, dark brown to black, globose to subglobose, surrounded by dark brown and stiff setae, 70–117.5 µm long × 5–12.5 µm wide, septate, tapering towards the acute apex, short papillate, with apical ostiole, 20–25 µm diameter. *Peridium* 20–25 µm wide, comprising 2–3(–4) layers of dark brown cells of *textura angularis*. *Hamathecium* comprising numerous, cylindrical, filiform, septate, hyaline pseudoparaphyses. *Asci* 40–52.5 × 5–10 µm (\bar{x} = 48 × 7 µm, n = 20), 8-spored, bitunicate, cylindrical-subclavate, saccate to narrowly clavate, sessile or with short pedicel. *Ascospores* 10–12.5 × 2.5 µm (\bar{x} = 11 × 2.5 µm, n = 20), biseriate, narrowly ellipsoid-fusiform, oblong to obovate, 1-septate, constricted at the septum, hyaline, smooth-walled. Asexual morph: Undetermined.

Material examined – RUSSIA, Russian Federation, Siberian Federal District, on dead branches of *Vaccinium myrtillus* L. (*Ericaceae*), 22 July 1927, K.E. Murashkin (No. 20a), (W Krypto 1978–0007650, holotype).

Dothideomycetes* genera, *incertae sedis

The following genera have few distinguishing characters, therefore, we treat these in *Dothideomycetes* genera, *incertae sedis*.

Eumela Syd., Annl. mycol. 23(3/6): 335 (1925)

Parasitic on living leaves, superficial, colonies large, irregular, black, numerous superficial mycelium forming a network, dark brown outwardly. Sexual morph: *Ascomata* superficial, solitary, scattered, globose to subglobose, black, surrounded by brown to dark brown appendaged hyphae,

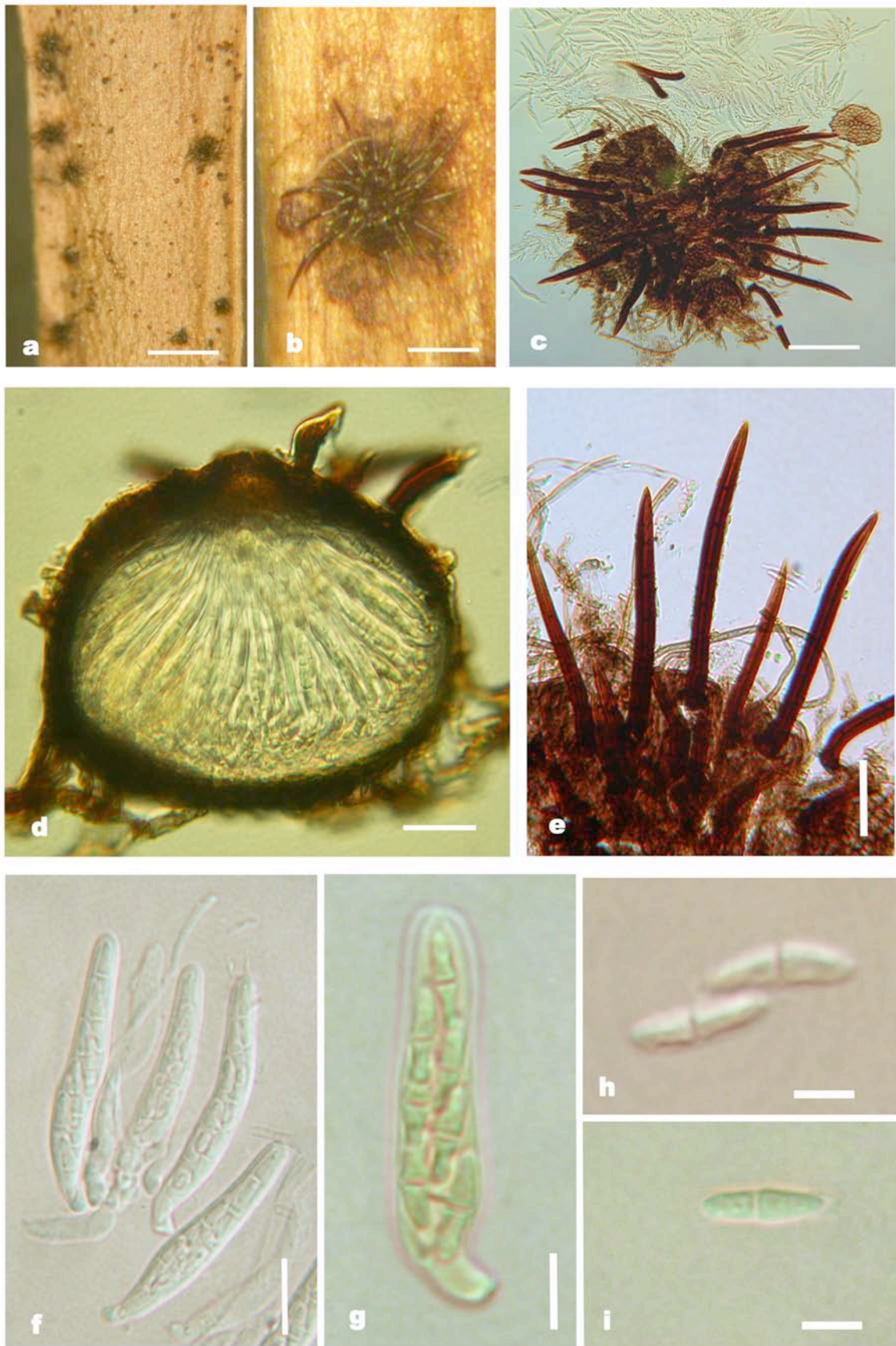


Figure 99 – *Neocoleroa sibirica* (W Krypto 1978–0007650, holotype). a Herbarium specimen and habit on branch. b Appearance of ascoma on branch. c Squash mount of ascoma with setae. d Section of ascoma and peridium. e Close up of setae. f, g Asci. h, i Ascospores. Scale bars: a–e, g–j = 25 μm, f = 5 μm, h–i = 2.5 μm.

longer than 100 μm , branched, septate. *Peridium* comprising brown cells of *textura angularis* to *subglobosa*, lacking pseudoparaphyses. *Hairy hyphae* longer than 100 μm , pale brown to dark brown, simple, unbranched, numerous, straight or curved, septate, gradually paler upwards, flexuous, slightly constricted at the septa, apex rounded. *Asci* 8-spored, bitunicate, broadly-clavate, obovate or subglobose, sessile, slightly thickened near the apex. *Ascospores* multi-seriate, oblong to ovoid oblong, ends rounded, 1-septate usually towards the lower end (occasionally median), slightly constricted at the septum, hyaline, smooth-walled. Asexual morph: Undetermined.

Type species – *Eumela chiococcae* Syd.

Notes – The genus *Eumela* was introduced by Sydow (1925) with *E. chiococcae* as the type species. It has been placed in *Pseudoperisporiaceae* in Lumbsch & Huhndorf (2010), Hyde et al. (2013) and Wijayawardene et al. (2014). This genus is characterized by superficial ascomata, with appendaged hyphae, broadly obovoid asci, with hyaline to smoky or brown, 1-septate ascospores (Sydow 1925, Farr 1984, Hyde et al. 2013). *Eumela* is closely related to *Episphaerella* Petr., *Eudimeriolum* Speg. and *Lasiostemma* Theiss. & Syd., but it differs from these genera as its hyphae do not form on a cuticular layer, but penetrate the epidermal cells (including stomata and guard cells) by delicate hyphae which may form haustoria; hyphae of *Episphaerella* form extensive mycelium throughout the leaf tissues, but usually with only limited superficial mycelium. The hyphae of *Eudimeriolum* are entirely superficial or penetrating trichomes. The hyphae of *Lasiostemma* form a discrete hyphal layer in or under the cuticle (Farr 1984, Barr 1987). There are no reports of an asexual morph and no sequence data in NCBI database (<http://www.ncbi.nlm.nih.gov/>). Therefore, we treat *Eumela* in *Dothideomycetes* genera, *incertae sedis*.

Eumela chiococcae Syd., Anns mycol. 23(3/6): 335 (1925)

Index Fungorum number: IF260515; Facesoffungi number: FoF03713 Figs 100, 101

Parasitic on living leaves of *Chiococca racemosa*, superficial, colonies large, irregular, black, with numerous superficial mycelium forming a network, dark brown outwardly. Sexual morph: *Ascomata* 49–54 μm diameter \times 48–54.5 μm high, superficial, solitary, scattered, globose to subglobose, black, surrounded by brown to dark brown appendaged hyphae, longer than 100 μm , branched, septate. *Peridium* comprising brown cells of *textura angularis* to *subglobosa*, lacking pseudoparaphyses. *Hairy hyphae* longer than 100 μm , pale brown to dark brown, simple, unbranched, numerous, straight or curved, septate, gradually paler upwards, flexuous, slightly constricted at the septa, apex rounded. *Asci* 20–23(–25) \times (7–)8.5–12 μm (\bar{x} = 22 \times 9.5 μm , n = 10), 8-spored, bitunicate, broadly clavate, obovate or subglobose, sessile, slightly thickened near the apex. *Ascospores* 9–12 \times 2–4 μm (\bar{x} = 11 \times 3 μm , n = 10), multi-seriate, oblong to ovoid oblong, ends rounded, 1-septate usually towards lower end (occasionally median), slightly constricted at the septum, hyaline, smooth-walled. Asexual morph: Undetermined.

Material examined – COSTA RICA, Alajuela, Grecia, on living leaves of *Chiococca racemosa* L., (*Rubiaceae*), 19 January 1925, H. Sydow, Poelt & Scheuer, Reliqu. Petrak. nr. 1620, (S-F11418, holotype = BPI 626994, isotype).

Leptomeliola Höhn. Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 128: 557 (1919)

Parasitic on living leaves. *Colonies* superficial, with radiating mycelium, branched, septate, dark brown, numerous with hyphopodia, with long setae, tapering towards apex narrow and obtuse, slightly curved, septate, dark brown. Sexual morph: *Ascomata* superficial, subglobose, papillate. *Asci* 8-spored. *Ascospores* somewhat small, oval ellipsoid, 4-celled, transparent, colourless. Asexual morph: Undetermined.

Type species – *Leptomeliola hyalospora* (Lév.) Höhn.

Notes – *Leptomeliola* was introduced by von Höhnel (1919) based on type species *L. hyalospora* (= *Meliola hyalospora* Lév.) and separated from the genus *Meliola* based on bitunicate asci. The genus *Leptomeliola* has been revised and synonymised with other genera by some mycologists (Hughes 1993, Eriksson & Hawksworth 1993). Barr (1997) revised several genera and

placed *Leptomeliola* in *Pseudoperisporiaceae*. Kirk et al. (2008) and Lumbsch & Huhndorf (2010) placed this genus in *Parodiopsidaceae*. Silvério et al. (2011) found *L. uvariae* in South America and clearly described asci as clavate and bitunicate. Recent studies based on molecular phylogeny indicated that *Leptomeliola ptilidii* clustered with the clade of *Epibryon*, *Epibryaceae* (Stenroos et al. 2010, Gueidan et al. 2014). However, the morphological features of *Leptomeliola ptilidii* of the strain no. M186 from Finland was not seen in Stenroos et al. (2010) and Gueidan et al. (2014). *Leptomeliola* is rather atypical for the families *Epibryaceae* and *Perisporiopsidaceae* by its hyphal colonies and ascospore features. We therefore treat *Leptomeliola* in *Dothideomycetes* genera, *incertae sedis*.

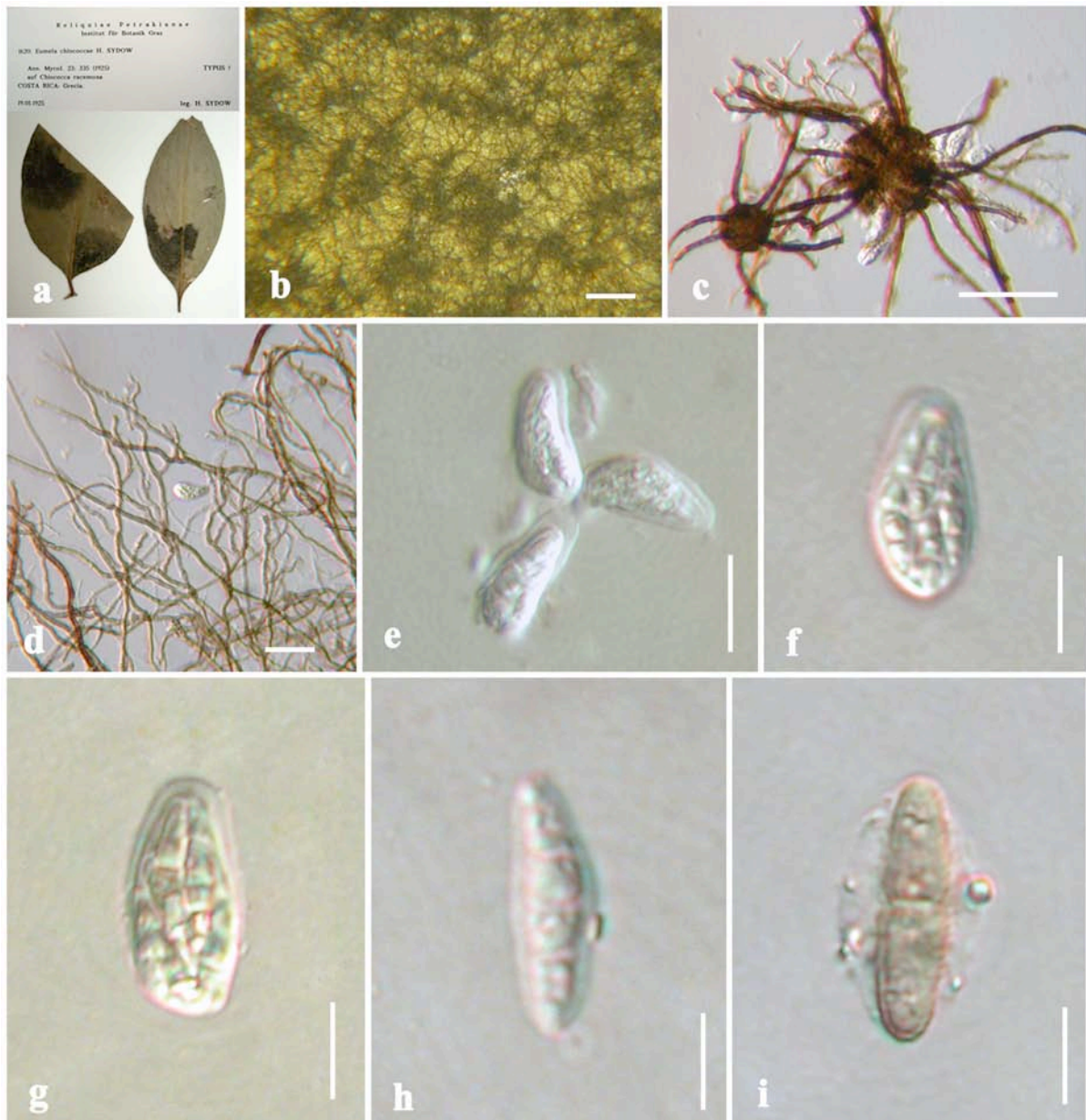


Figure 100 – *Eumela chiococcae* (S-F11418, holotype). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c, d Squash mount of ascoma, peridium and mycelia. e–g Asci. h, i Ascospores. Scale bars: b–d = 50 μ m, e–h = 20 μ m, h–i = 10 μ m.

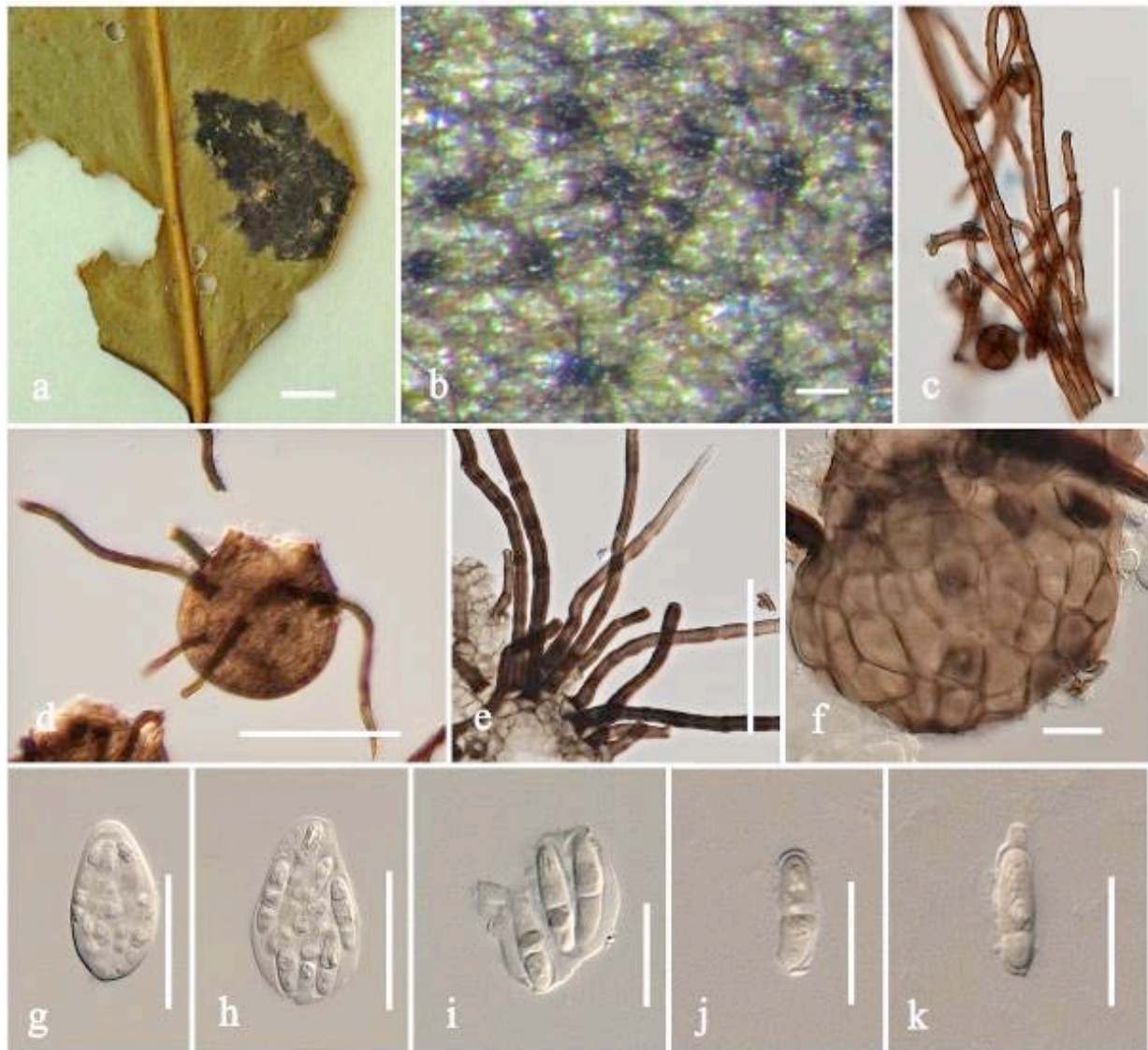


Figure 101 – *Eumela chiococcae* (BPI 626994, isotype). a Herbarium specimen and habit on leaf. b Appearance of ascomata. c–f Squash mount of ascoma, mycelia and peridium. g, h Asci. i–k Ascospores. Scale bars: b–e = 50 μ m, f, i–k = 10 μ m, g–h = 20 μ m.

Leptomeliola hyalospora (Lév.) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 128: 558 (1919)

≡ *Meliola hyalospora* Lév., Anns Sci. Nat., Bot., sér. 3 5: 256 (1846)

= *Meliolinopsis hyalospora* (Lév.) Beeli, Bull. Jard. bot. État Brux. 7: 119 (1920)

Index Fungorum number: IF431759; Facesoffungi number: FoF03714

Figs 102, 103

Parasitic on living leaves of *Desmoncus* sp. *Colonies* 2.5–5 mm diameter, superficial, with radiating mycelium, branched, septate, dark brown, numerous with hyphopodia, 15–22 μ m diameter, setae more than 200 μ m long \times 7–8 μ m wide, tapering towards narrow apex, obtuse at the apex, slightly curved, septate, dark brown. The ascomata, asci and ascospores are absent on the type material. The description of *M. hyalospora* on living leaves of *Desmonchi* sp., Kegel, No. 594 by Lévillé (1846) is as follows: Sexual morph: *Colonies* superficial, orbicular, effuse, outwardly radiating mycelium, branched, hyphopodia, with erect setae. *Ascomata* superficial, subglobose, papillate. *Asci* 8-spored. *Ascospores* somewhat small, oval ellipsoid, 4-celled, transparent, colourless (Note asci not mentioned as bi- or uni-tunicate). Asexual morph: Undetermined.

Material examined – SURINAME, on living leaves of *Desmonchi* (*Desmonchus* = *Desmoncus* sp.) (*Areaceae*), date not mentioned, M. Kegel 594 (ILL6481, isotype).

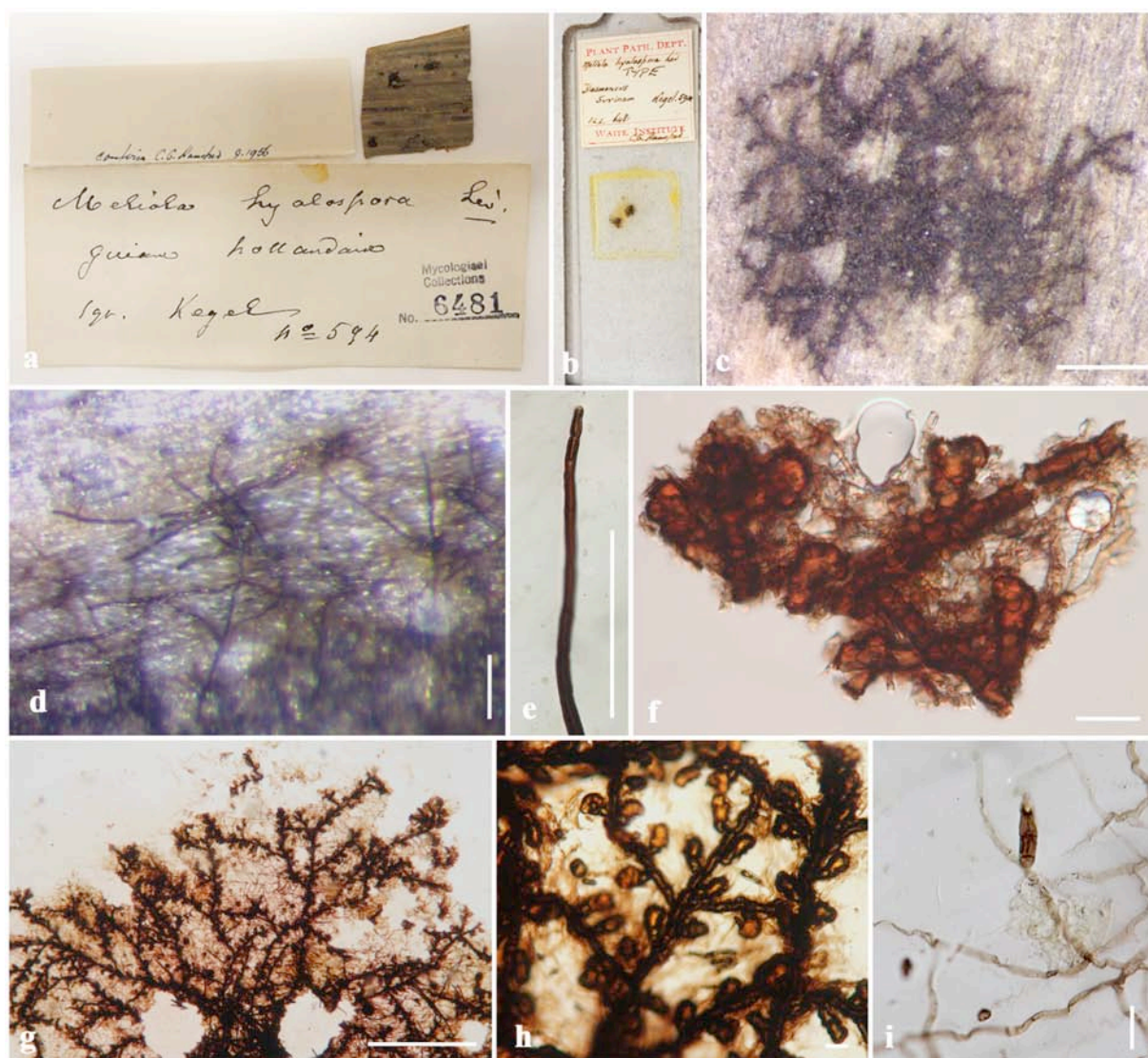


Figure 102 – *Leptomeliola hyalospora* (ILL6481, isotype). a Herbarium specimen and habit on leaf. b Slide samples. c Appearance of colony on leaf surface. d, e Close up of seta. f–h Squash mount of fungal colonies with hyphopodia. i Germinated spore. Scale bars: c, g = 500 μ m, d, e = 100 μ m, f, h, i = 20 μ m.

Leveillina Theiss. & Syd. 1915

Epifoliar on surface of leaves. Sexual morph: *Ascomata* solitary, erumpent, subglobose or subconical, with 2–3 locules, shiny, wrinkled, black. *Asci* bitunicate, clavate. *Ascospores* ellipsoid, 1-septate, constricted at the septum, brown (in Kalchbrenner & Cooke 1880). Asexual morph: *Conidiomata* superficial or semi-immersed on surface of leaves, same as sexual morph. *Peridium* thick at the upper part, comprising dark brown cells of *textura angularis*. *Conidiogenous cells* phialidic, cylindrical, hyaline. *Conidia* globose to subglobose, 1-celled, hyaline.

Type species – *Leveillina arduinae* (Kalchbr. & Cooke) Theiss. & Syd.

Notes – The genus was established by Theiss and Sydow (1915), with type species *Leveillina arduinae* (\equiv *Dothidea arduinae* Kalchbr. & Cooke). Only three species are listed in *Leveillina* in Index fungorum (2017). The placement of this genus is uncertain (Lumbsch & Huhndorf 2007, 2010). It is placed as *Dothideomycetes* genera, *incertae sedis* in Wijayawardene et al. (2014).

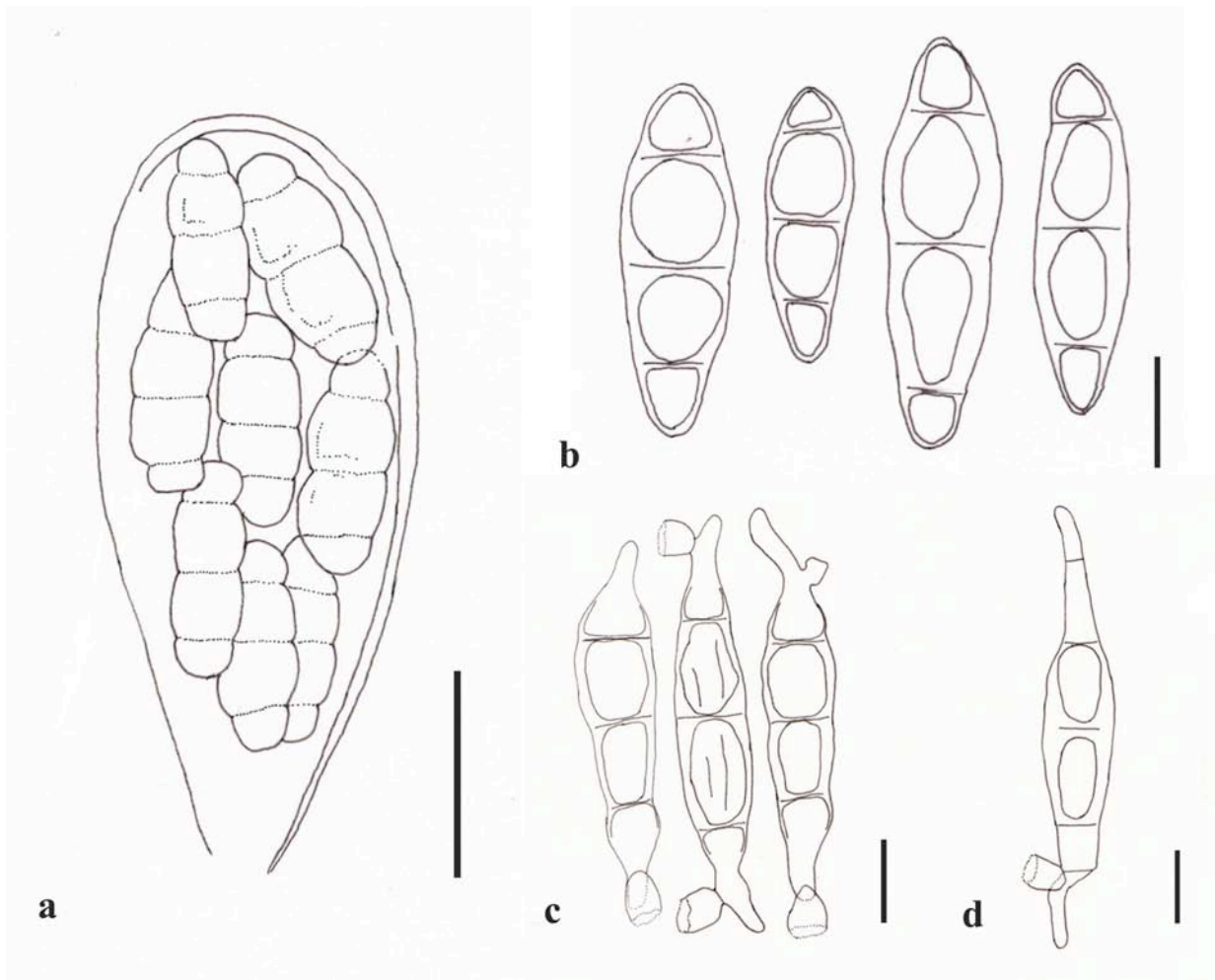


Figure 103 – *Leptomeliola hyalospora*. a Ascus (redrawn from L veill  1846). b Ascospores. c Germinated ascospores of *L. hyalospora* bearing collarettes. d Germinated conidia of *Spiropes helleri* bearing collarettes, some with phialoconidia. Note Figs b–d are redrawn from Hughes (1993). Scale bars: a = 20 μm , b–d = 10 μm .

Leveillina arduinae (Kalchbr. & Cooke) Theiss. & Syd., *Annls mycol.* 13(3/4): 286 (1915)

Index Fungorum number: IF157931; Facesoffungi number: FoF03715

Fig. 104

Epifoliar on surface of leaves of *Carissa arduino* Lam. Sexual morph: *Ascomata* solitary, erumpent, subglobose or subconical, with 2–3 locules, shiny, wrinkled, black. *Asci* bitunicate, clavate. *Ascospores* ellipsoid, 1-septate, constricted at the septum, brown (in Grevillea 1880). Asexual morph: *Conidiomata* 260–370 μm diameter \times 260–147 high, superficial or semi-immersed on the surface of leaves, same as sexual morph. *Peridium* 16–25 μm , thick at the upper part, comprising dark brown cells of *textura angularis*. *Conidiogenous cells* 3–4.5 \times 2–3 μm (\bar{x} = 4 \times 3 μm , n = 10), phialidic, cylindrical, hyaline. *Conidia* 5–7 \times 4.5–6 μm (\bar{x} = 6 \times 5 μm , n = 20), globose to subglobose, 1-celled, hyaline, outer layer seen in cotton blue regent.

Material examined – SOUTH AFRICA, Blouberg, on leaves of *Carissa arduino* Lam. (*Apocynaceae*), February 1878, McOwan 1354 (S-F68798, holotype).

Phaeostigme Syd. & P. Syd., *Annls mycol.* 15(3/4): 199 (1917)

Saprobic on upper surface of dried leaves. Sexual morph: *Ascomata* superficial, globose to subglobose, grouped, dark brown, glabrous, with exposed ostiole. *Peridium* comprising 3–4 layers of dark brown cells of *textura angularis*. *Hamathecium* expanded among asci, comprising branched, septate, hyaline, pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindric-subclavate, sessile, apically thickened, slightly narrow-obovoid, with small ocular chamber. *Ascospores* 2-

seriate, obovoid, slightly fusiform-ellipsoid, 1-septate, constricted at the septum, hyaline, becoming brownish to brown at maturity, surrounded by thin gelatinous sheath, smooth-walled. Asexual morph: Undetermined.

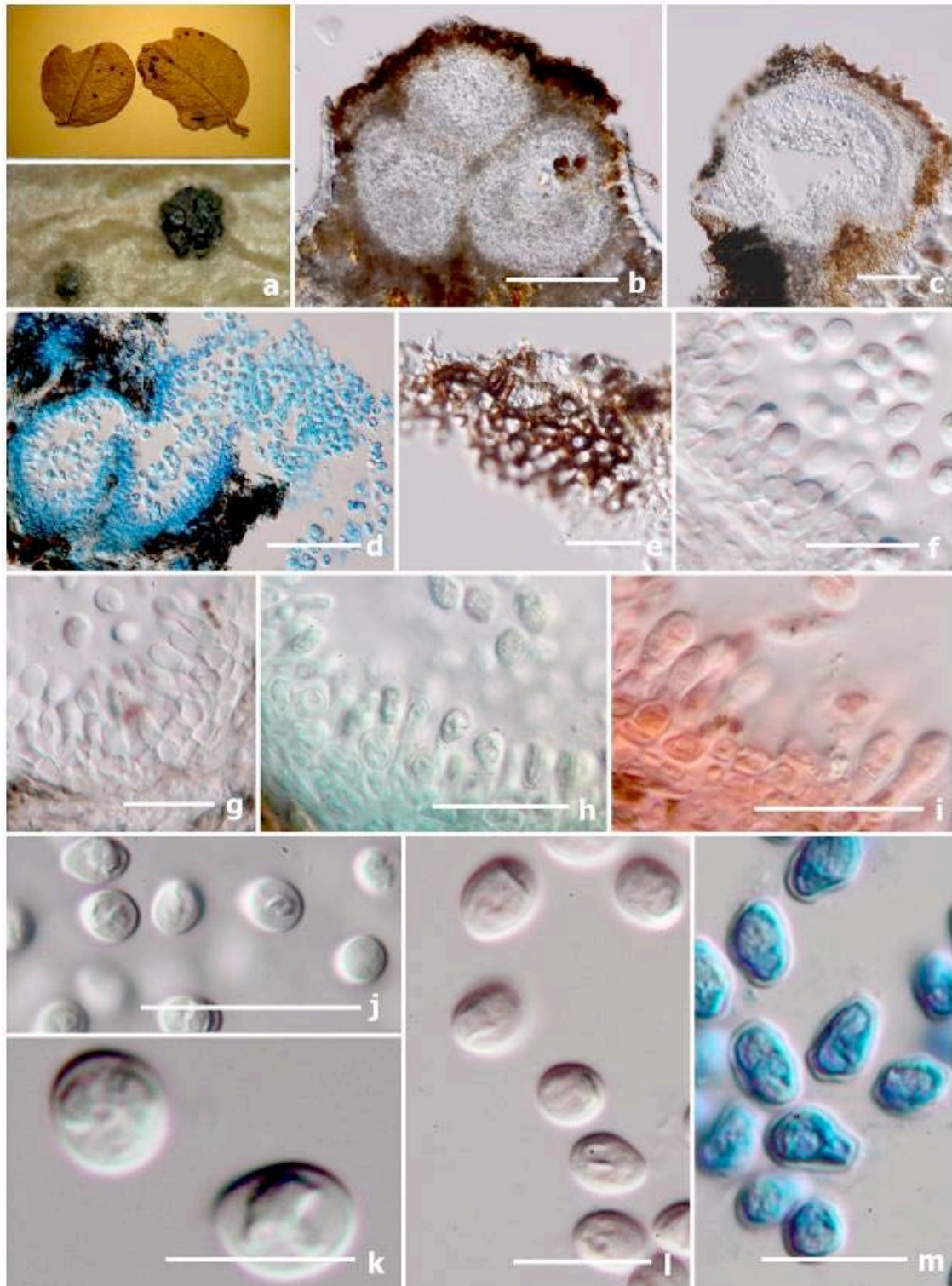


Figure 104 – *Leveillina arduinae* (S-F68798, holotype). a Herbarium specimen, habit on leaves and appearance of conidiomata. b, c Sections of conidiomata and peridium. d Section of conidiomata stained in cotton blue. e Peridium. f-i Conidiogenous cells stained by cotton blue and congo red. j-m Conidia stained by congo red and cotton blue. Scale bars: b = 100 μ m, c, d = 50 μ m, e-j, l, m = 20 μ m, k = 10 μ m.

Type species – *Phaeostigme picea* (Berk. & M.A. Curtis) Syd. & P. Syd.

Notes – Sydow & Sydow (1917) introduced *Phaeostigme* which is typified by *P. picea* (\equiv *Asterina picea* Berk. & M.A. Curtis) and is synonymised under *Dimerium piceum* Berk. & M.A. Curtis) Theiss. We re-examined the type specimen of *P. picea* (as *Asterina picea*) from Kew collection under no. K(M): 38642 and specimen was in poor in condition. We therefore loaned a collection from BPI. The genus is characterized by mycoparasitic, superficial, glabrous ascomata, growing on mycelium of *Meliola* colonies. *Phaeostigme picea* was distinguished from species in *Asterina* and *Dimerium* by its ascomata features and lack of superficial mycelium and hyphopodia. Lumbsch & Huhndorf (2010) listed *Phaeostigme* in *Pseudoperisporiaceae*. *Phaeostigme* can be distinguished from genera in *Pseudoperisporiaceae* by its ascomata with pigmented colonies and lack of superficial mycelium. The genus is therefore treated in *Dothideomycetes* genera, *incertae sedis*.

Phaeostigme alchorneae Boonmee & K.D. Hyde, sp. nov.

Index Fungorum number: IF553839; Facesoffungi number: FoF03716

Fig. 105

Etymology – Referring to the host plant *Alchornea cordifolia*

Mycoparasitic, fungicolous on dark colonies of *Irenina* sp. (*Meliolaceae*), on living leaves of *Alchornea cordifolia* Müll. Arg. Sexual morph: *Ascomata* 152–163 μm diameter, superficial, solitary, scattered in black colonies, globose to subglobose, dark brown to black, glabrous, with apical ostiole, collapsing when dry, surrounded by dark brown mycelia. *Peridium* 14.5–17 μm wide, comprising 3–4 layers of dark brown cells of *textura angularis*. *Hamathecium* 1–2.5(–3) μm wide, expanded among asci, comprising branched, septate, hyaline, pseudoparaphyses. *Asci* 40–56(–60) \times 9–11 μm (\bar{x} = 46 \times 10 μm , n = 20), 8-spored, bitunicate, cylindric-subclavate, sessile, apically thickened, slightly narrow-obovoid, with small ocular chamber. *Ascospores* 12–16 \times 5–6 μm (\bar{x} = 14 \times 6 μm , n = 20), 2-seriate, obovoid, slightly fusiform-ellipsoid, 1-septate, constricted at the septum, hyaline, becoming brownish to brown at maturity, surrounded by thin gelatinous sheath, smooth-walled. Asexual morph: Undetermined.

Material examined – UGANDA, Kawanda, on dark colonies of *Irenina* sp. (*Meliolaceae*), on living leaves of *Alchornea cordifolia* Müll. Arg. (*Euphorbiaceae*), August 1940, C.G. Hansford (BPI 691253, holotype).

Notes – *Phaeostigme alchorneae* shares morphological features with the type species *P. picea* in having superficial, pigmented ascomata, cylindric-subclavate, bitunicate asci and fusiform-ellipsoid, 1-septate, hyaline to pigmented ascospores (Sydow & Sydow 1917, Batista & Maia 1960a). However, *P. alchorneae* differs from the type species *P. picea* by its black colonies and scattered ascomata and based on morphology, *P. alchorneae* may not belong in *Phaeostigme*.

Phaeostigme picea (Berk. & M.A. Curtis) Syd. & P. Syd., Anns mycol. 15(3/4): 200 (1917)

\equiv *Asterina picea* Berk. & M.A. Curtis, J. Linn. Soc., Bot. 10(no. 46): 374 (1868)

\equiv *Dimerium piceum* (Berk. & M.A. Curtis) Theiss., Anns mycol. 10(1): 3 (1912)

Index Fungorum number: IF102485; Facesoffungi number: FoF03244

Fig. 106

Saprobic on upper surface of dried leaves. *Ascomata* 93–102 μm diameter, superficial, globose to subglobose, grouped, dark brown, with exposed ostiole, peridium comprising dark brown cells of *textura angularis*, asci and ascospores absent. Sydow and Sydow (1917) described fungus with clavate asci and narrow oblong, 1-septate ascospores. Notes: The holotype specimen (K(M): 38642) is in poor condition, all ascomata are deteriorated and lack asci, ascospores and other sterile tissues.

Material examined – CUBA, on upper surface of dried leaves (unidentified host), date undetermined, C. Wright 144 (ex herb. M. J. Berkeley), (K(M): 38642, holotype).

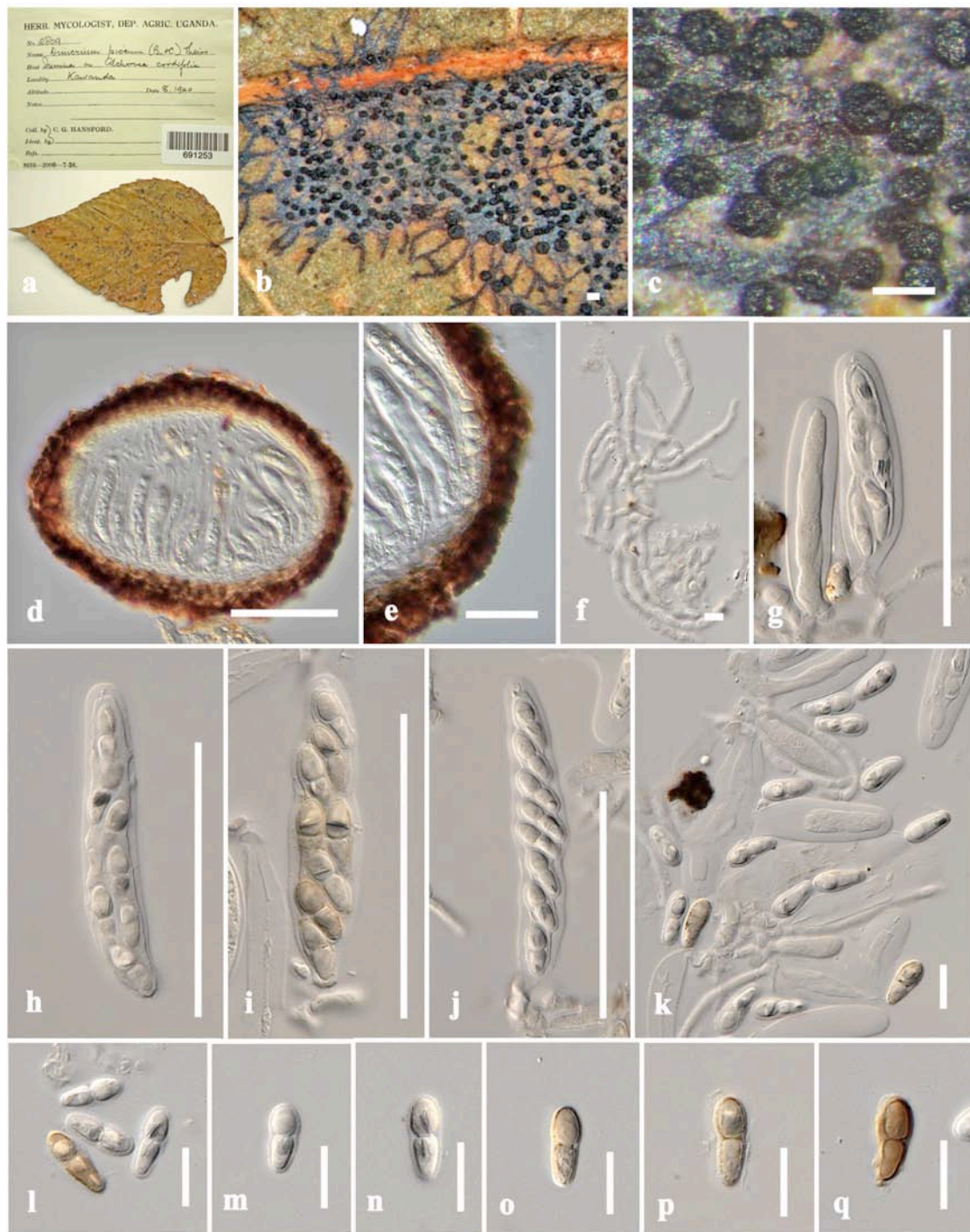


Figure 105 – *Phaeostigme alchorneae* (BPI 691253, holotype). a Herbarium specimen and habit on leaf. b, c Appearance of ascomata on leaf surface. d Section of ascoma. e Peridium. f Pseudoparaphyses. h–j Asci. k–q Ascospores at immature and mature states. Scale bars: b, c = 100 μm , d, g–j = 50 μm , e = 20 μm , f = 5 μm , k–q = 10 μm .

Scolionema Theiss. & Syd., *Annls mycol.* 15(6): 410 (1918) [1917]

Parasitic on living leaves. Sexual morph: *Colonies* up to 5 mm diameter, subcircular to irregular, superficial hyphae erect, dense, radiating outwards, flexuous, unbranched, septate, dark brown. *Ascomata* superficial, gregarious or solitary, seated on a subiculum, subglobose, carbonaceous and slightly brittle, black, with apical ostiole, covered by dark brown hyphae. *Peridium* exceeding 100 μm diameter, comprising dark brown to black cells of *textura angularis* and mixed with carbonaceous matter. *Ascomata* subglobose, sparse pseudoparaphyses, flexuous, filiform and hyaline. *Asci* 8-spored, bitunicate, subglobose to broadly obovoid, short pedicellate.

Ascospores 3–4-seriate, conglobate, broadly ellipsoidal to sub-fusiform, with upper cell slightly wider than the lower, 1-septate, constricted at the septum, hyaline, smooth-walled. Asexual morph: Undetermined.

Type species – *Scolionema palmarum* (Kunze & Fr.) Theiss. & Syd.

Notes – The genus *Scolionema* was described and introduced by Theissen & Sydow (1917) based on *S. palmarum* and it has remained monotypic. It has been placed in *Polystomellaceae* based on ascomata characters. This genus has been moved to several genera and families based on various characters (Fries 1829, Gaillard 1892, Hansford 1946, Petrak 1959, Müller & von Arx 1962, von Arx & Müller 1975). Eriksson et al. (2001) included *Scolionema* in *Parodiopsidaceae* (currently named *Perisporiopsidaceae*). The type species *S. palmarum* is characterised by dark colonies, with dense superficial hyphae, ascomata occurring among the dense dark hyphae, bitunicate asci and 1-septate, hyaline ascospores. Based on this morphology, *Scolionema* can be distinguished from all genera in *Pseudoperisporiaceae*. Therefore, we treat *Scolionema* as a genus in *Dothideomycetes* genera, *incertae sedis*.

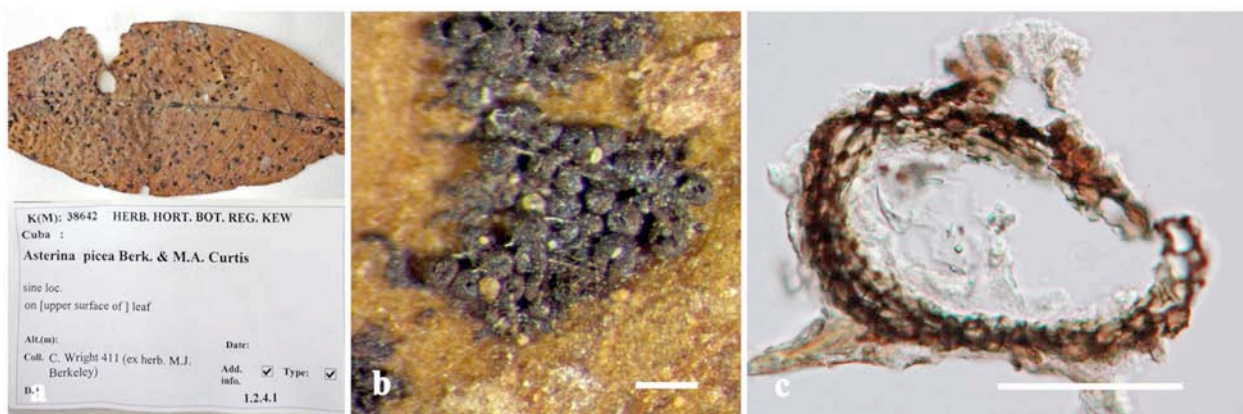


Figure 106 – *Phaeostigme picea* (K(M): 38642, holotype). a Herbarium specimen and habit on leaf. b Appearance of ascomata on leaf surface. c Section of ascoma. Scale bars: b = 200 µm, c = 50 µm.

Scolionema palmarum (Kunze & Fr.) Theiss. & Syd., *Annls mycol.* 15(6): 410 (1918) [1917]

≡ *Myxothecium palmarum* Kunze & Fr., *Syst. mycol.* (Lundae) 3(1): 232 (1829)

≡ *Meliola palmarum* (Kunze & Fr.) Sacc., *Syll. fung.* (Abellini) 1: 71 (1882)

≡ *Asterina palmarum* (Kunze & Fr.) Gaillard, *Bull. Soc. mycol. Fr.* 8(3): 116 (1892)

≡ *Myxotheciella palmarum* (Kunze & Fr.) Petr., *Sydowia* 13(1-6): 40 (1959)

Index Fungorum number: IF175370; Facesoffungi number: FoF03718

Fig. 107

Parasitic on living leaves of *Cocos* sp. Sexual morph: *Colonies* up to 5 mm diameter, subcircular to irregularly, superficial hyphae erect, dense, radiating outwardly flexuous, unbranched, septate, dark brown. *Ascomata* 180–260 µm diameter, superficial, gregarious or solitary, seated on a subiculum, subglobose, carbonaceous and slightly brittle, black, with apical ostiole, covered by dark brown hyphae. *Peridium* exceeding 100 µm diameter, comprising dark brown to black cells of *textura angularis* and mixed with carbonaceous matter. *Asci* 130 × 60 µm, 8-spored, bitunicate, subglobose to broadly obovoid, short pedicellate. *Ascospores* 65–75 µm × 20–22 µm, 3–4-seriate, conglobate, broadly ellipsoidal to sub-fusiform, with the upper cell slightly wider, 1-septate, constricted at the septum, hyaline, smooth-walled. The structures of the pseudoparaphyses, asci, ascospores and other microscopic structures could not be determined from the type material, therefore, illustrations and detailed descriptions to represent the genus are used following Gaillard (1892). Asexual morph: Undetermined.

Material examined – SURINAME, on living leaves of *Cocos* sp. (*Arecaceae*), 1827, C. Weigelt (MICH14659, isotype).

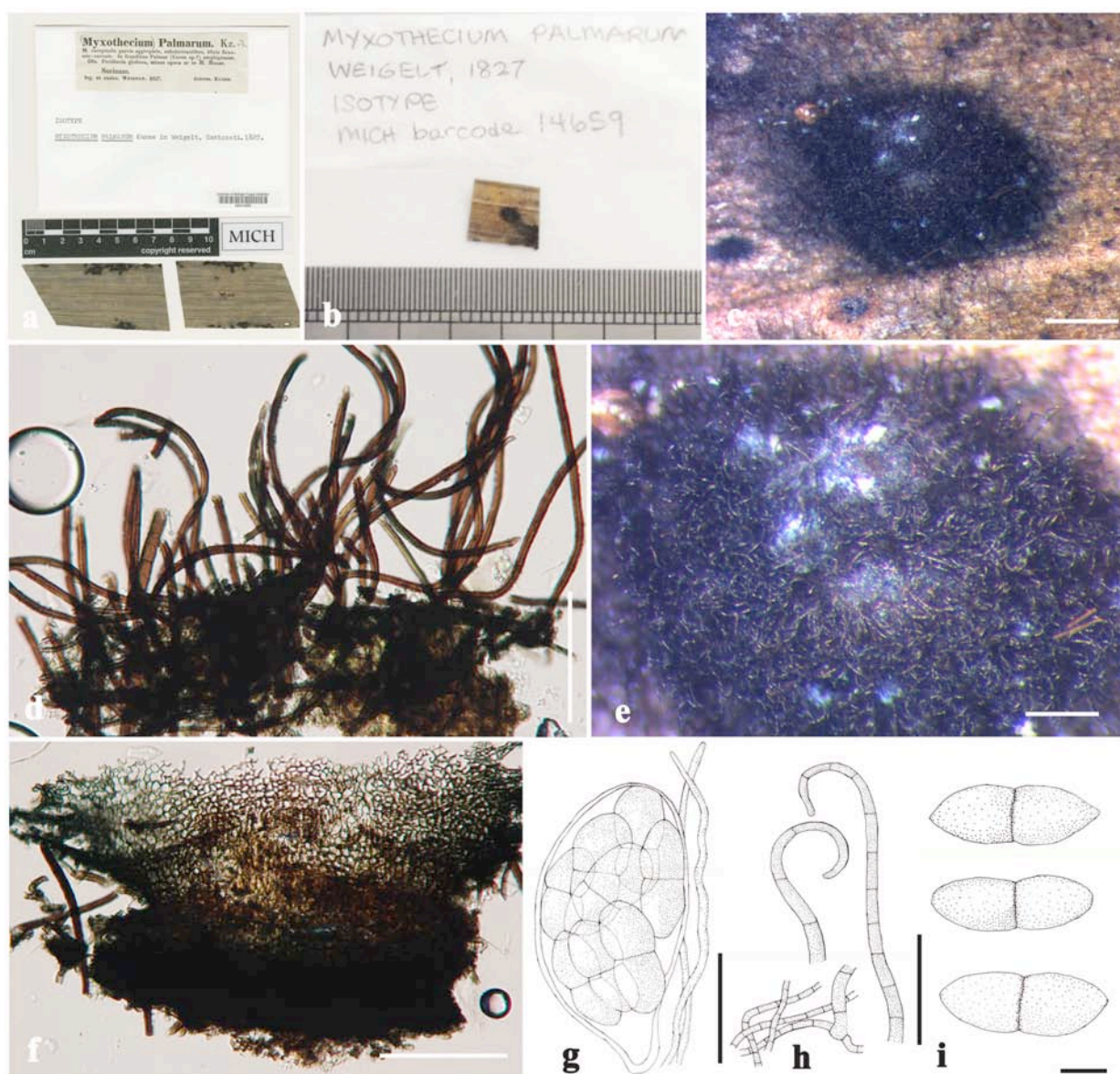


Figure 107 – *Scolionema palmarum* (MICH 14695, isotype). a, b Herbarium specimen and habit on leaves. c Appearance of colony and ascomata on leaf surface. d Superficial mycelium. e Close up of ascomata among dense mycelium. f Section of ascoma. g Asci. h Mycelium i Ascospores. (Figs g–i redrawn from *Asterina palmarum*, Gaillard 1892). Scale bars: c = 500 μm , d, h = 100 μm , e = 200 μm , f, g = 50 μm , i = 20 μm .

Pleoporales genera, incertae sedis

Based on ascomata features, the genus *Stuartella* is treated as genera *incertae sedis* in *Pleoporales*.

Stuartella Fabre, Anns Sci. Nat., Bot., sér. 6 9: 95 (1879) [1878]

Parasitic or saprobic on dead wood. Sexual morph: *Ascomata* superficial to erumpent on wood, slightly gregarious, subglobose to globose. *Peridium* comprising 2 layers of dark brown to black cells of *textura angularis*, top view of ascomata cells showing *textura porrecta*. *Hamathecium* comprising branched, aseptate, anastomosed, pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindrical or obovoid, lacking or with very short rounded pedicel, ocular chamber present when immature. *Ascospores* overlapping, 2–3-seriate, ellipsoid to fusiform, 1-septate at the center when immature, 3-septate at maturity, constricted and darker at the septa, with narrow end

cells, hyaline to pale brown when immature, brown to dark brown at maturity, smooth-walled, sometimes with mucous at maturity. Asexual morph: Undetermined.

Type species – *Stuartella formosa* Fabre

Notes – *Stuartella* was established by Fabre (1879), with *S. formosa* as the type species. Later, five species were introduced (Index Fungorum 2017). Although *Stuartella* was placed in *Sphaeriaceae* (Rehm 1899), the placement of *Stuartella* is uncertain because it has been poorly studied. *Stuartella formosa* (type species) was placed with *Enchnosphaeria pinetorum* Fuckel, *Melanommataceae* (Höhnelt 1913). *Trematosphaeria irregularis* Fabre was considered as a synonym of *S. formosa* by Berlese (1894), however, the original specimen of *T. irregularis* showed the differences of ascospores (Müller 1962). *Stuartella* was treated as *Dothideomycetes* genera, *incertae sedis* (Wijayawardene et al. 2014, Index Fungorum 2017). We are unable to locate the type specimen of *S. formosa* and no sequence data is available. Therefore, we illustrate and described a specimen of *Stuartella drimydis* (S-F51087) to represent *Stuartella*. Although, the ascomata with longitudinal ostiole was found in *S. drimydis*, however, this genus cannot be placed in *Hysteriales* based on non-hysteriaceous ascomata. We therefore treat the *Stuartella* as genera *incertae sedis* in *Pleoporales* based on ascomata and ascospores characters of *S. drimydis* (observed in this paper) and *S. formosa* (Müller 1962).

Stuartella drimydis Rehm [as 'drymidis'], Bih. K. svenska Vetensk-Akad. Handl., Afd. 3 25(no. 6): 5 (1899)

Index Fungorum number: IF244518; Facesoffungi number: FoF03719

Fig. 108

Parasitic or *saprobic* on dead wood. Sexual morph: *Ascomata* 344–375 µm diameter × 276–300 µm high, superficial to erumpent on upper surface of wood, slightly gregarious, subglobose to globose, sometimes with longitudinal ostiole. *Peridium* comprising 2 layers of dark brown to black cells of *textura angularis*, top view of ascomata cells showing *textura porrecta*. *Hamathecium* 2 µm wide, comprising branched, aseptate, anastomosed, pseudoparaphyses. *Asci* 166–175 × 54–60 µm (\bar{x} = 172 × 57 µm, n = 5), 8-spored, bitunicate, cylindrical or obovoid, lacking or with very short rounded pedicel, ocular chamber present when immature. *Ascospores* 61–64 × 21–25 µm diameter (\bar{x} = 62 × 22 µm, n = 10), overlapping 2–3-seriate, ellipsoid to fusiform, 1-septate at the center when immature, 3-septate at maturity, constricted and darker at the septa, end cells narrow, hyaline to pale brown when immature, brown to dark brown at maturity, smooth-walled, sometimes with mucous at maturity. Asexual morph: Undetermined.

Material examined – CHILE, Desolación Island, on dead wood, date undetermined, P. Dusén (S-F51087).

Eurotiomycetes O.E. Erikss. & Winka

Chaetothyriales M.E. Barr

Epibryaceae S. Stenroos & Gueidan

The family *Epibryaceae* was established by Gueidan et al. (2014) in *Chaetothyriales*, *Eurotiomycetes*, and includes the taxa *Epibryon*, *Cladophialophora* and one species *Leptomeliola ptilidii* (Stenroos et al. 2010, Gueidan et al. 2014). The family includes mostly biotrophic parasites of foliose hepatics and mosses including *Sphagnum* and *Polytrichaceae*. Some melanised asexual taxa, isolated from rock surfaces or from soil or associated with vascular plants are also included (Gueidan et al. 2014, Muggia et al. 2015, 2016, Teixeira et al. 2017). Their ascomata are pale to dark brown to black with straight or curved dark setae. Asci are ovoid, ellipsoidal or subcylindrical, without apical structures. Ascospores are transversely septate, and ellipsoidal to fusiform (Döbbeler 1997, Gueidan et al. 2014).

Family type – *Epibryon* Döbbeler

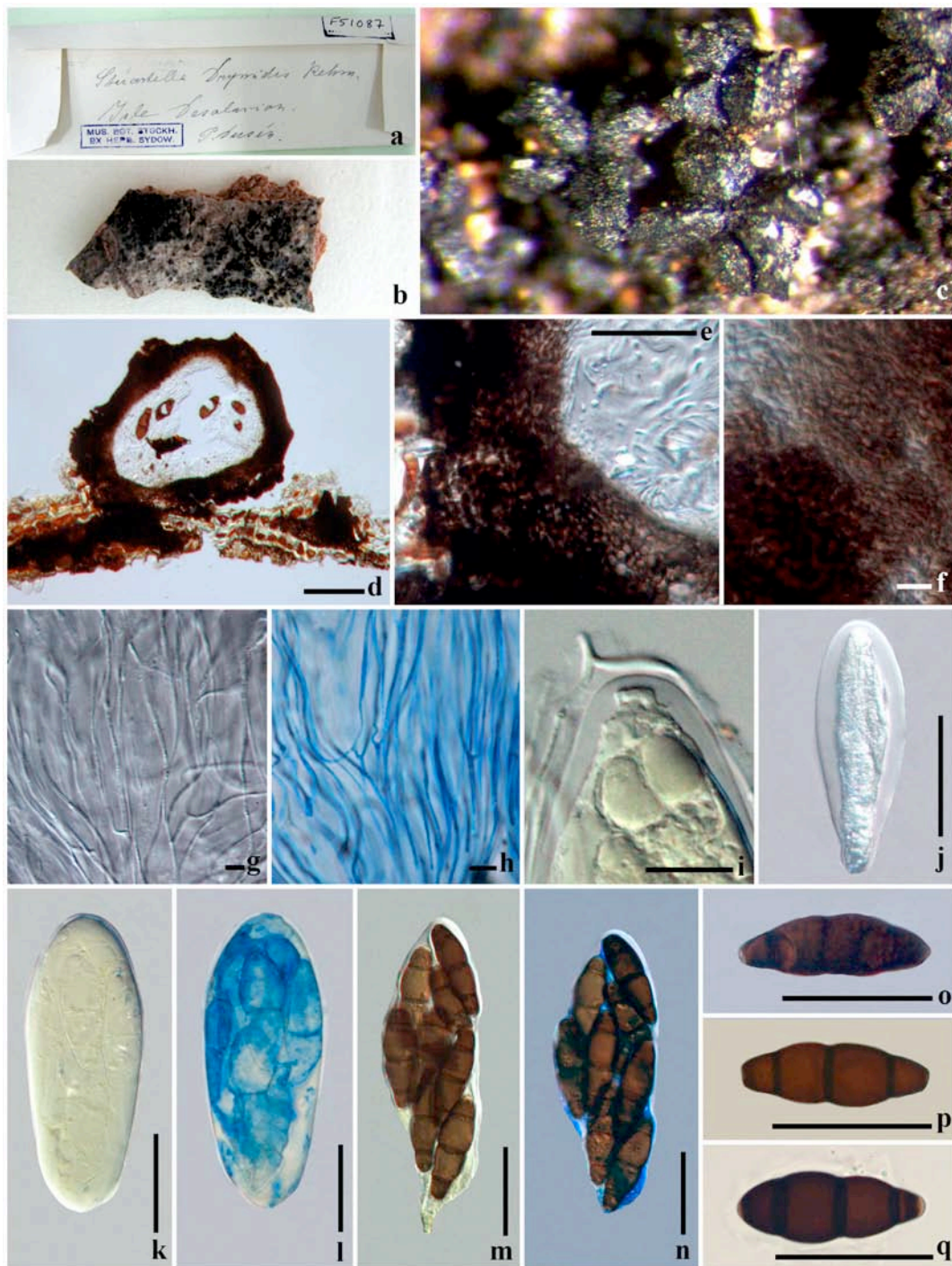


Figure 108 – *Stuartella drimydis* (S-F51087). a, b Herbarium specimen and habit on wood. c Appearance of ascomata on wood. d Section of ascoma. e Peridium. f Upper wall of ascoma. g, h Hamathecium stained in cotton blue reagent. i Ocular chamber. j-l Young ascus stained in Melzer's and cotton blue reagent. m, n Mature ascus stained in Melzer's and cotton blue reagent. o, p Ascospores stained in cotton blue and Melzer's reagent. p Ascospore in Melzer's reagent. q Ascospore with mucous. Scale bars: d = 100 μ m, e, j–q = 50 μ m, i = 20 μ m, f–h = 10 μ m.

Epibryon Döbblers, Mitt. bot. StSamml., Münch. 14: 260 (1978)

Saprobic on hairy leaves. Sexual morph: *Ascomata* superficial, subglobose to globose, without pseudoparaphyses, covered by setae. *Setae* dark brown, simple, straight or curved, septate, usually arising at the upper part, slightly constricted at the septa, apex rounded, sometimes gradually tapering towards the apex. *Peridium* 8–11 μ m wide, comprising several layers of brown to dark brown cells of *textura angularis*. *Asci* 8-spored, bitunicate, ellipsoid, oblong to broadly

obovoid, apex rounded, embedded in a gelatinous matrix. *Ascospores* 2–3-seriate and overlapping, hyaline to pale grey, ellipsoid-fusiform, broader median to suprmedian, tapering towards the subacute ends, septum median to suprmedian, not constricted at the septa, 1-septate, smooth-walled. Asexual morph: Undetermined.

Type species – *Epibryon plagiophilae* (Gonz. Frag.) Döbbeler

Notes – *Epibryon* was introduced by Döbbeler (1978) with *E. plagiophilae* as the type species. It was placed in *Pseudoperisporiaceae* families, *incertae sedis* (Lumbsch & Huhndorf 2007, Hyde et al. 2013, Wijayawardene et al. 2014). *Epibryon* was classified in *Epibryaceae*, *Chaetothyriales*, *Eurotiomycetes* based on phylogenetic analyses of nuLSU, nuSSU, mtSSU and RPB1 (Gueidan et al. 2014). The species in *Epibryon* are mostly biotrophic parasites and some are saprobes (Döbbeler 1978). *Epibryon* is rather diverse with over 30 assigned species, but they share characters. Their ascomata are globose or semi-globose, usually setose at the upper part. Ascospores are two- or multi-celled, hyaline to brown, and smooth-walled and the hymenium gel stains red with Lugol's solution (Döbbeler 1978).

Epibryon plagiophilae (Gonz. Frag.) Döbbeler, Mitt. bot. StSamml., Münch. 14: 293 (1978)

≡ *Coleroa casaresii* var. *plagiophilae* Gonz. Frag. [as 'casaresi'] 1919

Index Fungorum number: IF313925; Facesoffungi number: FoF03720

Fig. 109

Saprobic on hairy leaves of *Plagiophilae asplenoidis* (L. em. Tayl.) Dum. Sexual morph: *Ascomata* (70–)76–84(–89) μm diameter \times (73–)77–905(–97) μm high, superficial, subglobose to globose, without pseudoparaphyses, covered by dark brown setae. *Setae* (36.5–)42–60(–72) μm long, dark brown, simple, straight or curved, septate, usually arising at the upper part, slightly constricted at the septa, apex rounded, sometimes gradually tapering towards the apex. *Peridium* 8–11 μm wide, comprising several layers of brown to dark brown cells of *textura angularis*. *Asci* (30–)34–41.5(–42) \times 10–13(–14) μm (\bar{x} = 36 \times 11 μm , n = 20), 8-spored, bitunicate, ellipsoid, oblong to broadly obovoid, apex rounded, embedded in a gelatinous matrix. *Ascospores* 13–15(–17) \times 4–5.5 μm (\bar{x} = 14 \times 4.5 μm , n = 20), 2–3 seriate and overlapping, hyaline to pale grey, ellipsoid-fusiform, broader median to suprmedian, tapering towards the subacute ends, septum median to suprmedian, not constricted at the septa, 1-septate, smooth-walled. Asexual morph: Undetermined.

Material examined – AUSTRIA, Steiermark, Grazer Bergland, Dürrbachgraben östlich Graz-Andritz, reichlich, on hairy leaves of *Plagiophilae asplenoidis* (L. em. Tayl.) Dum. (*Plagiophilaceae*), July 1972, J. Poelt, Inv. Nr. 88-89 (DigiBota ID 266896, GZU 000291905).

Chaetothyriales* genera, *incertae sedis

Based on sequence data, the genus *Pleostigma* is treated as genera *incertae sedis* in *Chaetothyriales*.

Pleostigma Kirschst., Annls mycol. 37(1/2): 91 (1939)

Parasitic or *saprobic* on living leaves of liverworts. Sexual morph: *Ascomata* superficial, slightly erumpent at the base on surface of leaves, solitary, comprising thick-walled, brown-walled cells of *textura angularis*, peridium comprising 2 layers of hyaline to dark brown cells of *textura angularis*, when viewed in squash mount wall showing as *textura globulosa* to *angularis*. *Hamathecium* comprising aseptate, anastomosed, pseudoparaphyses. *Asci* 8-spored, bitunicate, broadly cylindrical or obovoid, with short, rounded pedicel, and with ocular chamber. *Ascospores* overlapping, uni-biseriate, ellipsoid to fusiform, 4–6-transverse septate, 1-longitudinal septate, constricted at the septa, hyaline to yellow or pale brown when immature, brown to dark brown at maturity, smooth-walled. Asexual morph: Undetermined.

Type species – *Pleostigma jungermannicola* (C. Massal.) Kirschst.

Notes – *Pleostigma* was established by Kirschstein (1939) for nine species, the type species is *P. jungermannicola*. The genus was treated as *Dothideomycetes* genera, *incertae sedis* based on its morphological uniqueness (Lumbsch & Huhndorf 2007, Wijayawardene et al. 2014). Sequence data of *P. jungermannicola* placed the genus in *Chaetothyriales* of *Eurotiomycetes* (Stenroos et al.

2010) because of unclear morphological characters between the two classes (Lumbsch and Huhndorf 2007). Fresh collections are needed to obtain molecular data which can demonstrate the correct placement of *Pleostigma*.

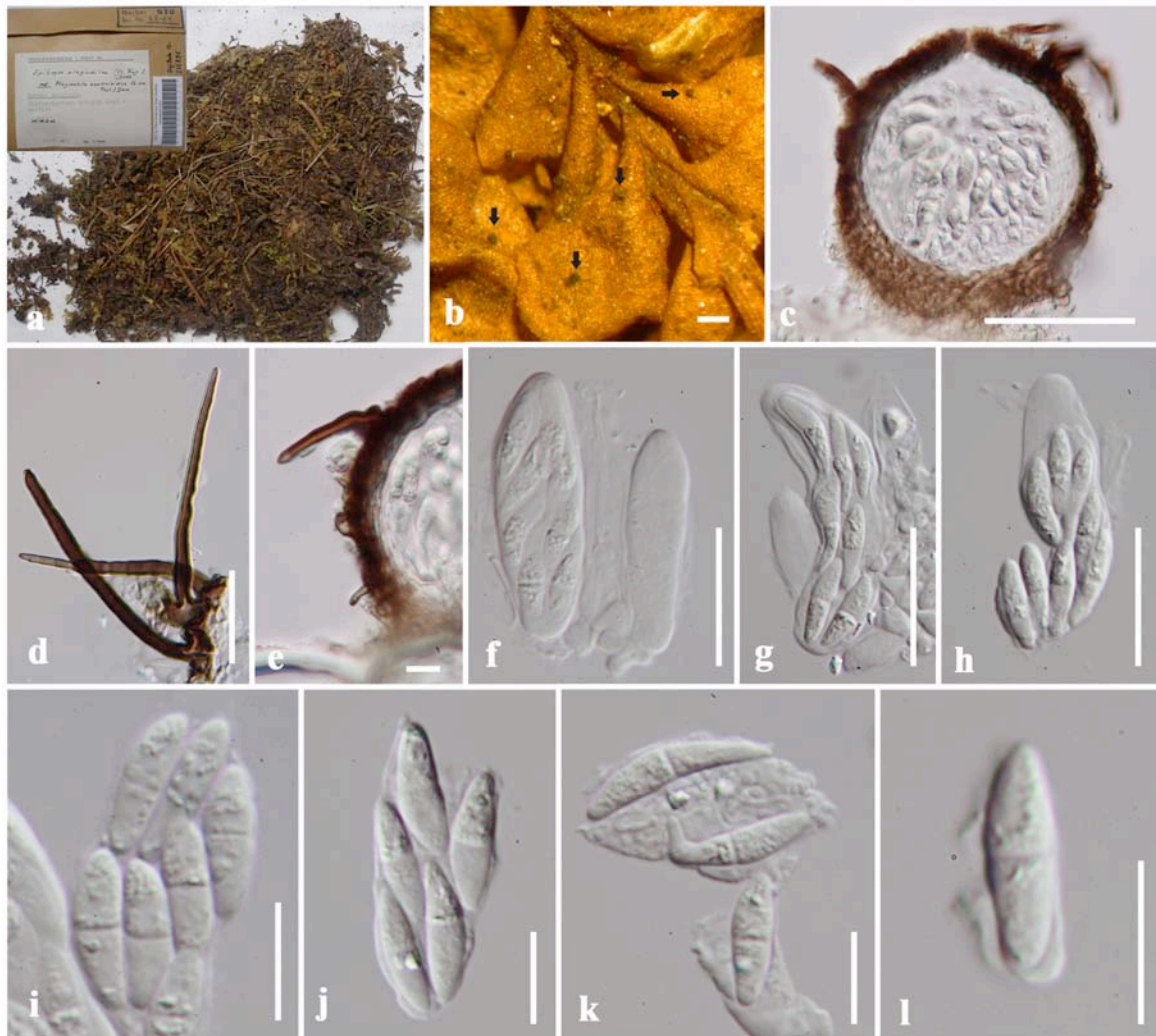


Figure 109 – *Epibryon plagiochilae* (GZU 000291905). a Herbarium specimen and habit on leaves. b Appearance of ascomata on leaf surface. c Section of ascoma. d Setae. e Peridium. f–h Immature and mature asci. i–l Ascospores. Scale bars: b, c = 50 μ m, d–h = 20 μ m, i–l = 10 μ m.

Pleostigma jungermannicola (C. Massal.) Kirschst., *Annls mycol.* 37(1/2): 91 (1939)

≡ *Strickeria jungermannicola* C. Massal., *Atti dell'Acc. delle Sc. Med. e Nat. Ferrara*: tab. 3 (1895)

≡ *Teichospora jungermannicola* (C. Massal.) Sacc. & P. Syd., *Syll. fung. (Abellini)* 14(1): 606 (1899)

= *Pleospora hepaticicola* Walt. Watson [as 'hepaticola'], *Trans. Br. mycol. Soc.* 4(2): 295 (1914) [1913]

Index Fungorum number: IF268477; Facesoffungi number: FoF03721

Fig. 110

Parasitic or saprobic on living leaves of *Lophocolea minor* Nees. Sexual morph: *Ascomata* 147–219 μ m diameter \times 160–199 μ m high, superficial, slightly erumpent at the base, on surface of liverworts, solitary, comprising thick-walled, brown-walled cells of *textura angularis*, peridium comprising 2 layers of hyaline to dark brown cells of *textura angularis*, when viewed in squash mount wall showing as *textura globulosa* to *angularis*. *Hamathecium* 1 μ m, comprising aseptate, pseudoparaphyses, anastomosing between and above the asci. *Asci* 61–70 \times 28–34 μ m (\bar{x} = 67 \times 30 μ m, n = 10), 8-spored, bitunicate, broadly cylindrical or obovoid, with short, rounded pedicel,

and with ocular chamber. *Ascospores* 25–27 × 10–12 μm (\bar{x} = 25.5 × 11 μm, n = 10), overlapping, uni-biseriate, ellipsoid to fusiform, with 4–6 transverse septa and 1 longitudinal septa, constricted at the septa, hyaline to yellow or pale brown when immature, brown to dark brown at maturity, smooth-walled. Asexual morph: Undetermined.

Material examined – CANADA, Eastern Canada, Nashville, York, Ontario, on living leaves of *Lophocolea minor* Nees (*Lophocoleaceae*), 7 May 1955, R.F. Cain (IMI 73319).

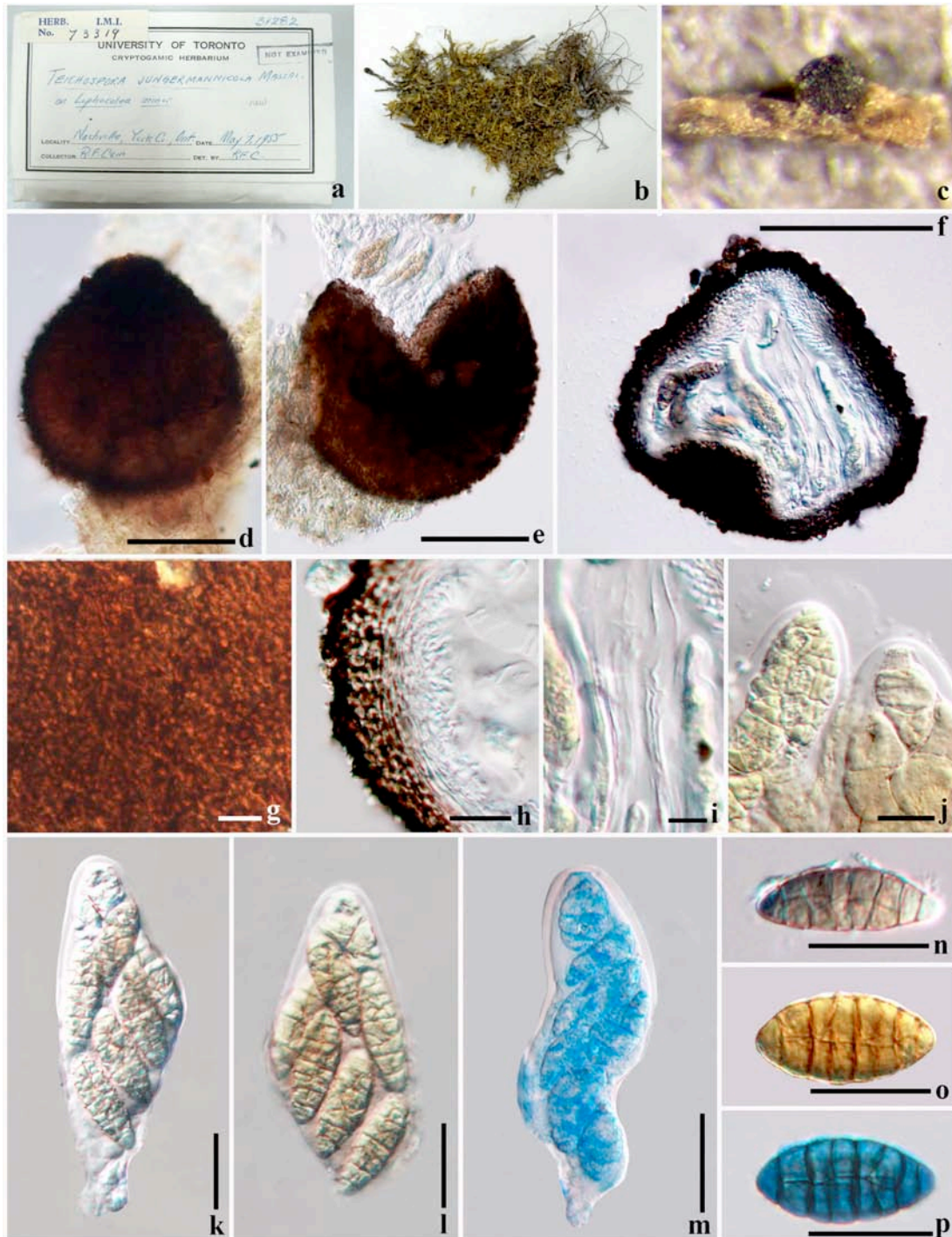


Figure 110 – *Pleostigma jungermannicola* (IMI 73319). a, b Herbarium specimens and habit on leaves. c Appearance of ascoma on leaf surface. d, e Squash mount of ascomata. f Section of ascoma. g Upper wall cells. h Peridium. i Hamathecium. j Ocular chamber. k–m Immature and mature asci stained in cotton blue and Melzer's reagent. n Ascospores stained in Melzer's and cotton blue reagent. Scale bars: d–f = 100 μm, g, i, j = 10 μm, h, k–p = 20 μm.

Excluded genera

Sordariomycetes genera, *incertae sedis*

Based on ascus features to be unitunicate, the genus *Phragmeriella* is treated as genera *incertae sedis* in *Sordariomycetes*.

Phragmeriella Hansf., Mycol. Pap. 15: 89 (1946)

Parasitic or *hyperparasitic*, *fungicolous* on mycelium of *Irenina tremae* Speg. (*Meliolaceae*), superficial mycelium, branched and coloured. Sexual morph: *Ascomata* superficial, grouped, globose to subglobose, seated on mycelium of another fungus, transparent to light brown, texture soft, surrounded by colourless setae, aseptate, collapsing when dry. *Peridium* comprising 1–2 layers of light brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 8-spored, unitunicate, oblong-subclavate, sessile, apex flattened. *Ascospores* 1–2-seriate, ellipsoid to obovate-oblong, ends rounded, 1-septate, slightly constricted at the septum, hyaline, smooth-walled. Asexual morph: Undetermined.

Type species – *Phragmeriella ireninae* Hansf.

Notes – *Phragmeriella* was introduced as a new genus in *Sphaeriaceae* by Hansford (1946) and is presently monotypic based on *P. ireninae*. von Arx and Müller (1975) transferred the genus to *Dimeriaceae* as it is parasitic on other fungi, has bitunicate asci and septate, hyaline ascospores. Lumbsch & Huhndorf (2010) included *Phragmeriella* in the family *Pseudoperisporiaceae*. The genus is characterized by its mycoparasitic habit, transparent to light brown ascomata, with colourless stiff setae, unitunicate asci and septate, hyaline ascospores. The ascus layer appears to be unitunicate. The genus is therefore assigned to *Sordariomycetes* genera, *incertae sedis*. The placement of *Phragmeriella* is uncertain. It may be related to the family *Niessliaceae* (Hypocreales). New collections with sequence data is needed to confirm its placement.

Phragmeriella ireninae Hansf. Mycol. Pap. 15: 89 (1946)

Index Fungorum number: IF289468; Facesoffungi number: FoF03722

Fig. 111

Parasitic or *hyperparasitic*, *fungicolous* on mycelium of *Irenina tremae* Speg. (*Meliolaceae*), on living leaves of *Tremae guineensis*, superficial mycelium, branched and coloured. Sexual morph: *Ascomata* 58–87 μm diameter \times 64–92 μm high, superficially, grouped, globose to subglobose, seated on mycelium of another fungus, transparent to light brown, texture soft, surrounded by colourless setae, aseptate, 31–42 μm long \times 5–7 μm wide, collapsing when dry. *Peridium* 3–5 μm wide, comprising 1–2 layers of light brown cells of *textura angularis*, lacking pseudoparaphyses. *Asci* 29–41 \times 7.5–14 μm (\bar{x} = 37 \times 12 μm , n = 15), 8-spored, unitunicate, oblong-subclavate, sessile, apex flattened. *Ascospores* 10–15 \times 3–5 μm (\bar{x} = 12 \times 4 μm , n = 15), 1–2-seriate, ellipsoid to obovate-oblong, ends rounded, 1-septate, slightly constricted at the septum, hyaline, smooth-walled. Asexual morph: Undetermined.

Material examined – UGANDA, Kiagwe Rifle Range, on mycelium of *Irenina tremae* Speg. (*Meliolaceae*), on living leaves of *Trema guineensis* (Schumach. & Thonn.) Ficalho (*Ulmaceae*), May 1904, G.C. Hansford No. 2695 (IMI 1706, holotype).

Doubtful genera

Keratosphaera H.B.P. Upadhyay, Publicações Inst. Micol. Recife 402: 5 (1964)

Hyperparasitic, *foliicolous* on lichens, on *Mazosia phyllosema* (Nyl) A. Zahlbra, on living leaves. *Colonies* occurring on thallus of *Mazosia*, superficial, irregularly, scattered as black dots, lacking superficial mycelium. Sexual morph: *Ascomata* erumpent to superficial, solitary, scattered, globose, brown to black, with black setae, unbranched, tapering towards the apex, base wider. *Asci* 6–8-spored, bitunicate, ellipsoid to obclavate, subsessile, with paraphyses. *Ascospores* 1–2-seriate, oblique, clavulate, obtuse, 2–3-septate, hyaline, smooth-walled. Asexual morph: Undetermined.

Type species – *Keratosphaera batistae* H.B.P. Upadhyay



Figure 111 – *Phragmeriella ireninae* (IMI 1706, holotype). a Herbarium specimen and habit on leaves. b Dark colony of *Meliolaceae*. c Appearance of ascomata on mycelia of *Meliolaceae* on leaf surface, marked by arrows. d, e Squash mount of ascomata. f Setae. g–i Asci. j Broken ascus (unitunicate-like). k–m Ascospores. Note Figs k and l are stained in lactophenol-cotton blue. Scale bars: b = 500 μ m, c = 100 μ m, d, e = 50 μ m, f–m = 10 μ m.

Notes – The genus *Keratosphaera* was introduced Upadhyay (1964) to accommodate a hyperparasitic fungus associated with lichens which is typified by *K. batistae* H.B.P. Upadhyay. We were unable to locate the type specimens of *Keratosphaera batistae* and thus provide a description and illustration based on the protologue of Upadhyay (1964) to represent the genus. The genus *Keratosphaera* is characterized by black colonies with superficial, globose, pigmented, setose ascomata, bitunicate asci and hyaline, septate ascospores. However, detailed morphology is unclear, we therefore treated *Keratosphaera* as doubtful genus until new collections with sequence data become available.

Keratosphaera batistae H.B.P. Upadhyay, Publicações Inst. Micol. Recife 402: 6 (1964)

Index Fungorum number: IF332732; Facesoffungi number: FoF03710

Fig. 112

Hyperparasitic, foliicolous on lichens, on *Mazosia phyllosema* (Nyl) A. Zahlbra, on living leaves of *Orbignya martiana* B. Rode. Colonies 0.8–1.5 mm diameter, occurring on thallus of *Mazosia*, superficial, irregularly, scattered as black dots, lacking superficial mycelium. Sexual morph: *Ascomata* 55–66 μm diameter, erumpent to superficial, solitary, scattered, globose, brown to black, with black setae, 9–15 μm long \times 3–4.5 μm wide, unbranched, tapering towards the apex, base wider. *Asci* 15–22 \times 6.5–9 μm , 6–8-spored, bitunicate, ellipsoid to obclavate, subsessile, with paraphyses. *Ascospores* 6–10 \times 2–2.5 μm , 1–2-seriate, oblique, clavulate, obtuse, 2–3-septate, hyaline, smooth-walled (Upadhyay 1964). Asexual morph: Undetermined.

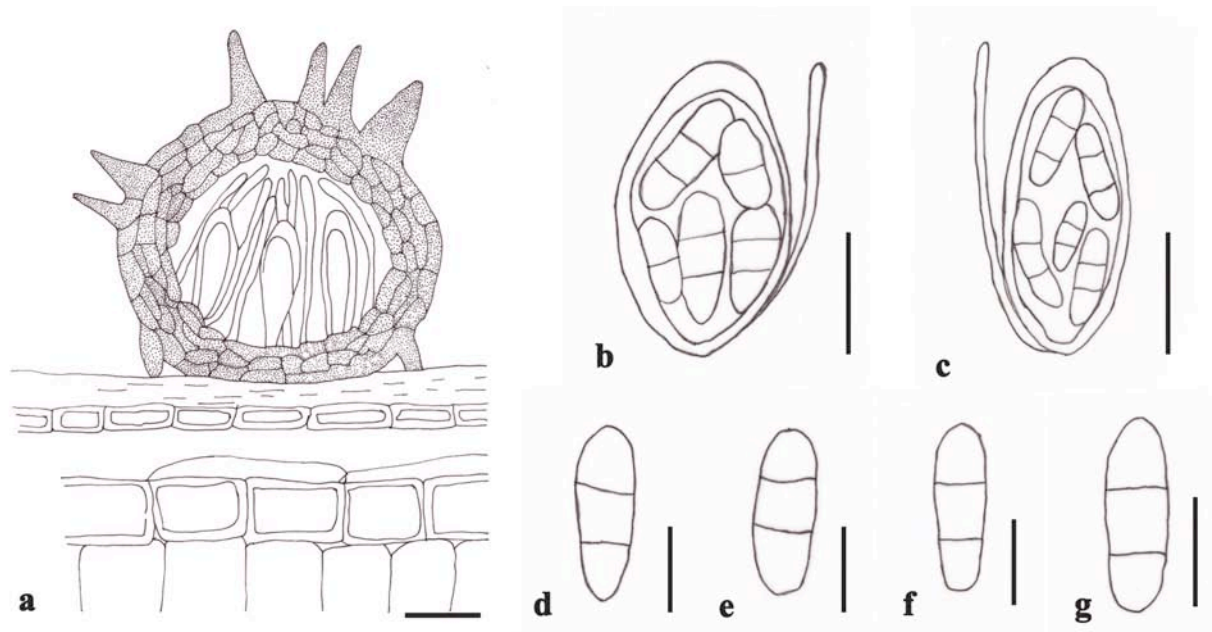


Figure 112 – *Keratosphaera batistae* (redrawn from Upadhyay 1964, Fig. 1a). a Ascoma. b, c Asci with cellular pseudoparaphyses. d–g Ascospores. Scale bars: a–c = 10 μm , d–g = 5 μm .

Raciborskiomyces Siemaszko, Acta Soc. Bot. Pol. 2: 270 (1925)

Saprobic on living and dead leaves. Sexual morph: *Ascomata* superficial, sphaerical, globose to subglobose, solitary to grouped, surrounded by stiff setae, dark brown and acute at the apex, with sparse basal hyphae, with apical ostiole. *Peridium* comprising brown cells of *textura angularis*. *Hamathecium* comprising cylindrical filiform, branched, septate, anastomosed, hyaline, pseudoparaphyses. *Asci* 8-spored, bitunicate, cylindric-clavate, sessile or with short pedicel apex rounded, narrow towards the base, with filiform paraphyses. *Ascospores* 2-seriate, ellipsoidal, upper cell often distinctly wider than the lower cell, 1-septate, slightly constricted at the septum, hyaline when immature, becoming greyish to olivaceous brown when mature (from Nüesch 1960). Asexual morph: Undetermined.

Type species – *Raciborskiomyces longisetosus* (Volkart) M.E. Barr

Notes – The genus *Raciborskiomyces* was introduced by Siemaszko (1925) and is typified by *R. polonicus*. Siemaszko (1925) included this genus in the family *Capnodiaceae* based on its superficial mycelium and stiff setae. *Raciborskiomyces* was synonymized with *Epipolaeum*, and other genera and placed in various families including *Sphaeriaceae*, *Venturiaceae* and *Dimeriaceae* (Clements & Shear 1931, Hansford 1946, Nüesch 1960, Müller & von Arx 1962). Barr (1997) did not synonymise *Raciborskiomyces* under *Epipolaeum* and recognised *Raciborskiomyces longisetosus* as the type species based on the earlier name and synonymised *R. polonicus*. The genus is characterized by superficial, sphaerical, darkly pigmented ascomata, with dark stiff setae, bitunicate asci, and ellipsoidal, pigmented and uniseptate ascospores. We were unable to examine

specimens of *Raciborskiomyces polonicus* and *R. longisetosus* and thus provide a description and illustration of *R. longisetosus* based on Nüesch (1960). Detailed morphology is unclear, we therefore treated *Raciborskiomyces* as doubtful genus until new collections with sequence data become available.

Raciborskiomyces longisetosus (Volkart) M.E. Barr, Mycotaxon 64: 165 (1997)

≡ *Venturia longisetosa* Volkart, in Rübel 1912

= *Raciborskiomyces polonicus* Siemaszko, Acta Soc. Bot. Pol. 2(4): 270 (1925)

= *Chaetyllis polonica* (Siemaszko) Clem. & Shear 1931

= *Epipolaeum longisetosum* (Volkart) Nüesch 1960

Index Fungorum number: IF437802; Facesoffungi number: FoF03711

Fig. 113

Saprobic on living and dead leaves of *Salix* sp. Sexual morph: *Ascomata* 50–90 µm diameter, superficial, sphaerical, globose to subglobose, solitary to grouped, surrounded by stiff setae, up to 200 µm long and 4–9 µm thick, dark brown and acute at the apex, with sparse basal hyphae, with apical ostiole. *Peridium* comprising 1–3 layers of brown cells of *textura angularis*. *Hamathecium* comprising cylindrical, filiform, branched, septate, anastomosed, hyaline pseudoparaphyses. *Asci* 35–50 × 9–13 µm, 8-spored, bitunicate, cylindric-clavate, sessile or with short pedicel, apex rounded, narrow towards the base, with filiform paraphyses. *Ascospores* 11–12.5(–15) × 4–5(–6) µm, bi-seriate, ellipsoidal, upper cell often distinctly wider than the lower cell, 1-septate, slightly constricted at the septum, hyaline when immature, becoming greyish to olivaceous brown when mature (from Nüesch 1960). Asexual morph: Undetermined.

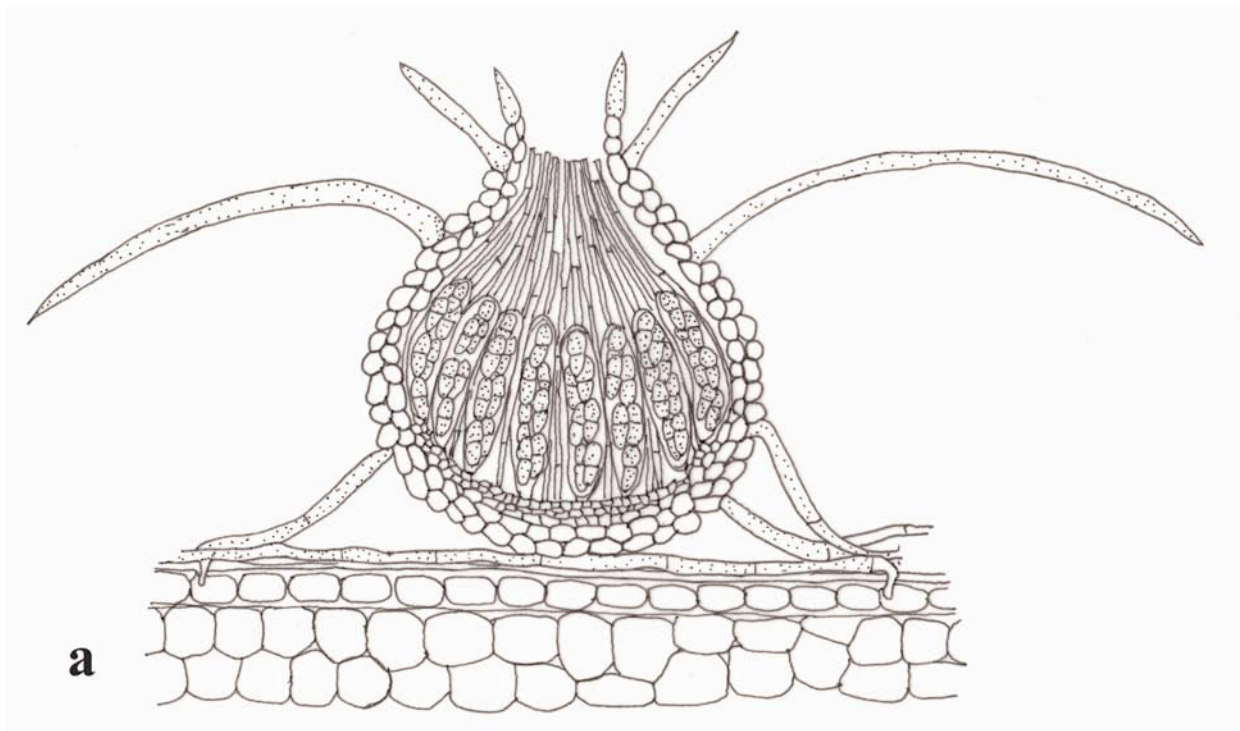


Figure 113 – *Raciborskiomyces longisetosus* (redrawn from Nüesch 1960, Fig. 11 under the name *Epipolaeum longisetosum*). a Ascoma have stiff setae, a hamathecium of pseudoparaphyses, and asci and ascospores.

Acknowledgements

S. Boonmee would like to thank the National Research Council of Thailand (No. 60215020003) and the Thailand Research Fund (No. TRG5880152). K.D. Hyde would like to thank Molecular Biology Experimental Center for the help on molecular work, the Mushroom Research Foundation (MRF), Chiang Rai, Thailand, the Thailand Research Fund grant no

RSA5980068 entitled Biodiversity, phylogeny and role of fungal endophytes on above parts of *Rhizophora apiculata* and *Nypa fruticans*. R. Phookamsak expresses appreciation to The CAS President's International Fellowship for Postdoctoral Researchers, project number 2017PB0072, the Research Fund from China Postdoctoral Science Foundation (grant no. Y71B283261) and Chiang Mai University for financial support.

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