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Doi 10.5943/mycosphe/8/1/15

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Morphophylogenetic study of Sydowiellaceae reveals several new genera

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Senanayake IC, Maharachchikumbura SSN, Jeewon R, Promputtha I, Al-Sadi AM, Camporesi E, Hyde KD. 2017 – Morphophylogenetic study of Sydowiellaceae reveals several new genera. *Mycosphere* 8(1), 172–217, Doi 10.5943/mycosphe/8/1/15

Abstract

Sydowiellaceae is a poorly studied family of the order Diaporthales, comprising a collection of morphologically diversified taxa. Eleven genera have been previously listed under this family. In this study, we provide a DNA sequence-based phylogeny for genera of Sydowiellaceae based on analyses of a combined LSU, ITS, RPB2 and TEF sequence dataset to establish the boundaries within the family. We introduce, describe, and illustrate three new genera, *Italiomyces*, *Ranulospora*, and *Tenuiappendicula*, based on newly collected specimens. Another three new genera, *Alborbis*, *Breviappendix*, and *Paragnomonina* are introduced to accommodate *Cryptodiaporthe galericulata*, *Gnomonia rosae*, *G. rostellata*, *G. rubi*, and *G. fragariae*. *Alborbis galericulata* comb. nov., *Breviappendix rubi* comb. nov., *B. rosae* comb. nov., *B. rostellata* comb. nov. and *Paragnomonina fragariae* comb. nov. are proposed. Two new species, *Sydowiella centaureii* and *Sillia karstenii*, are introduced with descriptions and illustrations. *Winterella* is replaced with a new genus *Tortilispora* typified by *T. aurantiaca*. Three new combinations are proposed in *Tortilispora*. We synonymize *Stegophora* under *Lambro* based on morphological similarities. An updated key for genera of Sydowiellaceae is presented.

Key words – *Alborbis*, *Breviappendix*, *Italiomyces*, *Paragnomonina*, *Ranulospora*, *Sillia karstenii*, *Sydowiella centaureii*, *Tenuiappendicula*, *Tortilispora*.

Submitted 10 January 2017, Accepted 8 February 2017, Published 20 February 2017

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Introduction

Sydowiellaceae Lar. N. Vassiljeva was established to accommodate the genus *Sydowiella* Petr., which is typified by *S. fenestrans* (Duby) Petr., and a collection of morphologically diverse fungal taxa whose intergeneric relationships are still uncertain (Maharachchikumbura et al. 2015). Sydowiellaceae is a phylogenetically, well-supported, monophyletic family within Diaporthales (Kruys & Castlebury 2012), but is morphologically poorly studied. To date, Sydowiellaceae comprises eleven genera (Maharachchikumbura et al. 2015, 2016) and 43 species (Index Fungorum 2017).

The family Sydowiellaceae is generally characterized by taxa with solitary or aggregated, erumpent to immersed ascomata, with wide papilla, a peridium comprising an outer layer of brown-walled cells of *textura globulosa* and inner layer of hyaline cells of *textura angularis*, cylindrical to cylindro-clavate or broadly fusoid unitunicate asci, with a J-, sometimes bi-lobed apical ring, and hyaline or greenish-brown, 0–11-septate, ellipsoidal or filiform ascospores that sometimes have apical and basal appendages (Maharachchikumbura et al. 2016).

The family Sydowiellaceae also includes the genera *Cainiella* E. Müll. typified by *C. johansonii* (Rehm) E. Müll., *Calosporella* J. Schröt typified by *C. innesii* (Curr.) J. Schröt., *Chapeckia* M.E. Barr typified by *C. nigrospora* (Peck) M.E. Barr, *Hapalocystis* Auersw. ex Fuckel typified by *H. berkeleyi* Fuckel, *Lambro* Racib. typified by *L. insignis* Racib., *Rossmania* Lar. N. Vassiljeva typified by *R. ukurunduense* Lar. N. Vassiljeva, *Stegophora* Syd. & P. Syd. typified by *S. ulmea* (Fr.) Syd. & P. Syd., *Sillia* P. Karst. typified by *S. ferruginea* (Pers.) P. Karst., *Uleoporthe* Petr typified by *U. orbiculata* (Syd. & P. Syd.) Petr. and *Winterella* (Sacc.) Kuntze typified by *W. aurantiaca* (Wehm.) J. Reid & C. Booth (Maharachchikumbura et al. 2015, 2016). Due to morphological plasticity, the taxonomic affinities of most genera within Sydowiellaceae have been uncertain and they were referred to Diaporthales genera *incertae sedis* (Rossman et al. 2006). Despite morphological based taxonomic discrepancies, DNA sequence based phylogenies have consistently reported Sydowiellaceae to be a well-supported monophyletic family comprising the above-mentioned genera (Morocco 2006, Rossman et al. 2007, Kruys & Castlebury 2012, Maharachchikumbura et al. 2015, 2016). *Stilbospora* Pers., *Hendersonia* E.J. Butler, and *Dothiorella* Sacc. have been reported as asexual morphs for *Hapalocystis* associated with ascomata on the natural substrate (Wehmeyer 1941, Barr 1978, Jaklitsch & Voglmayr 2004), While Glawe (1985) and Liu et al. (2015) reported a phoma-like asexual morph for *H. berkeleyi* in culture. *Cylindrosporella* Höhn. was reported as the asexual morph of *Stegophora* by Kobayashi (1970).

Members of Sydowiellaceae occur on herbaceous plants, dicotyledonous and hardwood trees, as saprobes, endophytes or pathogens. *Stegophora ulmea* was reported as a pathogen on living leaves of *Ulmus americana*, while *Sydowiella depressula* was reported on leaves and stem cankers of cultivated black berry (*Rubus fruticosus*) (Nordskog et al. 2003). *Sydowiella fenestrans* has been recorded on leaves and dead stems of various plants. *Cainiella johansonii* was reported on both living and dead leaves and petioles of *Dryas* species, while *Cainiella borealis* was found as a saprobe on dead branches of *Cassiope tetragona* (Kruys & Castlebury 2012). *Hapalocystis berkeleyi* forms stromatic fruiting bodies on dead woody plants. Collections of *Uleoporthe orbiculata* were recorded on living and fallen leaves. There are reports that *U. orbiculata* and many other taxa in this family may have biotrophic lifestyles (Cannon 2001, De Silva et al. 2016).

Species in Gnomoniaceae appear to be similar to Sydowiellaceae. Kruys & Castlebury (2012) showed that *Cryptodiaporthe galericulata*, *Gnomonia fragariae*, *G. rostellata*, and *G. rubi* (Gnomoniaceae) clustered in Sydowiellaceae based on ITS sequence analysis. Morocco (2006) also showed a close affinity of *Gnomonia rosae* to Sydowiellaceae. Voglmayr &

Jaklitsch (2014) introduced *Calosporella* for *Prosthecius innesii* and accommodated it as *Calosporella innesii*.

Here we provide an updated phylogeny based on DNA sequence analyses of taxa of Sydowiellaceae to clarify intergeneric relationships. In addition, we introduce and describe three new monotypic genera based on fresh collections, another three new genera based on combinations of existing species with molecular data and two new species in existing genera based on fresh collections. *Winterella* is replaced with a new genus *Tortilispora* typified by *T. aurantiaca*. *Stegophora* is synonymized under *Lambro* based on its morphology. An updated taxonomic key of genera in Sydowiellaceae is also provided.

Materials & Methods

Specimen collection, morphological examination and photomicrography

Collections were made in Italy from 2013 to 2016. Specimens were placed in paper bags and collection details noted. Samples were brought to the laboratory and examined under a stereomicroscope to observe the characteristics of the fruiting bodies. Macro-morphological characters were photographed using a digital camera fitted to the stereomicroscope. A few fruiting bodies were transferred to a drop of water mounted on a slide using fine needles or forceps for rehydration and they were crushed to observe internal structures. Cross sections of fruit bodies were hand cut with a razor blade and mounted in a drop of water on a slide. Morphological characteristics of ascomata/conidiomata, asci, ascospores/conidia and other tissues associated with ascomata/conidiomata were photographed using a digital camera fitted to a compound microscope. Melzer's reagent, Indian ink and 5 % KOH were used where necessary to stain fungal structures. All microphotographs were arranged using Adobe Photoshop CS6 (v. 13.0.1.1) and all measurements were made with Tarosoft (R) Image Frame Work (v. 0.9.0.7). Specimens were preserved and deposited at Mae Fah Luang University herbarium (MFLU) and BIOTEC Bangkok Herbarium (BBH). Facesoffungi and Index Fungorum numbers were registered (Jayasiri et al. 2015, Index Fungorum 2017). New species were resolved following recommendations as outlined by Jeewon & Hyde (2016).

Single spore isolation

A few fruiting bodies were picked from substrates using a sterilized needle and placed in a few drops of sterilized distilled water on a sterilized cavity slide as detailed in Chomnunti et al. (2014). Fruiting bodies were crushed to separate the spores and obtain a spore suspension. The suspension was inoculated on to malt extract agar (MEA) and incubated at 18 °C. Germinating ascospores were aseptically transferred to new culture plates. Colonies were photographed and characters were noted. Living cultures are deposited at Mae Fah Luang University Culture Collection (MFLUCC) and the Thailand Bioresource Research Center (TBRC).

Promoting asexual morphs

Dried and sterilized grass leaves or pine needles were laid parallel to the colony margin of pure cultures which were grown on water agar (Phookamsak et al. 2015). Conidiomata produced on both water agar and sterilized pine needles were observed after few weeks of incubation at 18 °C. Morphological characteristics were examined as mentioned above.

Herbarium material examination and re-drawing

Types and other relevant authentic specimens were loaned from accessible herbaria (New York State Museum (NYS), Swedish Museum of Natural History (S),

Naturhistorisches Museum Wien (W), and International Mycological Institute (IMI)). A small part of the herbarium specimen was cut and rehydrated using water or 5 % KOH. Micro-morphological characters were observed from rehydrated ascomata and photography was done as previously described. Some specimens were redrawn based on previously illustrated authentic specimens.

DNA extraction, PCR amplification, sequencing and phylogenetic analyses

Scraped fresh fungal mycelia grown on MEA for 4 weeks at 18 °C, or internal content of ascomata or conidiomata were used for genomic DNA extraction using a modified protocol of Jeewon et al. (2002). PCR amplification and sequencing of large subunit ribosomal RNA (LSU) region using the primer pair LROR/LR5, internal transcribed spacer (ITS) regions using primer pair ITS4/ITS5, RNA polymerase II gene (RPB2) region using the primer pair fRPB2-5F/fRPB2-7cR, and translation elongation factor (TEF) region using primer pair 728F/986R were performed (Vilgalys & Hester 1990, White et al. 1990, Carbone & Kohn 1999, Liu et al. 1999).

Each PCR reaction contained 0.3 µl of TaKaRa Ex-Taq DNA polymerase, 12.5 µl of 2 × PCR buffer, 2.5 µl of dNTPs, 1 µl of forward and reverse primers, 1 µl of DNA template and was adjusted with 6.5 µl of double-distilled water to a total volume of 25 µl. Amplification reactions were performed in a thermal-cycler (BIORAD 1000TM Thermal Cycler, Bio-Rad Laboratories, Hercules, California). The temperature profile for both ITS and LSU was an initial denaturing step for 2 min at 94 °C, followed by 35 amplification cycles of denaturation at 94 °C for 60 s, annealing at 58 °C for 60 s and extension at 72 °C for 90 s and a final extension step of 72 °C for 10 min (Jeewon et al. 2004, Phillips et al. 2008). The temperature profile for the RPB2 was, initial denaturation at 94 °C for 2 min, followed by 35 amplification cycles of denaturation at 95 °C for 45 s, annealing at 57 °C for 50 s and extension at 72 °C for 90 s. (Liu et al. 1999). The temperature profile for the TEF was, initial denaturation at 94 °C for 2 min, followed by 35 amplification cycles of denaturation at 95 °C for 30 s, 58 °C for 50 s, 72 °C 60 s. (Glass & Donaldson 1995). All amplified PCR products were determined by electrophoresis at 90 V/cm for 40 min in 1% agarose gel stained with ethidium bromide (0.5 mg/mL). The gel was visualized under a UV transilluminator to estimate the fragment size. PCR products were purified and sequenced with both primers at the Sunbiotech Company, Beijing, China. Sequences were edited and assembled with DNASTAR Lasergene (v.7.1) to obtain consensus sequences. The sequences generated in this study were supplemented with additional sequences obtained from GenBank (Table 1) based on blast searches and published literature. Multiple sequence alignments were generated with MAFFT v. 7 (<http://mafft.cbrc.jp/alignment/server/index.html>) and the alignment was manually improved with BioEdit v. 7.0.5.2 (Hall 1999).

Phylogenetic analyses of the sequence data consisted of Maximum Likelihood, Bayesian inference and maximum parsimony. Maximum likelihood (ML) analysis was performed by RAxML GUI v.1.3 (Stamatakis et al. 2008, Silvestro & Michalak 2012). The search strategy was set to rapid bootstrapping and the analysis was carried out using the GTRGAMMAI model of nucleotide substitution with 1000 replicates. The model of evolution was estimated by using MrModeltest 2.3 (Nylander 2004) and GTR+I+G was selected as the model for Bayesian analyses. Bayesian inference in MrBayes v. 3.2.1 (Ronquist et al. 2012) was performed with default settings, running four chains over 3 million generations and sampling each 100th tree. The first 6000 of the 3000000 saved trees were discarded and the consensus tree was based on the remaining 2994000 trees. Maximum parsimony analysis (MP) was performed using PAUP v. 4.0b10 (Swofford 2003). Ambiguously aligned regions were excluded and gaps were treated as a missing data. All characters were unordered and given equal weight. Trees were inferred using the heuristic

Table 1. Isolates used in the analyses and their GenBank and culture accession numbers. Newly generated sequences are in bold.

Taxa	Culture accession numbers	ITS	GenBank accession numbers		
			LSU	RPB2	TEF
<i>Asterosporium asterospermum</i>	KT2125	-	AB553743	-	-
<i>Asterosporium asterospermum</i>	CBS 112404	-	AB553745	-	-
<i>Asterosporium asterospermum</i>	KT2101	-	AB553742	-	-
<i>Asterosporium asterospermum</i>	KT2138	-	AB553744	-	-
<i>Breviappendix rubi</i>	MFLUCC 16–1205	KY523473	KY523491	-	-
<i>Breviappendix rubi</i>	MFLUCC 16–1205A	KY523474	KY523492	-	-
<i>Breviappendix rubi</i>	MFLUCC 16–1205B	KY523475	KY523493	-	-
<i>Cainiella borealis</i>	Kruys 725 (UPS)	JF701921	-	-	-
<i>Cainiella johansonii</i>	Kruys 731 (UPS)	-	JF701920	-	-
<i>Calospora innesii</i>	AR 3639	JF681965	EU683071	-	-
<i>Calospora innesii</i>	AR 3925	JF681966	-	-	-
<i>Calospora innesii</i>	AR 3831	JF681964	-	-	-
<i>Chapeckia nigrospora</i>	CBS 125532	JF681957	EU683068	-	-
<i>Cryphonectria macrospora</i>	CBS 109764	EU199182	AF408340	EU220029	-
<i>Cryphonectria parasitica</i>	ATCC 38755	AY141856	EU199123	DQ862017	EU222014
<i>Cryptodiaporthe galericulata</i>	AR 3890	JF681967	-	-	-
<i>Cryptodiaporthe galericulata</i>	AR 4004	JF681968	-	-	-
<i>Cryptodiaporthe galericulata</i>	AR 3811	JF681969	-	-	-
<i>Cryptodiaporthe galericulata</i>	AR 4027	JF681970	-	-	-
<i>Cytospora hippophaes</i>	CFCC 89640	KF765682	KF765698	KF765714	KP310865
<i>Diaporthe eres</i>	AR 5193	KJ210529	-	-	KJ210550
<i>Diaporthe eres</i>	PS57	JF430494	JF704176	-	-
<i>Gnomonia cf rosae</i>	BPI 877452B	EU254935	EU255157	-	-
<i>Gnomonia fragariae</i>	CBS 146.64	EF212844	EF212856	-	-
<i>Gnomonia fragariae</i>	UN22	EF212833	EF212851	-	-
<i>Gnomonia fragariae</i>	F 5.6	EF212840	EF212855	-	-
<i>Gnomonia fragariae</i>	F 1.4	-	EF212853	-	-
<i>Gnomonia fragariae</i>	M1	EF212834	EF212852	-	-
<i>Gnomonia fragariae</i>	GF2	EF212832	EF212850	-	-
<i>Gnomonia fragariae</i>	SER1	EF212841	EF212854	-	-
<i>Gnomonia fragariae</i>	SER7	EF212843	-	-	-
<i>Gnomonia fragariae</i>	SER4	EF212842	-	-	-
<i>Gnomonia fragariae</i>	L56	EF212838	-	-	-
<i>Gnomonia fragariae</i>	O3	EF212837	-	-	-
<i>Gnomonia fragariae</i>	S12	EF212836	-	-	-
<i>Gnomonia fragariae</i>	S7	EF212835	-	-	-
<i>Gnomonia gnomon</i>	CBS 829.79	AY818957	AY818964	-	EU221905
<i>Gnomonia gnomon</i>	CBS 199.53	AY818956	AF408361	DQ470922	EU221885
<i>Gnomonia rosae</i>	CBS 850.79	EF212846	EF212858	-	-
<i>Gnomonia rostellata</i>	AR 3533	JF681962	-	-	-
<i>Gnomonia rostellata</i>	AR 3987	JF681963	-	-	-
<i>Gnomonia rubi</i>	CBS 102.72	EF212847	EF212859	-	-
<i>Hapalocystis berkeleyi</i>	AR 3851	-	EU683069	-	-
<i>Hapalocystis berkeleyi</i>	AR 3870	JF681958	-	-	-
<i>Hapalocystis berkeleyi</i>	MFLUCC 13–0662	-	KP744486	-	-
<i>Hapalocystis occidentalis</i>	WU 24705	-	AY616231	-	-
<i>Hercospora tiliae</i>	AR 3526	-	AF408365	-	-
<i>Italiomyces centaureii</i>	MFLU 16–2866	KY523478	KY523494	-	-
<i>Italiomyces centaureii</i>	MFLU 16–2867	KY523477	KY523495	-	-
<i>Italiomyces centaureii</i>	MFLUCC 14–0849	KY523476	KY523496	-	-
<i>Lamproconium desmazieri</i>	MFLUCC 15–0871	KX430136	KX430137	-	-
<i>Lamproconium desmazieri</i>	MFLUCC 14–1047	KX430132	KX430133	-	-
<i>Lamproconium desmazieri</i>	MFLUCC 15–0870	KX430134	KX430135	-	-
<i>Lamproconium desmazieri</i>	MFLUCC 15–0873	KX430140	KX430141	-	-
<i>Ophiognomonia rubi-idaei</i>	BPI 877638	EU254938	-	-	-
<i>Ranulospora alnii</i>	MFLUCC 13–0793	KY523479	KY523497	-	-
<i>Ranulospora alnii</i>	MFLUCC 13–0793A	KY523480	KY523498	-	-
<i>Ranulospora alnii</i>	MFLU 16–2868	KY523481	KY523499	-	-
<i>Rossmania ukurunduensis</i>	AR 3484	-	EU683075	-	-
<i>Sillia italica</i>	MFLU 16–0056A	KY523484	KY397949	-	-

Table 1. continued. Isolates used in the analyses and their GenBank and culture accession numbers. Newly generated sequences are in bold.

Taxa	Culture accession numbers	ITS	GenBank accession numbers		
			LSU	RPB2	TEF
<i>Sillia italica</i>	MFLU 16-0056B	KY523485	-	-	-
<i>Sillia ferruginea</i>	CBS 126567	JF681959	EU683076	-	-
<i>Sillia karstenii</i>	MFLU 16-2864	KY523482	KY523500	KY501636	-
<i>Sillia karstenii</i>	MFLU 16-2865	KY523483	KY523501	-	-
<i>Stegonsporium acerophilum</i>	CBS 117025	EU039982	EU039993	KF570173	-
<i>Stilbospora macrosperma</i>	CBS 121883	JX517290	JX517299	KF570196	-
<i>Sydowiella centaureii</i>	MFLU 16-2860	KY523486	KY523502	-	-
<i>Sydowiella centaureii</i>	MFLU 16-2858	KY523487	KY523503	-	-
<i>Sydowiella depressula</i>	CBS 813.79	-	EU683077	-	-
<i>Sydowiella fenestrans</i>	CBS 125530	JF681956	EU683078	-	-
<i>Sydowiella urticola</i>	MFLUCC 13-0665	-	KY523504	-	-
<i>Tenuiappendicula alnicola</i>	MFLU 16-1265	KY523488	KY523505	-	-
<i>Tenuiappendicula alnicola</i>	MFLU 16-2865	KY523489	KY523506	-	-
<i>Tenuiappendicula alnicola</i>	MFLUCC 16-1452	KY523490	KY523507	-	-
<i>Valsa ambiens</i>	CFCC 89622	KR045698	AF362564	KU710944	KU710911
<i>Winterella aurantiaca</i>	AR 4022	JF681960	-	-	-

search option with TBR branch swapping and 1000 random sequence additions. MaxTrees were set up to 1000, branches of zero length were collapsed and all multiple parsimonious trees were saved. Tree length (TL), consistency index (CI), retention index (RI), rescaled consistency index (RC), homoplasy index (HI), and log likelihood (-ln L) (HKY model) were calculated for trees generated under optimality criteria. The robustness of the most parsimonious trees was evaluated by 1000 bootstrap replications resulting from maximum parsimony analysis, each with ten replicates of random step-wise addition of taxa (Felsenstein 1985). The Kishino–Hasegawa tests (Kishino & Hasegawa 1989) were performed to determine whether the trees inferred under optimality criteria were significantly different. Trees were figured in Treeview (Page 1996). The final alignments and the trees obtained were deposited in TreeBASE (<http://purl.org/phylo/treebase/phyloWS/study/TB2:S20545?x-access-code=e3bdc851b5ecb55a1daa3054ff455627&format=html>) and are available under study accession no. S20545.

Results and Discussion

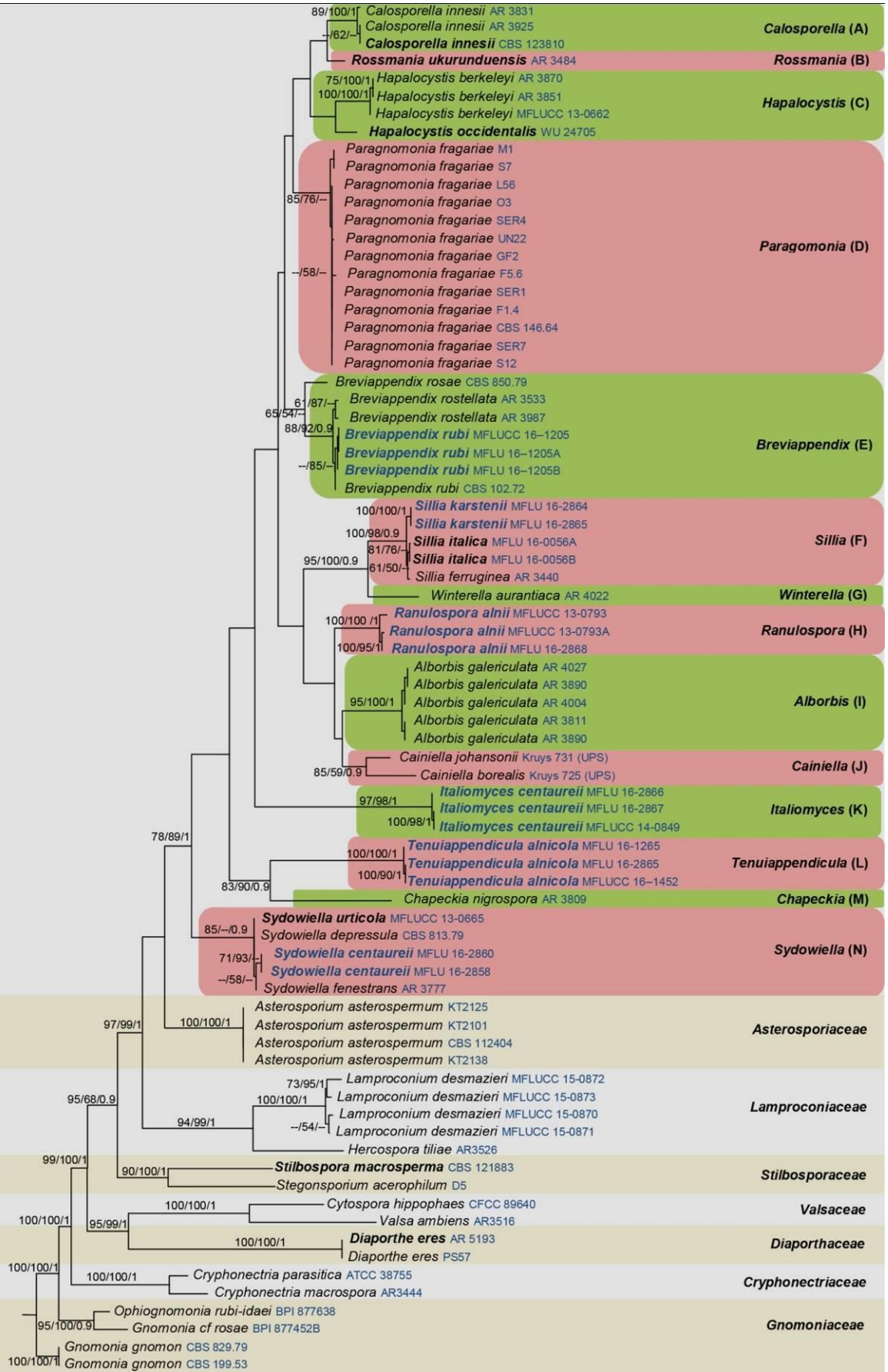
The phylogenetic analyses were carried out using combined LSU, ITS, RPB2 and TEF sequence data from taxa of Diaporthales as listed in Table 1. Taxon sampling was based on GenBank blast searches and recent publications (Morocco 2006, Kruijs & Castlebury 2012, Maharachchikumbura et al. 2015, 2016). The final multiple alignment data comprised 76 taxa and 3283 characters including gaps. Overall, the topologies obtained from the different phylogenetic methods and parameters were congruent and the best scoring RAxML tree is illustrated together with bootstrap support values (TL = 3526, CI = 0.664, RI = 0.853, HI = 0.336, RC = 0.567) in Fig. 1. Maximum likelihood analysis based on 1000 bootstrap replicates, yielded a tree with the likelihood value of ln: -19847.102701 with the following model parameters: alpha: 0.779450, $\Pi(A)$: 0.238610, $\Pi(C)$: 0.265774, $\Pi(G)$: 0.286696, and $\Pi(T)$: 0.20892.

The separation of Sydowiellaceae from other diaporthalean taxa (Fig. 1) is well-supported and Sydowiellaceae comprises 14 clades (Clades A-N) representative of the generic placement. The type genus *Sydowiella* (Clade N) forms a moderately-supported clade within the family and here we introduce a new species *S. centaureii* which is morphologically and phylogenetically distinct. The phylogeny indicates that *Tenuiappendicula* (Clade L) constitutes an independent monophyletic clade with high statistical support, while *Chapeckia*

(Clade M) has a sister relationship to *Tenuiappendicula*, but is phylogenetically distinct (Fig. 1). *Chapeckia* and *Tenuiappendicula* species have pseudostromata with very thin peridia and 1-septate, oval ascospores. The asexual morph of *Tenuiappendicula* is illustrated here and ITS, LSU sequences derived from conidiomatal DNA are similar to the sexual morph sequences. A new genus *Italiomyces* (Clade K) is introduced, with *I. centaureii* as the type species. *Italiomyces* differs from other genera in Sydowiellaceae in having mostly bi-guttulate, rarely 4-guttulate ascospores, with minute, spine-like apical appendages at both ends. The new genus *Alorbis* (Clade I) is introduced to accommodate *Cryptodiaporthe galericulata* which is morphologically and phylogenetically distinct from the type species of *Cryptodiaporthe*. This taxonomic circumscription of *C. galericulata* was suggested by Kruijs & Castlebury (2012). Hence, we introduce *Alorbis* to accommodate *Cryptodiaporthe galericulata* with a new combination as *Alorbis galericulata*. *Alorbis* is sister to *Cainiella* (Clade J) and the new genus *Ranulospora* (Clade H), typified by *R. alnii*, is introduced as sister to *Alorbis* and *Cainiella*. *Sillia* (Clade F) and *Tortilispora* (Clade G) both have cylindrical asci containing long, filiform ascospores with pointed ends. *Tortilispora*, however, has a diaportheid configuration of ascomata with 4-spored asci and septate paraphyses, while *Sillia* has a diatrypoid configuration of ascomata with 8-spored asci and aseptate paraphyses (Tibpromma et al. 2017). This morphological segregation is also supported in the phylogeny (Fig. 1). Reid & Booth (1987) studied *Tortilispora* (= *Winterella*), but further collections are needed together with support from molecular data as our assumption is based on only a single species. A new *Sillia* species, *S. karstenii* is introduced, as it constitutes a highly-supported subclade and is phylogenetically apart from other species (Fig. 1). The new species also differs from other *Sillia* species in having a very poorly developed stroma and ascospores with pointed ends (Fig. 15). A new genus *Breviappendix* (Clade E) is introduced to accommodate *Gnomonia rubi* and *G. rostellata* which were previously accommodated in Gnomoniaceae. *Breviappendix* forms a distinct clade in the family with moderate support. *Breviappendix rosae*, *B. rostellata* and *B. rubi* are introduced as new combinations for *Gnomonia rosae*, *G. rostellata* and *G. rubi* respectively and *Breviappendix rubi* is designated as the type species of the genus. A new genus *Paragnomonina* (Clade D) is introduced to accommodate *Gnomonia fragariae* which was previously placed in Gnomoniaceae. The placement in Sydowiellaceae was also noted by Mejía et al. (2011). *Calosporella* (Clade A) forms a well-supported separate clade as a well-resolved genus. This monotypic genus was recently revisited by Voglmayr & Jaklitsch (2014). *Calosporella* is sister to *Rossmania* (Clade B) which is represented by *R. ukurunduensis*. *Hapalocystis* (Clade C) does not have any support and *Hapalocystis occidentalis* is basal to all other *Hapalocystis berkeleyi* strains. *Hapalocystis berkeleyi* and *H. occidentalis* are morphologically similar, but differ primarily in spore ornamentation and size of appendages. Our phylogeny also supports the concept that *Hapalocystis occidentalis* can be considered as a separate species from *H. berkeleyi* based on morphological differences mentioned and phylogenetic support for this has been reported in other studies (Jeewon et al. 2002).

Figure 1 – Consensus tree resulting from a maximum likelihood analysis of combined LSU, ITS, RPB2 and TEF sequence alignment of genera of Diaporthales. genera in Sydowiellaceae are indicated in pink and green blocks while families are indicated in ash-coloured blocks.. Maximum parsimony bootstrap support (MPB above 50%), RAxML bootstrap support (MLB above 50 %), and Bayesian posterior probabilities (PP above 0.9) are given at the nodes (MPB/MLB/PP). The scale bar represents the expected number of changes per site. The tree is rooted to *Gnomonia gnomon* (CBS 829.79; CBS 199.53). Ex-type strains are in bold and new strains are in blue bold.

S
Y
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A
C
E
A
E



0.2

Taxonomy

Sydowiellaceae Lar.N. Vassiljeva, Pirenomits. Lokuloaskomits. Severa Dal'nego Vostoka (Leningrad): 210 (1987)

Saprobic on dead branches of deciduous trees or parasitic on both living and dead leaves and petioles of temperate shrubs. Sexual morph – Stromata present or absent. If present, erumpent through cracks, roughly circular, pseudoparenchymatous to prosenchymatous with few ascomata in a stroma, erumpent, sometimes with simple to complex stellate splits in the substrate, with poorly to well-developed black lines around the stroma and internal eustromatic tissues with thick-walled, glassy, hyaline cells of *textura globulosa* to *textura angularis* around the basal regions of ascomata and dark brown-walled cells of *textura globulosa* to *textura angularis* around the ostioles, sometimes becoming rouge in 10 % KOH. If pseudostromatic, pseudostromata pustulate on surface, circular, containing up to 20 ascomata. Ectostromatic disc erumpent, conspicuous, white to light grey, becoming dark at maturity, fusoid to circular, containing 1–20 distinctly protruding ostioles. Entostroma crumbly, brownish. Ascomata scattered, solitary or aggregated, erumpent to immersed, globose to subglobose, coriaceous, brown to black, ostiolate, papillate. Papilla wide, erumpent from the substrate, internal wall covered by hyaline, filamentous periphyses. Peridium comprising outer layer of brown-walled cells of *textura angularis* to *globulosa* and inner layer of, hyaline cells of *textura angularis*. Hamathecium comprising cellular or filamentous, hyaline, septate or aseptate paraphyses or aparaphysate. Asci 8-spored, unitunicate, cylindrical to cylindro-clavate or broadly fusoid, short pedicellate, apex blunt, with J-, apical ring or without apical ring, sometimes apex wide and flat, with multi-layered, J-, apical ring. Ascospores overlapping uniseriate, biseriate to triseriate, kidney-shaped, filamentous, oval or ellipsoidal, hyaline or initially hyaline, becoming brown with age, 0–11-septate, slightly constricted or not constricted at the septum, thick and smooth-walled, sometimes multi-guttulate, sometimes hyaline, with tapering bipolar appendages or appendages basal only. Asexual morph – Coelomycetous. Conidiomata pycnidia, superficial to erumpent, aggregated 3–5 in a single group, globose, orange to brown, conidiomatal wall thick-walled, with orange cells of *textura angularis*. Conidiophores annelidic, branched, hyaline, short, few conidiogenous cells arising from a single conidiophore, attached to conidiomatal wall. Conidiogenous cells cylindrical, hyaline, bottle-shaped, septate, pointed-ends, phialidic. Conidia ellipsoid or cylindroid, unicellular or multi-septate, hyaline or brown, smooth-walled.

Type genus – *Sydowiella* Petr.

Notes – Barr (1978) placed *Sydowiella* in the family Pseudovalsaceae (subfamily Pseudovalsoideae, tribe Ditopelleae) based on its morphological distinctiveness. There have been also a few suggestions to place *Sydowiella* in Gnomoniaceae. However, Monad (1983), did not accept the placement of *Sydowiella* in Gnomoniaceae because of absence of stromatic tissues. Vasilyeva (1987) introduced the family Sydowiellaceae based on *Sydowiella fenestrans* (Duby) Petr. and this family was accommodated in the order Ceratostomatales. Rossman et al. (2007) included *Chapeckia*, *Hapalocystis*, *Rossmania*, *Sillia*, and *Stegophora* in Sydowiellaceae. Sogonov et al. (2008) noted a close affinity of *Lambro* and *Uleoporthe* with this family, while Kruys & Castlebury (2012) analyzed ITS sequence data for genera in the family. The phylogenetic position of *Cainiella* in Sydowiellaceae was resolved and *Winterella* was also included in the family based on molecular data. *Calosporella* was introduced and placed in Sydowiellaceae to accommodate *Prosthecium innesii* by Voglmayr & Jaklitsch (2014).

List of accepted genera and species in Sydowiellaceae

Based on Index Fungorum 2017, Maharachchikumbura et al. (2015, 2016), Mejia et al. (2008), MycoBank (2017), Tibpromma et al. (2017)

Alborbis Senan. & K.D. Hyde

Alborbis galericulata (Tul. & C. Tul.)
Senan. & K.D. Hyde

Breviappendix Senan. & K.D. Hyde

Breviappendix rosae (Fuckel) Senan. &
K.D. Hyde

Breviappendix rostellata (Fr.) Senan. &
K.D. Hyde

Breviappendix rubi (Rehm) Senan. & K.D.
Hyde

Cainiella E. Müll.

Cainiella borealis M.E. Barr

Cainiella johansonii (Rehm) E. Müll.

Calosporella J. Schröt.

Calosporella innesii (Curr.) J. Schröt.

Chapeckia M.E. Barr

Chapeckia nigrospora (Peck) M.E. Barr

Chapeckia ribesia (Sacc. & Scalia) M.E.
Barr

Hapalocystis Auersw. ex Fuckel

Hapalocystis berkeleyi Auersw. ex Fuckel

Hapalocystis bicaudata Fuckel

Hapalocystis corni (Wehm.) M.E. Barr

Hapalocystis corticalis (Schwein.) M.E.
Barr

Hapalocystis occidentalis Jaklitsch &
Voglmayr

Hapalocystis ulmi (Wehm.) M.E. Barr

Hapalocystis vexans Speg.

Italiomyces Senan., Camporesi & K.D.
Hyde

Italiomyces centaureii Senan., Camporesi &
K.D. Hyde

Lambro Racib.

= *Stegophora* Syd. & P. Syd

Lambro insignis Racib.

Lambro symploci G.C. Zhao & R.L. Zhao

Paragnomonina

Paragnomonina fragariae (Kleb.) Senan. &
K.D. Hyde

Ranulospora Senan., Camporesi & K.D.
Hyde

Ranulospora alnii Senan., Camporesi &
K.D. Hyde

Rossmania Lar.N. Vassiljeva

Rossmania aculeata (Petch) Lar.N.
Vassiljeva

Rossmania ukurunduensis Lar.N. Vassiljeva

Sillia P. Karst.

Sillia albofusca Höhn.

Sillia biformis Rick

Sillia celastrina R. Rao

Sillia ferruginea (Pers.) P. Karst.

Sillia italica de Silva, Camporesi & K.D.
Hyde

Sillia kamatii Tilak, S.B. Kale & S.V.S.
Kale

Sillia karstenii Senan., Camporesi & K.D.
Hyde

Sillia theae Hara

Tenuiappendicula Senan., Camporesi &
K.D. Hyde

Tenuiappendicula alnicola Senan.,
Camporesi & K.D. Hyde

Tortilispora (Sacc.) Senan. & K.D. Hyde

= *Cryptosporella* Sacc.

Tortilispora albofusca (Cooke & Ellis)

Senan. & K.D. Hyde

Tortilispora aurantiaca (Wehm.) Senan. &
K.D. Hyde

Tortilispora cinctula (Cooke & Peck)

Senan. & K.D. Hyde

Key to genera within the family Sydowiellaceae

1. Stromata conspicuous, well-developed	2
1. Stromata absent, inconspicuous, poorly developed	4
2. Ascumata valloid, stromatic tissues do not form any colour with 10% KOH	3
2. Ascumata diatrypoid, stromatic tissues form dull red with 10% KOH.....	<i>Sillia</i>
3. Ascospores oval to fusoid-oval, 1-septate, hyaline or hyaline to brown.....	<i>Chapeckia</i>
3. Ascospores fusiform to ellipsoid with long filiform basal cell, 2-septate, hyaline.....	<i>Ranulospora</i>
4. Ascumata solitary.....	5
4. Ascumata aggregated	9
5. Asci 4-spored	<i>Breviappendix</i>
5. Asci 8-spored	6
6. Ascospores apiosporous	<i>Lambro</i>
6. Ascospores non-apiosporous	7
7. Ascospores oval, hyaline to brown, not constricted at the septa	<i>Cainiella</i>
7. Ascospores fusoid, hyaline, constricted at the septa.....	8
8. Ascospores non-appendaged, globules at the center of each cell.....	<i>Sydowiella</i>
8. Ascospores appendaged, globules at the septa of the spore	<i>Italiomyces</i>
9. Ascospores oval, short fusoid to ellipsoidal	10
9. Ascospores long fusoid cylindrical	14
10. Ascospores 1-septate	11
10. Ascospores multi-septate.....	13
11. Ascospores with long strip-like appendages.....	<i>Tenuiappendicula</i>
11. Ascospores with short, appendages.....	12
12. Ascospores ellipsoid to cylindrical, usually 4-guttulate.....	<i>Alorbis</i>
12. Ascospores fusiform, usually multi-guttulate	<i>Paragnomonina</i>
13. Ascospores hyaline to brown, ellipsoidal with broadly rounded ends, 1–3-septate, constricted at the septa	<i>Hapalocystis</i>
13. Ascospores hyaline, fusoid to oblong, 3–4-septate, not constricted at the septa	<i>Calosporella</i>
14. Ascospores 0–5-septate	<i>Tortilispora</i>
14. Ascospores 6–11-septate	<i>Rossmania</i>

Sydowiella Petr., *Annls mycol.* 21(1/2): 30 (1923)

Saprobic or pathogenic on plants. Sexual morph – Ascomata solitary, scattered, erumpent to immersed, globose, brown, papillate, ostiolate. Papilla short and wide, comprising brown, elongated cells. Peridium comprising an inner layer of thin-walled, hyaline cells of *textura angularis* and outer layer of thick-walled, brown cells of *textura angularis*. Hamathecium comprising cellular, septate, hyaline paraphyses. Asci 8-spored, unitunicate, cylindrical, short-pedicellate, apex blunt, with a J-, apical ring. Ascospores overlapping uniseriate, oval to ellipsoid, 1-median septate, hyaline. Asexual morph – Undetermined.

Type species – *Sydowiella fenestrans* (Duby) Petr.

Basionym – *Sphaeria fenestrans* Duby

Notes – *Sydowiella* is characterized by solitarily, erumpent ascomata without stromatic tissues, a melanconis-like hamathecium, and 2-celled ascospores (Kobayashi 1970). The type species *Sydowiella fenestrans* was illustrated in Maharachchikumbura et al. (2016). *Sydowiella* comprises ten species (Index Fungorum 2017): *S. ambigua* (Mouton) Munk, *S. azukiae* I. Hino & Katum., *S. dakotensis* Petr., *S. depressula* (P. Karst.) M.E. Barr, *S. fenestrans* (Duby) Petr., *S. indica* Bilgrami & Rizwi, *S. juncina* Spooner, *S. stellatifolii* Marinc. et al. and *S. uticola* Senan. et al. Here we introduce an additional species.

Sydowiella centaureii Senan., Camporesi & K.D. Hyde, *sp. nov.*

Index Fungorum number – IF552715, Facesoffungi number – FoF 2834 Fig. 2

Etymology – Name referring to the host genus *Centaurea*.

Holotype – MFLU 16–2858

Saprobic on dead branches of *Centaurea* L. Sexual morph – Stromata pseudoparenchymatous, comprising outer dark brown to black line made by hyphal cells and inner light yellow to hyaline, large cells of *textura globosa*. Ascomata 450–510 µm high, 280–355 µm diameter (\bar{x} = 504 × 314 µm, n = 20), scattered, solitary, immersed to erumpent, erect or slanted, globose to subglobose, coriaceous, black, papillate, ostiolate. Papilla 185–195 µm high, 110–120 µm wide (\bar{x} = 190 × 115 µm, n = 20), internally covered with hyaline periphyses. Peridium 15–25 µm wide (\bar{x} = 21 µm, n = 20), comprising inner layer of hyaline, thin-walled, compressed cells of *textura angularis* and outer layer of dark brown, thick-walled, cells of *textura angularis*. Hamathecium comprising 4–7 µm (\bar{x} = 6 µm, n = 20) wide, septate, cellular paraphyses. Asci 85–110 × 10–15 µm (\bar{x} = 102 × 14 µm, n = 20), 8-spored, unitunicate, cylindrical, short-pedicellate, with distinct, bilobed, J- apical ring. Ascospores 10–15 × 5–8 µm (\bar{x} = 13 × 6.8 µm, n = 20), overlapping uniseriate, oval to widely fusiform, hyaline, 1-septate, slightly constricted at the septum, with a large guttule in each cell. Asexual morph – Undetermined.

Material examined – ITALY, Province of Forlì-Cesena, Fiumicello di Premilcuore, dead stem of *Centaurea* sp. (Asteraceae), 2 April 2014, Erio Camporesi, IT 1792 (MFLU 16–2858, holotype; *ibid* BBH, isotype).

Notes – *Sydowiella juncina* and *S. stellatifolii* were collected on *Juncus effusus* L. and *Brabejum stellatifolium* L. respectively, and are possibly host-specific species. *Sydowiella ambigua* and *S. azukiae* form aggregated ascomata, while *S. centaureii* has solitary ascomata. *Sydowiella centaureii* differs from *S. fenestrans* and *S. urticola* in having large ascomata immersed within distinct stromatic tissues, surrounded by a layer of dark cells and small asci and ascospores (Maharachchikumbura et al. 2016, Index Fungorum 2017). However, we could not obtain a culture from this fungus and we extracted DNA directly from the ascomata.

Alborbis Senan. & K.D. Hyde, *gen. nov.*

Index Fungorum number – IF552717, Facesoffungi number – FoF 2835

Etymology – based on Latin words “alba” and “orbis”, referring to the ascomata opening to the host surface through a whitish disk.

Saprobic on dead stems. Sexual morph – Ectostromatic disc appearing as pustulate swellings, small, whitish, usually containing several ascomata. Ascomata immersed, aggregated, globose to

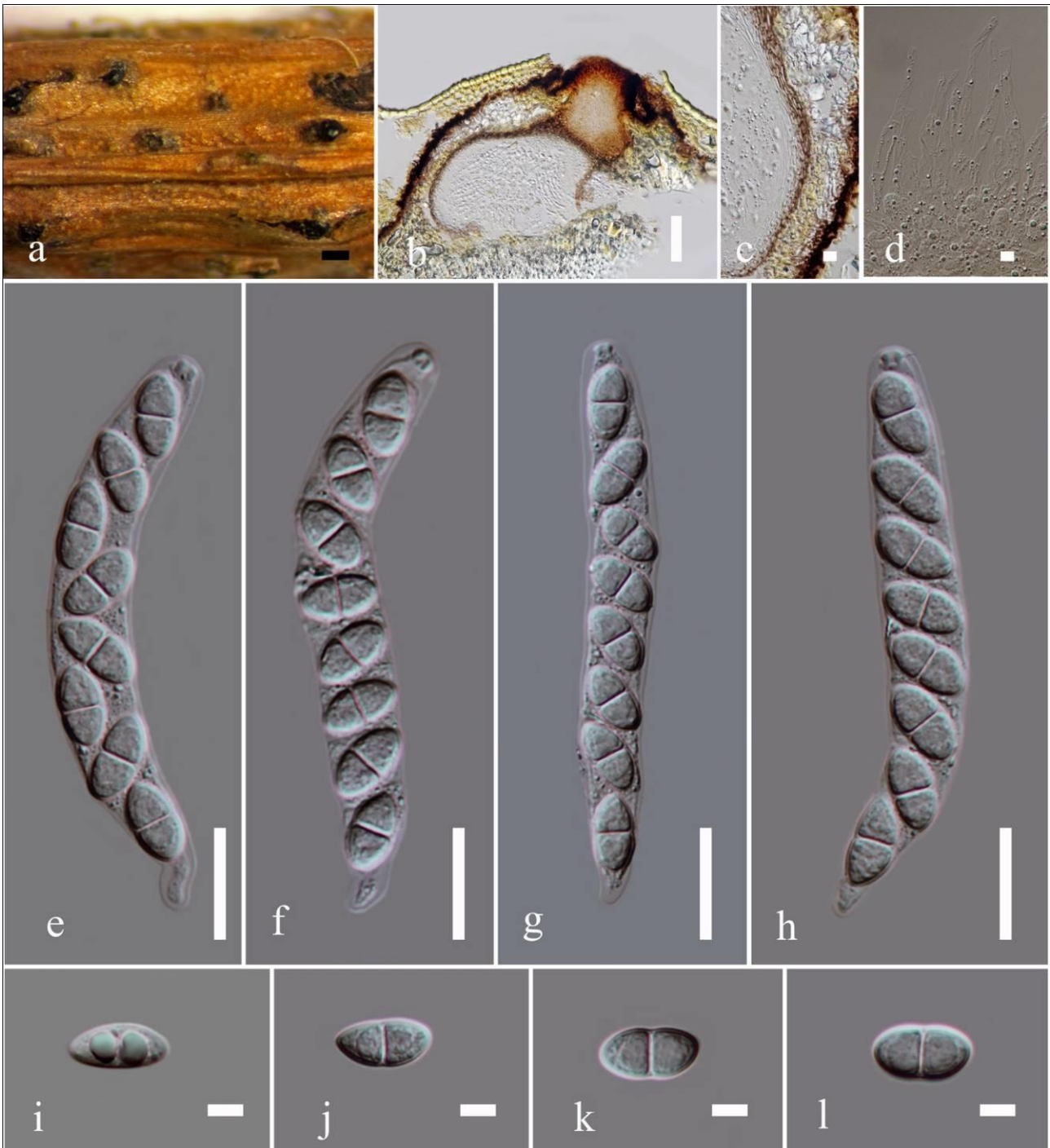


Figure 2 – *Sydowiella centaureii* (holotype) a Appearance of ascomata on substrate. b Vertical section of ascoma. c Peridium. d Paraphyses. e-h Asci. i-l Ascospores. Scale bars – a = 200 μ m, b = 100 μ m, c = 10 μ m, d = 5 μ m, e-h = 20 μ m, i-l = 5 μ m.

subglobose, coriaceous, black, ostiolate. Ostiolar canal scarcely emergent, separate, opening to ectostromatic disc by a wide ostiole, internally covered by hyaline, filamentous periphyses. Peridium comprising thick-walled, dark brown cells of *textura angularis*. Asci 8-spored, unitunicate, cylindrical to clavate, apex rounded with J-, apical ring. Ascospores overlapping uniseriate to biseriata, fusiform, 1-septate, sometimes with apical and basal appendages. Asexual morph – Undetermined.

Type species – *Alborbis galericulata* (Tul. & C. Tul.) Senan. & K.D. Hyde

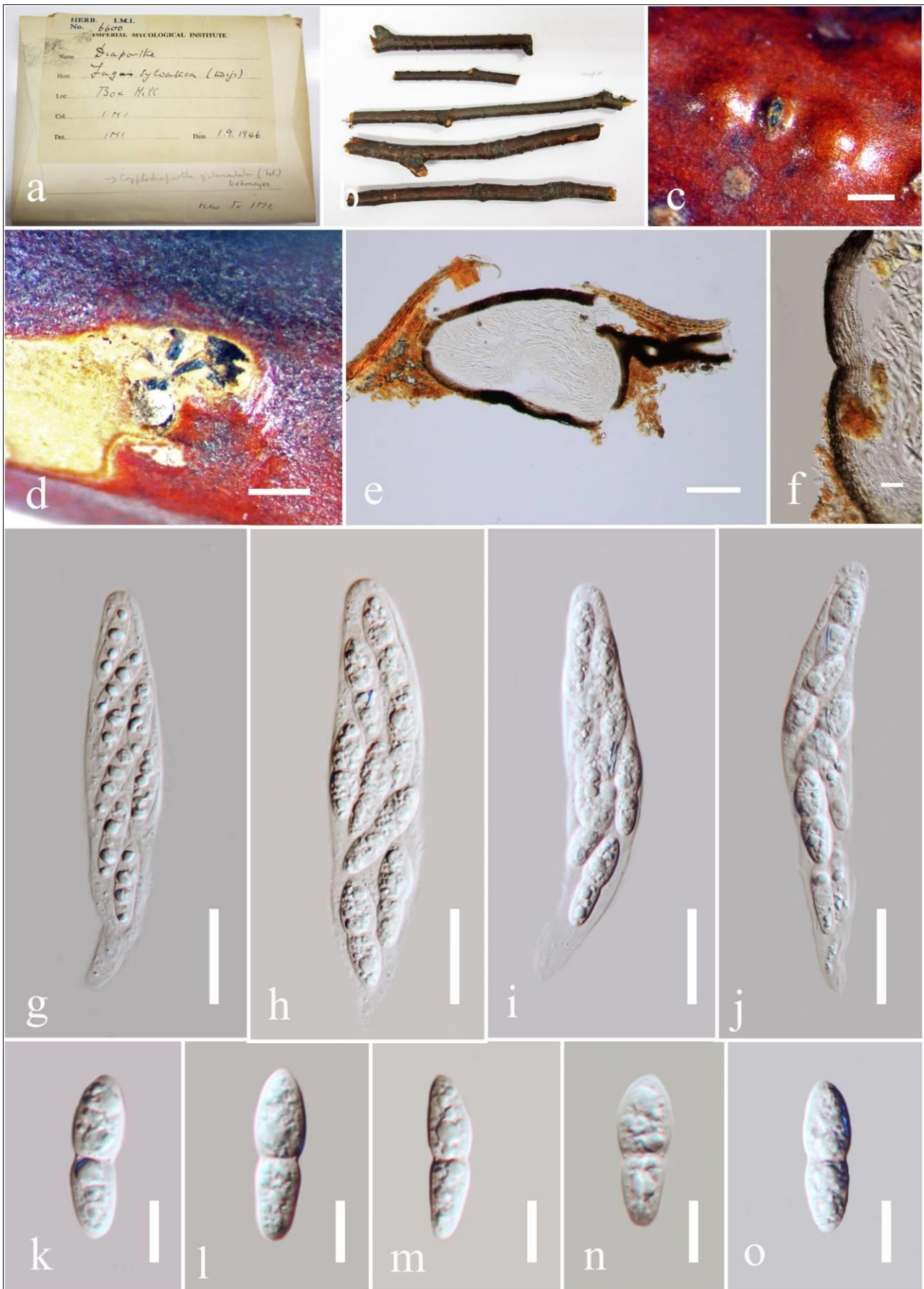


Figure 3 – *Alborbis galericulata* (IMI 6600). a Herbarium packet. b Herbarium specimen. c Appearance of ascomata on host surface. d Horizontal section of ascomata through the ectostromatic disc. e Vertical cross section through the ascomata. f Peridium. g-j Asci. k-o Ascospores. Scale bars – c, d = 500 μ m, e = 200 μ m, f-j = 20 μ m, k-o = 10 μ m.

Alborbis galericulata (Tul. & C. Tul.) Senan. & K.D. Hyde, *comb. nov.*

Index Fungorum number – IF552718, Facesoffungi number – FoF 2836

Fig. 3

Basionym – *Valsa galericulata* Tul. & C. Tul., *Select. fung. carpol.* (Paris) 2: 203 (1863)

Holotype – NYBG 02929068

Saprobic on dead stems of *Fagus sylvatica* L. Sexual morph – Appearing on the surface as small, pustulate swellings, with a central stellate rupture of the periderm through a white, minute, elliptic to fusoid ectostromatic disk, usually containing 1–6 ascospores. Ascospores 600–950 µm high, 260–450 µm diameter, immersed, aggregated, globose to subglobose, coriaceous, black, ostiolate. Ostiolar canal 375–400 µm high, 80–90 µm wide (\bar{x} = 390 × 83 µm, n = 20), scarcely emergent, separate, opening to host surface by wide ostiole, internally covered by hyaline, filamentous periphyses. Peridium 30–35 µm thick, comprising thick-walled, dark brown cells of *textura angularis*. Asci 90–110 × 17–20 µm (\bar{x} = 100 × 19 µm, n = 20), 8-spored, unitunicate, cylindrical to clavate, apex rounded with J- apical ring, short-pedicellate. Ascospores 21–26 × 5–7 µm (\bar{x} = 24 × 6 µm, n = 20), biseriate to triseriate, often 4-guttulate, ellipsoid to cylindrical, 1-septate, hyaline, slightly constricted at the septum lacking appendages. Asexual morph – Undetermined.

Material examined – UK, England, Surrey, Box Hill, on twigs of *Fagus sylvatica* L (Fagaceae), 1 September 1946, IMI 6600.

Notes – *Cryptodiaporthe galericulata* was introduced by Tulasne & Tulasne (1863) based on *Valsa galericulata*. *Cryptodiaporthe galericulata* has been reported as causing mild canker of *Fagus* species and saprobic on branches of *Fagus sylvatica* (Mejía et al. 2011). Wehmeyer (1933) mentioned that *Cryptodiaporthe* contains a heterogeneous group of species. Barr (1978) accommodated *Cryptodiaporthe galericulata* in family Valsaceae (Tribe Valseae). However, the type species of *Cryptodiaporthe* is accommodated in Gnomoniaceae based on phylogeny. Mejía et al. (2011) noted that LSU based phylogeny of a fresh collection of *C. galericulata* (BPI 863767) from the USA, clustered in Sydowiellaceae rather than Gnomoniaceae. Kruijs & Castlebury (2012) placed *C. galericulata* in Sydowiellaceae using ITS sequence data. Combined LSU, ITS, RPB2 and TEF sequence analysis in this study (Fig. 1) also places *C. galericulata* in Sydowiellaceae. Hence, we exclude *C. galericulata* from *Cryptodiaporthe* and introduce a new genus *Alborbis* to accommodate *Cryptodiaporthe galericulata*.

Breviappendix Senan. & K.D. Hyde, *gen. nov.*

Index Fungorum number – IF552719, Facesoffungi number – FoF 2837

Etymology – based on Latin words “appendicibus” and “brevis” referring to the ascospores having short appendages.

Pathogenic on living stems forming cankers. Sexual morph – Ascospores solitary, scattered, erumpent to immersed, globose, coriaceous, brown, papillate, ostiolate. Papilla short, wide, comprising brown, elongated cells, internally covered by hyaline periphyses. Peridium comprising inner layer of thin-walled, hyaline, compressed cells of *textura angularis* and outer layer of thick-walled, brown, compressed cells of *textura angularis*. Hamathecium paraphysate. Asci 8-spored, unitunicate, fusiform, sessile, apex blunt, with J- apical ring. Ascospores biseriate, fusiform to ellipsoid, 1-median septate, hyaline, ends with appendages. Asexual morph – Undetermined.

Type species – *Breviappendix rubi* (Rehm) Senan., Maharachch. & K.D. Hyde

Breviappendix rubi (Rehm) Senan., Maharachch. & K.D. Hyde, *comb. nov.*

Index Fungorum number – IF552720, Facesoffungi number – FoF 2838

Figs 4, 5

Synonymy – *Gnomonia tetraspora* var. *rubi* Rehm, *Ascomyceten*, fasc. 12: no. 596 (1880)

Gnomonia rubi (Rehm) G. Winter, *Hedwigia* 26(2): 62 (1885)

Epitype – MFLU 16–2861

Pathogenic on living stems of *Rubus ulmifolius* Schott. forming cankers. Sexual morph – Ascospores 660–760 µm high, 520–535 µm diameter (\bar{x} = 720 × 530 µm, n = 15), solitary, scattered, erumpent to immersed, globose, coriaceous, brown, papillate, ostiolate. Papilla 380–410 µm high, 130–220 µm diameter (\bar{x} = 405 × 210 µm, n = 15), comprising brown, elongate cells, internally

covered by hyaline periphyses. Peridium 20–35 μm wide (\bar{x} = 31 μm , n = 15), comprising inner, thin-walled, hyaline, compressed cells of *textura angularis* and outer, thick-walled, brown, compressed cells of *textura angularis*. Hamathecium 9–11 μm wide at base (\bar{x} = 10 μm , n = 15), 4–5 μm wide at the apex (\bar{x} = 4.8 μm , n = 15), comprising thin-walled cellular, septate, paraphyses. Asci 35–45 \times 5–10 μm (\bar{x} = 41 \times 7.8 μm , n = 25), 4–(6)-spored, unitunicate, fusiform, sessile, apex blunt, with a J- apical ring. Ascospores 10–15 \times 2.5–3.5 μm (\bar{x} = 13 \times 2.8 μm , n = 25), biseriate, ellipsoid, 1-median septate, slightly constricted at the septa, hyaline, smooth-walled, ends with small, pointed small, setose appendages 1.5–6 μm long. Asexual morph – coelomycetous. Conidiomata on MEA sporodochial, developing in 14 days, with a golden-yellow, slimy, pycnidial, superficial, globoid conidial head 150–200 μm wide/diameter (\bar{x} = 180 μm , n = 15). Conidiophores 7–11 μm high, 1–3 μm diameter (\bar{x} = 9 \times 1.6 μm , n = 15), macronematous, cylindrical, short, septate, branched, hyaline, smooth, compactly packed. Conidiogenous cells 10–20 μm high, 1–2.5 μm diameter (\bar{x} = 14.8 \times 1.7 μm , n = 15), phialidic, discrete, vase-shaped, without collarette, hyaline, sometimes branched, aseptate, narrowing towards the apex. Conidia 5.5–7 \times 1.5–2 μm (\bar{x} = 6.5 \times 1.8 μm , n = 15), lunar, widest in the centre, pointed at both ends, aseptate, smooth, hyaline, accumulated in a slimy, golden-yellow mass.

Material examined – ITALY, Province of Forli-Cesena, Santa Sofia, near Corniolo, on dead branch of *Rubus ulmifolius* Schott (Rosaceae), 25 August 2014, Erio Camporesi, IT 2070 (MFLU 16–2861, epitype designated here), ex-epitype living culture, MFLUCC 16–1205, TBRC; *ibid* MFLU 16–2862, BBH).

Culture characters – Colonies growing on MEA attaining 1 cm diameter within 7 days at 18 °C, rich in aerial mycelia, woolly, circular, flat, smooth, greyish white.

Notes – *Gnomonia rubi* was reported as the causal agent of severe stem cankers and dieback of various cultivated and wild *Rubus* species in both Europe and America (Ellis et al. 1984, Maas et al. 1989, Nordskog et al. 2003). Morphologically *G. rubi* and *G. rostellata* (Fr.) Wehm., have similar characters and some authors have synonymized *G. rubi* under *G. rostellata* (Monod 1983, Barr 1991). Barr (1978) reported *G. rubi* as the four-spored form of *G. rostellata*. Studies have placed *Gnomonia rosae*, *G. rostellata* and *G. rubi* out of Gnomoniaceae as they cluster together with *Hapalocystis* species (Morocco & Fatehi 2007). Krays & Castlebury (2012) placed *G. rubi* in Sydowiellaceae based on ITS sequence data. In this study, we observed the same results and hence we introduced a new genus *Breviappendix* to accommodate *G. rosae*, *G. rostellata* and *G. rubi* and we proposed three new combinations as *Breviappendix rosae* (IF552798), *B. rostellata* (IF552799) and *B. rubi*. *Breviappendix rubi* is designated as the type species and we observed two specimens of *Breviappendix rubi* (= *Gnomonia rubi*) from IMI (IMI 252650, IMI 286320). Our fresh collection is morphologically identical to the prologue of *Gnomonia rubi* and the specimens we observed. However, we could not obtain the type specimen which is probably destroyed. The holotype was collected from *Rubus fruticosus* L (Rosaceae) in Switzerland and our fresh collection was collected from *Rubus ulmifolius* Schott in Italy. Considering the morphological similarity and close proximity of collections, we therefore designate our fresh collection as an epitype of *Breviappendix rubi* (*sensu* Ariyawansa et al. 2014) and both sexual and asexual morphs are illustrated herein.

Breviappendix rosae (Fuckel) Senan., Maharachch. & K.D. Hyde, *comb. nov.*

Index Fungorum number – IF552798

Basionym – *Gnomonia rosae* Fuckel, Jb. nassau. Ver. Naturk. 23-24: 122 (1870) [1869-70]

Breviappendix rostellata (Fr.) Senan., Maharachch. & K.D. Hyde, *comb. nov.*

Index Fungorum number – IF552799

Basionym – *Sphaeria rostellata* Fr., Observ. mycol. (Havniae) 1: 178 (1815)

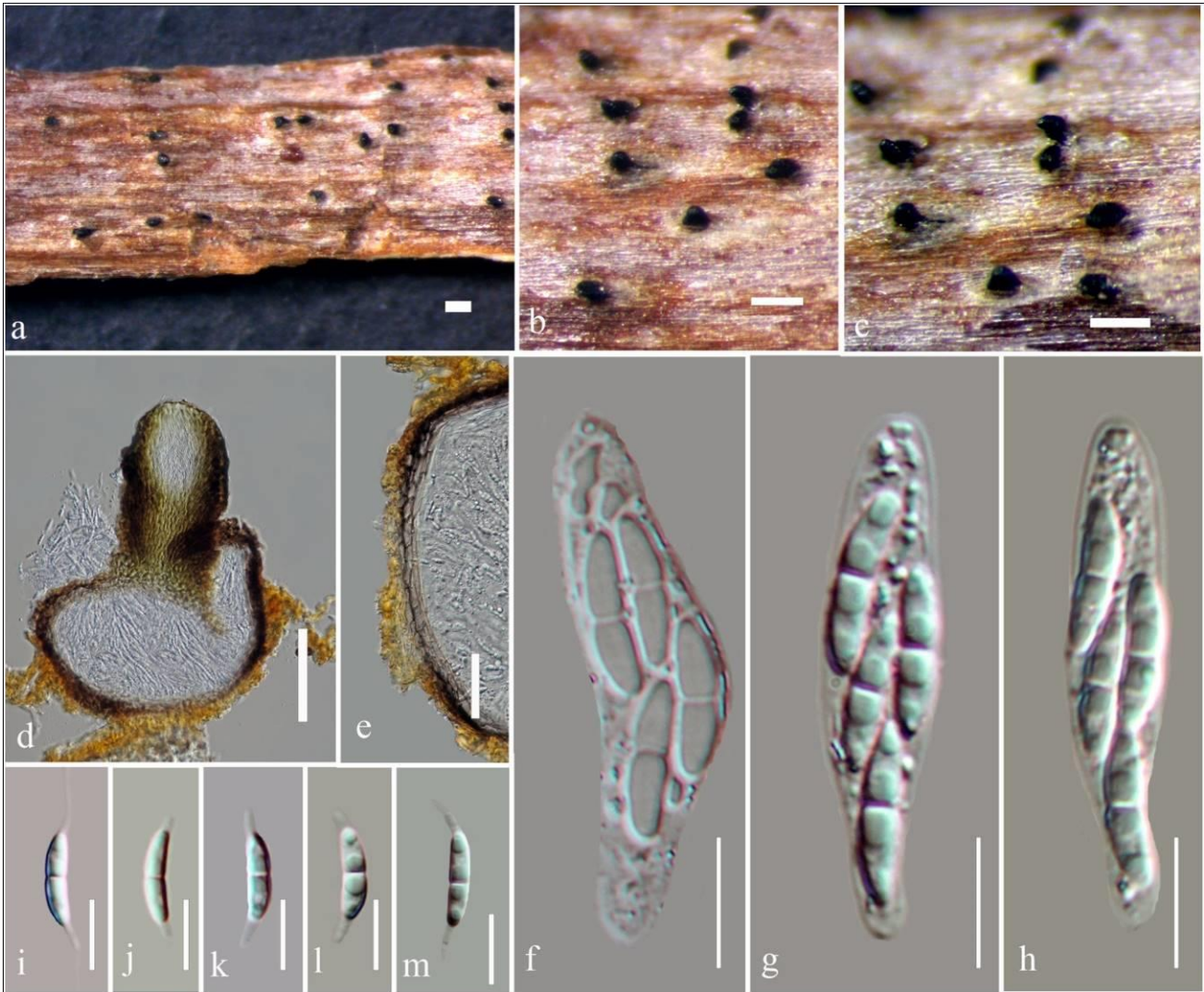


Figure 4 – *Breviappendix rubi* (MFLU 16–2861, epitype). a-c Appearance of ascomata on substrate. d Vertical section of ascoma. e Peridium. f-h Asci. i-m Ascospores. Scale bars – a-c = 200 μ m, d = 100 μ m, e = 50 μ m, f-m = 10 μ m.

Cainiella E. Müll., Sydowia 10(1-6): 120 (1957) [1956]

Facesoffungi number – FoF2839

Saprobic or parasitic on both living and dead leaves and petioles of temperate shrubs. Sexual morph – Ascomata scattered, solitary or in pairs, erumpent, globose to subglobose, coriaceous, black, ostiolate, papillate. Papilla wide, erumpent, internal wall covered by hyaline, filamentous periphyses. Peridium comprising a few layers of outer brown-walled cells of *textura globulosa* and inner layer of hyaline cells of *textura angularis*. Hamathecium comprising filamentous, hyaline, aseptate paraphyses. Asci few in number, 8-spored, unitunicate, cylindro-clavate, short pedicellate, apex wide, flat, with, J- apical ring. Ascospores overlapping uniseriate to biseriate, kidney-shaped or ellipsoidal, guttulate, initially hyaline, greenish or yellowish, becoming brown with age, 1-septate, with a thick and smooth episore. Asexual morph – Undetermined.

Type species – *Cainiella johansonii* (Rehm) E. Müll.

Cainiella borealis M.E. Barr, Contr. Inst. bot. Univ. Montréal 73: 65 (1959)

Facesoffungi number – FoF2840

Fig. 6

Saprobic or parasitic on both living and dead leaves and petioles of temperate shrubs. Sexual morph – Ascomata 775–1000 μ m high, 260–345 μ m diameter (\bar{x} = 846 \times 300 μ m, n = 15), scattered, solitary, erumpent, globose to subglobose, coriaceous, black, ostiolate, papillate. Papilla 400–450 μ m high, 120–150 μ m diameter (\bar{x} = 415 \times 142 μ m, n = 20), erumpent, internal wall

covered by hyaline, filamentous periphyses. Peridium 15–25 μm wide (\bar{x} = 21 μm , n = 20), comprising a few outer layers of brown-walled cells of *textura globulosa* and inner, hyaline, cells of *textura angularis*. Hamathecium comprising filamentous, hyaline, aseptate paraphyses. Asci 190–220 \times 30–40 μm (\bar{x} = 204 \times 35 μm , n = 20), few in number, 8-spored, unitunicate, cylindro-clavate, short pedicellate, apex wide, flat with complex, J-, apical ring. Ascospores 30–35 \times 17–20 μm (\bar{x} = 34 \times 19 μm , n = 20), biseriata, kidney-shaped, guttulate, hyaline, 1-septate, slightly constricted at the septum, with a thick episore. Asexual morph – Undetermined.

Material examined – NORWAY, Svalbard and Jan Mayen, Svalbard, Brøgger Peninsula: 6 km SE of Ny-Alesund near the bird cliff on the beach, on stems of *Cassiope tetragona* D. Don (Ericaceae), 12 August 1988, Nils Lundqvist, 17327-d, S-F133018.

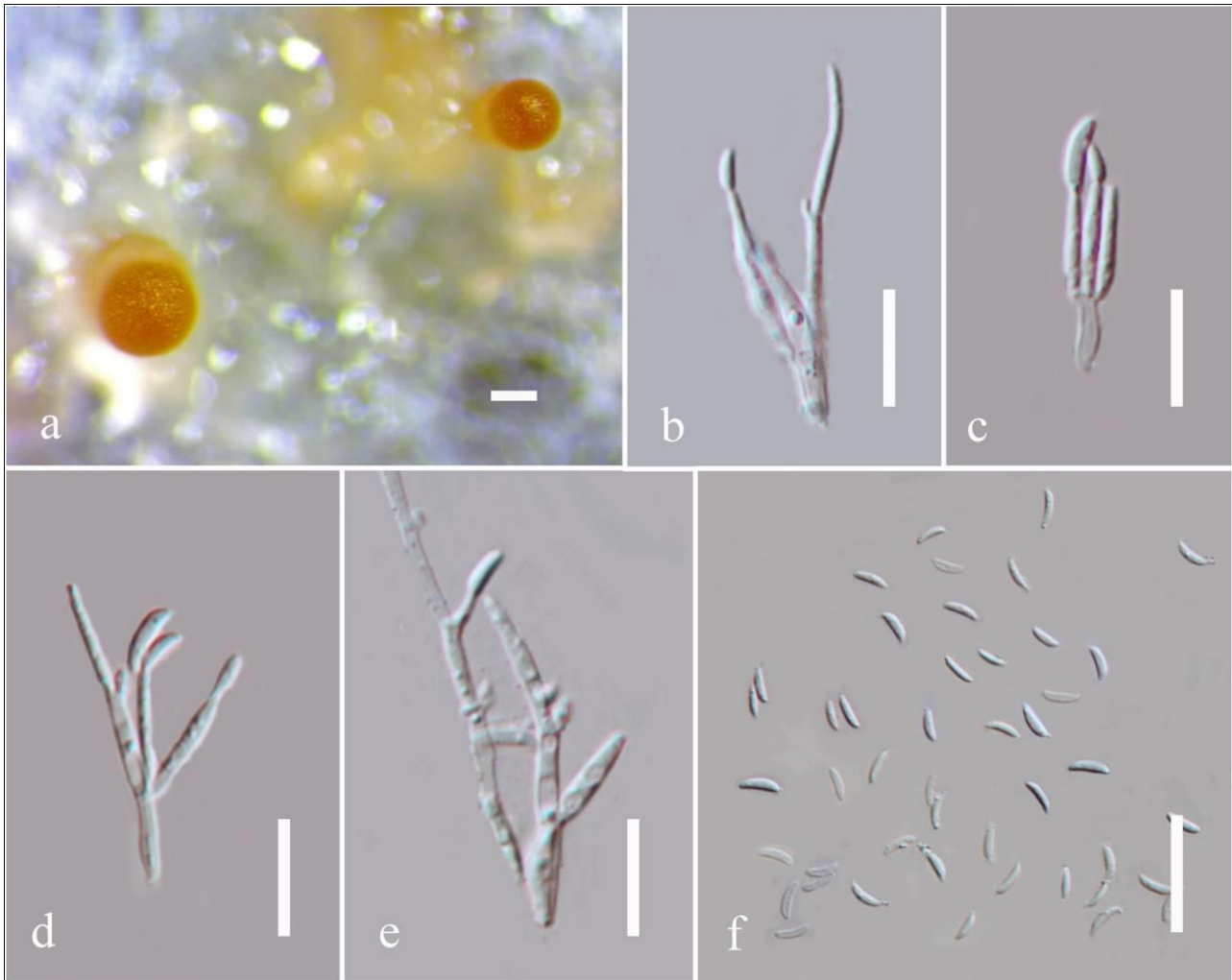


Figure 5 – Asexual morph of *Breviappendix rubi* (ex-epitype). a Conidiomata on MEA. b-e Conidiophores, conidiogenous cells and conidia. f Conidia. Scale bars – a = 100 μm , b-f = 10 μm .

Notes – The genus *Cainiella* was introduced by Muller (1957) based on *Lizonia johansonii* Rehm. This genus is characterized by dark, immersed ascomata, with long-necks, deliquescent paraphyses, as well as asci with a J-, refractive ring and 1-septate ascospores. *Cainiella* comprises the type species *C. johansonii* (Rehm) E. Müll. and *C. borealis*. These taxa are associated with arctic dwarf shrubs and prostrate evergreen subshrubs. Initially, this genus was assigned to Sphaeriales (Muller 1956). However, Barr (1959) placed *Cainiella* in Xylariaceae when she introduced *C. borealis*. Subsequently *Cainiella* was placed in Amphisphaeriaceae (Muller & von Arx 1962), in Cainiaceae (Vasilyeva 1987, 1998) and in Hyponectriaceae (Kirk et al. 2008). Vasilyeva (1998) separated the two species, transferring *C. borealis* to *Sydowiella* (Sydowiellaceae) and *C. johansonii* to *Cainia* (Cainiaceae). However, Lumbsch & Huhndorf (2009) placed *Cainiella* in the family Sordariaceae.

Kruys & Castlebury (2012) reported that the taxonomic placement of *Cainiella* is in Sydowiellaceae based on LSU and ITS sequence data.



Figure 6 – *Cainiella borealis* (S-F133018). a Herbarium packet. b Herbarium specimen. c, d Appearance of ascomata on substrate. e Cross section of ascus. f Peridium. g Paraphyses. h, i Asci in water. j Ascus in Melzer's reagent. k-n Ascospores. Scale bars – c = 200 μ m, d = 200 μ m, e = 100 μ m, f, h-j = 20 μ m, g, k-n = 10 μ m.

Calosporella J. Schröt., in Cohn, Krypt.-Fl. Schlesien (Breslau) 3.2(4): 442 (1897) [1908]

Facesoffungi number – FoF2841

Saprobic on dead branches of deciduous trees. Sexual morph – Pseudostromata pustulate on surface, circular, containing up to 20 ascomata. Ectostromatic disc erumpent, conspicuous, white to light grey, becoming dark at maturity, fusoid to circular, possessing 1–20 distinctly protruding ostioles. Entostroma crumbly, brown. Ascomata immersed in stromata, aggregated, globose to subglobose, coriaceous, black, ostiolate, papillate. Papilla erumpent, cylindrical, black. Asci 8-spored, unitunicate, broadly fusoid, without or with inconspicuous pedicel, without a distinct apical ring. Ascospores bi- to triseriate, fusoid to oblong, 3–4-euseptate, hyaline, with tapering appendages at both ends. Asexual morph – Undetermined.

Type species – *Calosporella innesii* (Curr.) J. Schröt.

Calosporella innesii (Curr.) J. Schröt., in Cohn, Krypt.-Fl. Schlesien (Breslau) 3.2, 4: 442. 1897 (1908).

Basionym – *Sphaeria innesii* Curr., Trans. Linn. Soc. London 22: 281. 1858 ('1859').

Facesoffungi number – FoF2842

Epitype – WU 32161

Fig. 7

Saprobic on dead branches of deciduous trees. Sexual morph – Pseudostromata 1–3 mm diameter, pustulate on surface, circular, containing up to 20 ascomata. Ectostromatic disc erumpent, conspicuous, white to light grey, becoming dark at maturity, fusoid to circular, possessing 1–20 distinctly protruding ostioles. Entostroma crumbly, brownish. Ascomata 400–600 μ m diameter, immersed in stromata, aggregated, globose to subglobose, coriaceous, black, ostiolate, papillate.

Ostioles erumpent, cylindrical, black. Asci 60–100 × 16–22 μm, 8-spored, unitunicate, broadly fusoid, without or with inconspicuous pedicel, lacking a distinct apical ring. Ascospores 20–34 × 6.5–10.5 μm, bi- to triseriate, fusoid to oblong, 3–4-euseptate, not to slightly constricted at septa, hyaline, multi-guttulate, with rounded ends, hyaline tapering appendages at both ends, appendages 5–7 μm long, 3–4.5 μm wide at the base. Asexual morph – Undetermined (description based on Voglmayr & Jaklitsch 2014).

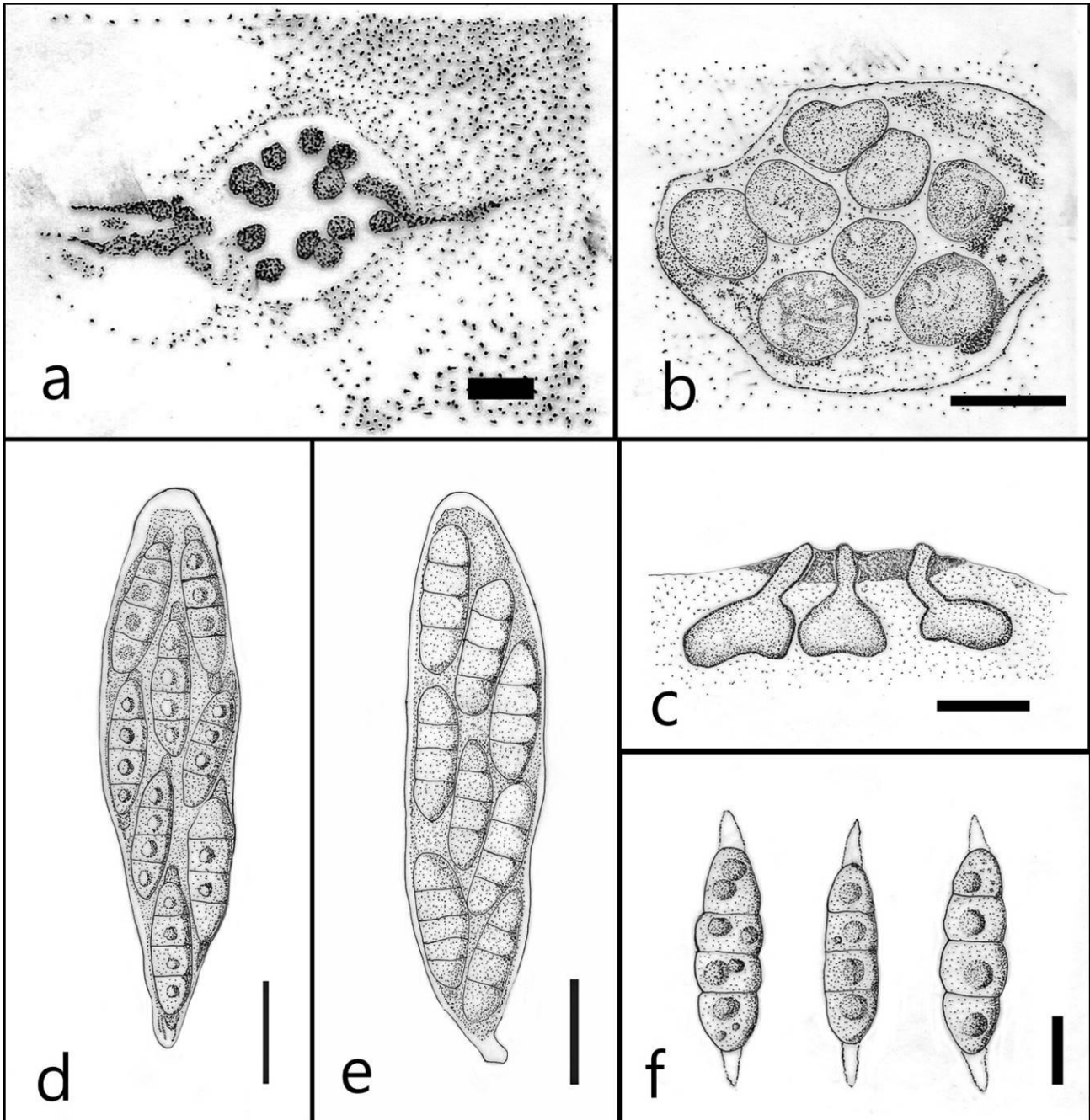


Figure 7 – *Calospora innesii*. (Redrawn from Voglmayr & Jaklitsch 2014). a Ascomata on substrate. b Horizontal cross section of ascoma. c Vertical cross section of ascoma. d, Matured ascus e. Over matured ascus. f Ascospores. Scale bars – a-c = 500 μm, d, e = 20 μm, f = 10 μm.

Notes – Schröter (1897) erected the genus *Calospora* as a replacement for *Calospora* Sacc. Saccardo (1883) listed 13 species under the genus without designating a generic type. However, the first two species, *C. platanoidis* (Pers.) Sacc. and *C. innesii* (Curr.) Sacc., are morphologically distinct (Saccardo 1883). Clements & Shear (1931) lectotypified *Calospora* with *C. platanoidis*. However, Wehmeyer (1941) suggested the type specimen of its basionym, *Sphaeria platanoidis*

Pers., is not congeneric with *C. platanoidis*, based on its morphology. Hence lectotypification of the genus *Calosporella*, with *C. platanoidis* could not be accepted. Therefore, Voglmayr & Jaklitsch (2014) typified *Calosporella* with *C. innesii* using a specimen collected from Austria associated with dead corticated branches of *Acer pseudoplatanus*. *Calosporella innesii* is characterized by hyaline, mostly 3-septate ascospores, with small apical appendages. It was transferred to *Prosthecium* by Wehmeyer (1941) based on phragmospores with apical appendages. However, in the prologue, Currey (1858) did not provide any details about the collection which was selected as the lectotype. Phylogenetic placement of *Calosporella* in Sydowiellaceae has been reported using ML analysis of the LSU sequence data from selected taxa in Diaporthales (Voglmayr & Jaklitsch 2014).

Chapeckia M.E. Barr, Mycol. Mem. 7: 164 (1978)

Facesoffungi number – FoF2843

Saprobic on branches of deciduous trees and shrubs. Sexual morph – Stromata pseudoparenchymatous, scattered on host surface, immersed, opening to the outside through cracks in the host epidermis, appearing as an aggregation of ostioles, rounded or elliptic, externally black, internally brown, composed of compact pseudoparenchymatous tissues, 3–9 ascomata in a stroma. Ascomata upright, deeply immersed in stromata. Peridium thin at the base, wider at base of neck. Hamathecium comprising cellular paraphyses. Asci 8-spored, unitunicate, oblong to ellipsoidal, short-pedicellate. Ascospores biseriata, oblong-ellipsoidal to oval, light to dark brown, 1-median septate. Asexual morph – Undetermined.

Type species – *Chapeckia nigrospora* (Peck)

Chapeckia nigrospora (Peck) M.E. Barr, Mycol. Mem. 7: 165 (1978)

Basionym – *Diatrype nigrospora* Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 33: 33 (1883) [1880]

Facesoffungi number – FoF2844

Fig. 8

Holotype – NYS 2083

Saprobic on branches of deciduous trees and shrubs. Sexual morph – Stromata 800–925 µm wide (\bar{x} = 900 µm, n = 10), pseudoparenchymatous, scattered on host surface, immersed, opening to outside through cracks in the host epidermis, appearing as an aggregation of ostioles, rounded or elliptic in shape, externally black, internally brown, composed of compact pseudoparenchymatous tissues, 3–4 or up to 9 ascomata in a stroma. Ascomata 360–455 µm high, 160–225 µm diameter (\bar{x} = 408 × 180 µm, n = 20), upright, deeply immersed in stromata, necks short and wide, flared at upper portion, globose. Peridium 10–13 µm wide (\bar{x} = 11 µm, n = 20), thin at the base, comprising 1–3 layers of brown-walled cells of *textura angularis* and base of neck comprising 6–8 layers of cells of *textura angularis*. Hamathecium comprising cellular paraphyses. Asci 40–55 × 10–15 µm (\bar{x} = 49 × 12 µm, n = 20), 8-spored, unitunicate, oblong to ellipsoidal, apex slightly pointed, short-pedicellate. Ascospores 9.5–11 × 5–6 µm (\bar{x} = 10.7 × 5.6 µm, n = 20), biseriata, oblong-ellipsoidal to oval, hyaline when immature, light to dark brown at maturity, 1-median septate, slightly constricted at the septum, wall surrounded by narrow gel coating becoming irregularly rough when dry, appendages narrow, short or elongate. Asexual morph – Undetermined.

Material examined – USA, New York, Quaker Street, on bark of *Betula lutea*, C.H. Peck (NYS 2083, holotype).

Notes – *Chapeckia* was introduced by Barr (1978) based on *Diatrype nigrospora* and accommodated in Pseudovalsaceae. There are two species in the genus (Index Fungorum 2017) the type species and *C. ribesia* (Sacc. & Scalia) M.E. Barr.

Lumbsch & Huhndorf (2007) placed *Chapeckia* in Melanconidaceae while Rossman et al. (2007) placed it in Sydowiellaceae. Later, Lumbsch & Huhndorf (2010) also accommodated *Chapeckia* in Sydowiellaceae. De Silva et al. (2009) and Kruys & Castlebury (2012) analyzed sequence data for *Chapeckia* and agreed it belonged in Sydowiellaceae.

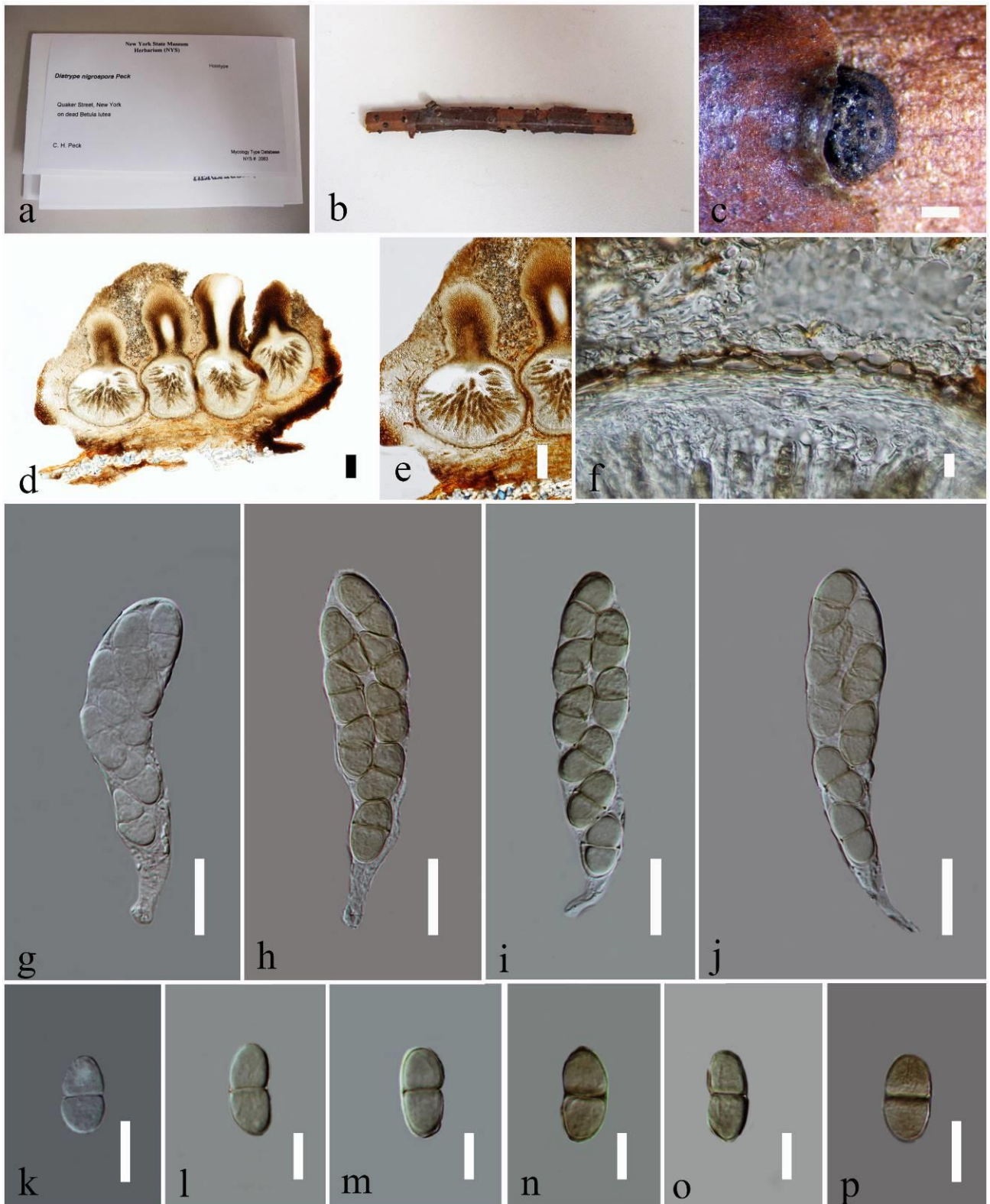


Figure 8 – *Chapeckia nigrospora* (holotype). a, b Herbarium packet and specimen. c Appearance of stroma on host surface. d-e Cross section of ascomata in stroma. f Peridium. g-j Asci. k-p Ascospores. Scale bars – c = 500 μ m, d, e = 100 μ m, f = 10 μ m, g-j = 20 μ m, k-p = 10 μ m.

Haplocystis Auersw. ex Fuckel, *Fungi rhenani exsic.*, fasc. 6: no. 585 (1863)

Facesoffungi number – FoF2845

Saprobic on woody bark. Sexual morph – Stromata forming a thin, web of light brown hyphae around upper part of ascomata. Ascomata immersed, aggregated, subglobose to globose, coriaceous, black, ostiolate, papillate. Papilla short, black, cylindrical, periphysate. Peridium

comprising few layers of black, thick-walled, cells of *textura angularis*. Hamathecium comprising a few, septate, hyaline paraphyses attached to the base, longer than asci. Asci 4 or 8-spored, unitunicate, clavate to fusoid, with a short pedicel, and an inconspicuous flat, J-, refractive ring. Ascospores inequilaterally ellipsoidal, with broadly rounded ends, hyaline to dark brown, distoseptate, with short or long, hyaline strap-like appendages at both rounded ends. Asexual morph: Coelomycetous. Conidiomata pycnidia, superficial, aggregated in groups of 3–5, globose, orange to brown. Conidiomatal wall small, thick-walled, orange, comprising cells of *textura angularis*. Conidiophores annelidic, branched, hyaline, short, few conidiogenous cells arising from a single conidiophore, attached to conidiomatal wall. Conidiogenous cells cylindrical, hyaline, bottle-shaped, septate, ends pointed, phialidic. Conidia ellipsoid or cylindroid, unicellular or multi-septate, hyaline or brown.

Type species – *Hapalocystis berkeleyi* Auersw. ex Fuckel, Fungi rhenani exsic., fasc. 6: no. 585 (1863)

Hapalocystis berkeleyi Auersw. ex Fuckel, Fungi rhenani exsic., fasc. 6: no. 585 (1863)

Facesoffungi number – FoF2846

Fig. 9

Isotype – K(M) 195743

Saprobic on woody bark. Sexual morph – visible through dark cracks on the host surface. Stromata forming a thin, weft of light brown hyphae around upper part of ascomata. Ascomata 90–185 µm high, 206–302 µm diameter (\bar{x} = 150 × 245 µm, n = 15), immersed, aggregated, subglobose to globose, coriaceous, black, ostiolate. Ostiole 130–195 µm high, 90–113 µm wide (\bar{x} = 145 × 105 µm, n = 10), short papillate, black, cylindrical, periphysate with hyaline, filamentous paraphyses. Peridium 4–16 µm wide (\bar{x} = 10 µm, n = 15), comprising 3–5-layers of black, thick-walled cells of *textura angularis*. Paraphyses 3–7 µm wide (\bar{x} = 6 µm, n = 15), few, septate, hyaline, attached to the base, longer than asci. Asci 112–127 × 46–80 µm (\bar{x} = 121 × 66 µm, n = 20), 4- or 8-spored, unitunicate, clavate to fusoid, with a short pedicel, with an inconspicuous flat, refractive ring at the lower end of the thickened apical wall, apex narrow and blunted. Ascospores 34–42 × 12–18 µm (\bar{x} = 37 × 17 µm), 2–5-seriate, inequilaterally ellipsoidal, with broadly rounded ends, initially hyaline, dark brown at maturity, (1–)2–(–3)-septate, with cells of equal length, thick and smooth-walled, with short, hyaline, strap-like appendages situated at both rounded ends, having the same width as the ascospores. Asexual morph – Coelomycetous. Conidiomata 165–195 µm diameter (\bar{x} = 182 µm, n = 15), pycnidial, superficial, aggregated, 3–5 in a group, globose, orange to brown. Conidiomata wall 7–13 µm wide (\bar{x} = 10 µm, n = 10), comprising 5–10 layers of small, thick-walled, orange cells of *textura angularis*. Conidiophores 1.5–2 µm high, 1–1.5 µm wide (\bar{x} = 2 × 1.5 µm, n = 10), branched, hyaline, short, few conidiogenous cells arising from a single conidiophore, attached to conidiomatal wall. Conidiogenous cells 10–14 µm high, 5–7 µm wide, cylindrical, hyaline, bottle-shaped, septate, pointed at ends, phialidic. Conidia 0.5–1.5 µm diameter (\bar{x} = 1 µm, n = 20) ellipsoid, 1-celled, hyaline, smooth-walled.

Material examined – ITALY, Province of Forlì-Cesena [FC], Modigliana, Montebello, on branch of *Platanus hybrida* L. (Platanaceae), 14 April 2013, Erio Camporesi, IT 1187 (MFLU 14–0798).

Notes – *Hapalocystis* was established to accommodate two species, *H. berkeleyi* and *H. bicaudata* Fuckel (Fuckel 1863). Clements & Shear (1931) designated *H. berkeleyi* as the type species. Later this genus was synonymized under *Pseudovalsa* (Winter 1887, Ellis & Everhart 1892) and *Prosthecium* (Wehmeyer 1941).

Barr (1978) however excluded *Hapalocystis* from *Prosthecium* based on morphology and placed the genus in Melanconidaceae (Barr 1978, Lumbsch & Huhndorf 2007). Rossman et al. (2007) placed *Hapalocystis* in Sydowiellaceae based on its morphology. *Hapalocystis* now comprises *H. bicaudata* *H. corni* (Wehm.) M.E. Barr, *H. corticalis* (Schwein.) M.E. Barr, *H. mirabilis* Sorokīn, *H. occidentalis* Jaklitsch & Voglmayr, *H. ulmi* (Wehm.) M.E. Barr, and *H. berkeleyi* (*H. berkeleyi* var. *berkeleyi* and *H. berkeleyi* var. *kickxii* (Westend.) M.E. Barr and *H. vexans* Speg. (Index Fungorum 2017). The asexual morph of *Hapalocystis* was recorded as

Stilbospora, *Hendersonia* or *Dothiorella* (Jaklitsch & Voglmayr 2004). Glawe (1985) and Liu et al. (2015) reported a *Phoma*-like asexual morph for *H. berkeleyi* from culture.

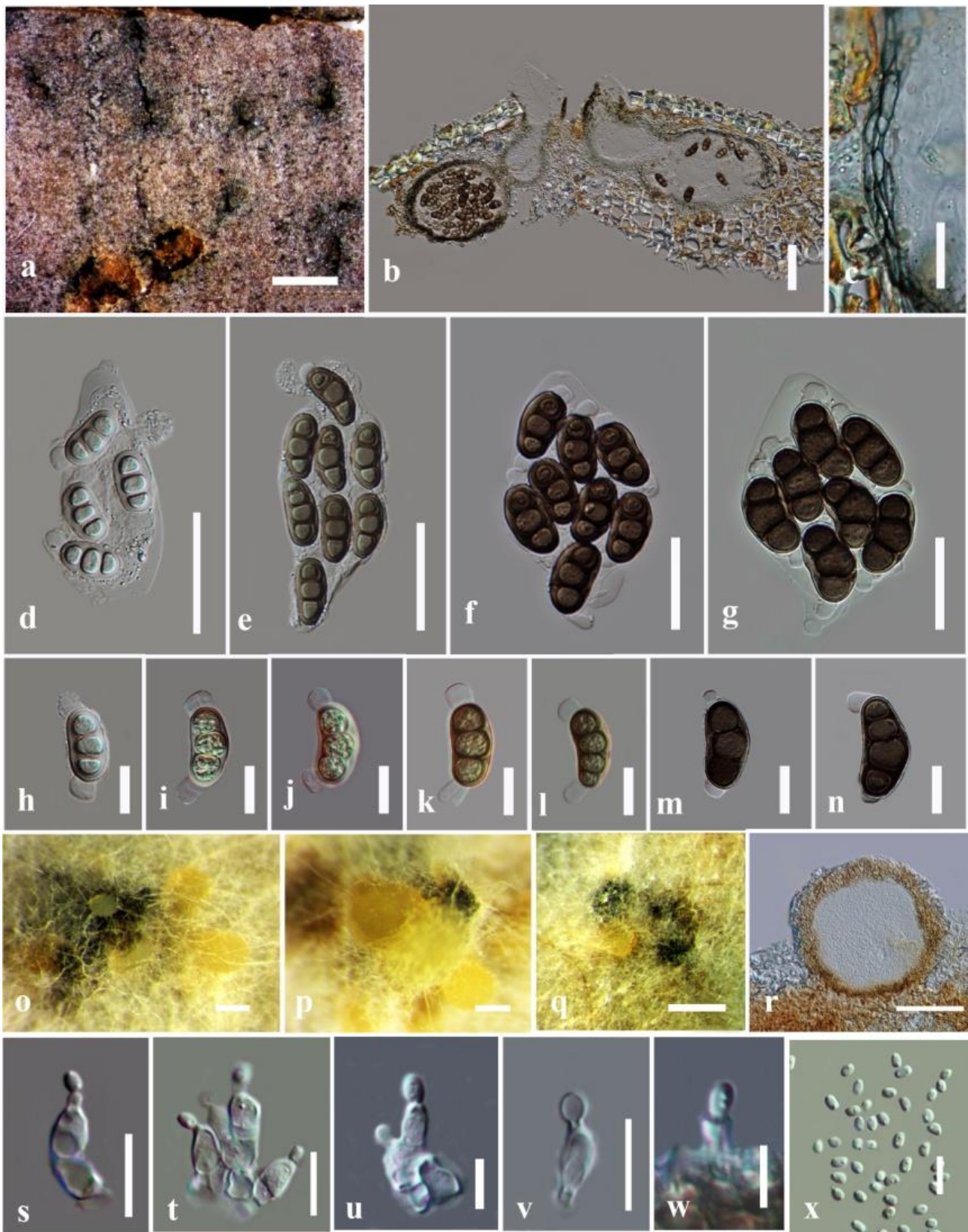


Figure 9 – *Hapalocystis berkeleyi*. a Appearance of ascomata on substrate. b Vertical cross section of ascomata. c Peridium. d–g Asci. h–n Ascospores. o–q Conidiomata. r Vertical cross section of conidioma. s–w Conidiophores, conidiogenous cells and conidia. x Conidia. Scale bars – a = 1 mm, b = 100 μ m, c = 20 μ m, d–g = 50 μ m, h–n = 20 μ m, o–q = 500 μ m, g = 100 μ m, s–w = 10 μ m, x = 5 μ m.

Italiomyces Senan., Camporesi & K.D. Hyde, *gen. nov.*

Index Fungorum number – IF552721, Facesoffungi number – FoF 2847

Etymology – Based on the country where the fungus was collected.

Saprobic on dead stem of *Centaurea* L. Sexual morph – Ascomata solitary to rarely aggregated, scattered, immersed, globose to subglobose, black coriaceous, papillate, ostiolate. Papilla short, wide, emerging through cracks in the substrate, comprising small, thick-walled, cells of *textura angularis*, internally covered by hyaline, periphyses. Peridium comprising thick-walled, compressed, dark brown cells of *textura angularis*. Asci 8-spored, unitunicate, fusiform, short-pedicellate, apex blunt with bi-lobed apical ring. Ascospores overlapping uniseriate to biseriate, fusiform to narrowly oval, 1-septate, large, hyaline, with appendages. Asexual morph – Undetermined.

Type species – *Italiomyces centaureii* Senan., Camporesi & K.D. Hyde

Italiomyces centaureii Senan., Camporesi & K.D. Hyde, *sp. nov.*

Index Fungorum number – IF552722, Facesoffungi number – FoF 2848 Fig. 10

Etymology – Based on the host genus.

Holotype – MFLU 16–2866

Saprobic on dead stems of *Centaurea* L. Sexual morph – Ascomata 360–380 µm high, 405–415 µm diameter ($\bar{x} = 375 \times 411$ µm, n = 15), solitary to rarely aggregated, scattered, immersed, globose to subglobose, black, coriaceous, papillate, ostiolate. Papilla 140–165 µm high, 150–185 µm diameter ($\bar{x} = 160 \times 175$ µm, n = 15), emerging through cracks in the substrate, comprising small, thick-walled cells of *textura angularis*, internally covered by hyaline, periphyses. Peridium 15–25 µm wide ($\bar{x} = 20$ µm, n = 15), comprising thick-walled, compressed, dark brown cells of *textura angularis*. Asci 90–110 × 15–20 µm ($\bar{x} = 105 \times 17$ µm, n = 25), 8-spored, unitunicate, fusiform, short-pedicellate, apex blunt with bi-lobed apical ring. Ascospores 20–30 × 6.5–8.5 µm ($\bar{x} = 26 \times 7.7$ µm, n = 25), overlapping uniseriate to biseriate, fusiform to narrowly oval, 1-septate, bi-guttulate, hyaline, with short, spine-like appendages at both ends. Asexual morph – Undetermined.

Culture characters – Colonies growing on MEA attaining 1 cm within 7 days when incubated at 18° C, with sparse aerial mycelia, forming minute mycelia tufts, powdery, flat, circular, smooth, white to off-white.

Material examined – ITALY, Province of Forlì-Cesena, Fiumicello di Premilcuore, on dead stem of *Centaurea* sp. (Asteraceae), 2 April 2014, Erio Camporesi, IT 1976 (MFLU 16–2866, holotype), ex-type living cultures MFLUCC 14–0849, *ibid* (BBH isotype), ex-type living culture, TBRC.

Notes – *Italiomyces* is distinct from other genera in Sydowiellaceae in its bi-guttulate or rarely 4-guttulate ascospores with minute, spine-like apical appendages. The guttule arrangement is unique for this genus and comprising two guttules located very close to each septum and smaller guttules at the ends of the spores. Furthermore, phylogenetically *Italiomyces* is distinct (Fig. 1) and hence we introduce the new genus.

Lambro Racib., Parasit. Alg. Pilze Java's (Jakarta) 2: 13 (1900)

= *Stegophora* Syd. & P. Syd., Annls mycol. 14(5): 364 (1916)

Index Fungorum number – IF552801 Facesoffungi number – FoF 2849

Pathogenic forming spots on living leaves. Sexual morph – Stromata pseudoparenchymatous to prosenchymatous, well-developed, black, with 3–12 ascomata in a stroma, forming a dark outer crust around the hyaline interior. Ascomata solitary, scattered, vertically or obliquely immersed within leaf tissue, globose to subglobose, coriaceous, black, with short neck and effuse clypeus-like hypostroma. Peridium membranaceous, outer layer comprising brown, thick-walled cells of *textura angularis* and inner layer of hyaline, thin-walled cells of *textura angularis*. Necks central or asymmetrically located, slightly protruding from either upper or lower leaf surface as blackish papillae, broader near the tip, internally covered by hyaline periphyses, wall comprising plectenchymatous, vertically elongate cells. Hamathecium aparaphysate. Asci 8-spored,



Figure 10 – *Italiomyces centaureii* (holotype). a, b Herbarium specimen. c Vertical section of ascoma. d Peridium. e-h Asci. i-m Ascospores. Scale bars: a = 1 mm, b = 200 μm, c = 100 μm, d-m = 10 μm.

unitunicate, clavate, tapering towards the base, apex thickened with J- apical ring. Ascospores overlapping uniseriate, apiosporous, elliptic to ovoid, tapering towards the base, hyaline. Asexual morph – Coelomycetous, *Cylindrosporella*-like. Appearing as greyish-brown to brown, circular or

irregularly-shaped. Conidiomata acervuli, scattered, solitary, erumpent. Conidiophores simple, short or obscure. Conidiogenous cells phialidic. Conidia hyaline, small, unicellular, filiform, fusiform, clavate or fusoid.

Type species – *Lambro insignis* Racib., Parasit. Alg. Pilze Java's (Jakarta) 2: 10 (1900)

Lambro oharana (Y. Nisik. & H. Matsumoto) E. Müll., in Müller & von Arx, Beitr. Kryptfl. Schweiz 11(no. 2): 778 (1962)

Facesoffungi number – FoF 2850

Fig. 11

Parasitic forming yellowish spots on living leaves, without distinct marginal zone, aggregated in a small black phyllachoroid scab, which is the cover of the conidial layer. Sexual morph – Stromata hypostromatic, pseudoparenchymatous, spread beneath ascomata, surrounded by clypeus in epidermal layer. Ascomata 370–480 µm diameter, entirely immersed within leaf tissue, usually located as pairs, brown to light brown, globose to subglobose, with central or asymmetrically located short neck. Necks 120–180 µm high, 100–110 µm wide, slightly elevated from the upper leaf surface, parallel between paired ascomata, broader near the apex, with hyaline periphyses. Peridium plectenchymatous, light brown. Asci 43–56 × 7.5–10 µm (\bar{x} = 48.8 × 8.8 µm), 8-spored, clavate, tapering toward the base, thin-walled, with slightly visible apical ring at the thickened apex, irregularly loose in ascomata. Ascospores 12.5–15 × 5–6.5 µm (\bar{x} = 13.4 × 5.5 µm), irregularly biseriate, apiosporous, elliptic to ovoid, hyaline. Asexual morph – Coelomycetous. Conidiomata 0.45–0.5 mm diameter, acervuli, subepidermal, initially with thick, black cover, flat, round to elliptic. Conidiophores obscure. Conidiogenous cells phialidic. Conidia 4.5–8 × 1.5–2.5 µm (\bar{x} = 5.4 × 1.5 µm), clavate or oblong-ovoid, straight or curved, hyaline, unicellular (description is based on Kobayashi 1970).

Notes – The genus *Lambro* is typified by *L. insignis*, which produces necrotic spots in leaves of *Sterculia subpeltata* Blume (Sterculiaceae) (Raciborski 1900). Müller & von Arx (1962) described and illustrated this genus and reported the morphological similarity with *Stegophora* and *Metadothella* Henn. species. *Lambro insignis* has a well-developed pseudoparenchymatous stromata completely enveloping 3–12 ascomata, and a dark outer crust around the hyaline interior region. However, the type species of *Stegophora*, *S. ulmea* has only subepidermal hypostroma (Müller & von Arx 1962). *Stegophora oharana* forms both a clypeus and hypostroma, which is limited to the epidermal layer of leaves. Sydow (1936) described *S. aenula* Syd. on *Ulmus davidiana* collected in China. Morphologically and biologically this species is identical to *S. oharana*. *Stegophora oharana* was transferred to *Lambro* based on its morphological similarity. Monod (1983) examined the type species, *L. insignis* and suggested that this species is related to *Stegophora*, thus it may belong in Sydowiellaceae. Hence, we synonymize *Stegophora* under *Lambro* giving priority to the older generic name *Lambro* and ignoring the small morphological differences between stromata. The asexual morph of *Lambro* is reported as a *Cylindrosporella*-like species.

Paragnomonina Senan. & K.D. Hyde, *gen. nov.*

Index Fungorum number – IF552723, Facesoffungi number – FoF 2851

Etymology – In reference to the similarity to *Gnomonia*.

Pathogenic on plants. Sexual morph – Ascomata immersed, on roots and petioles, only neck visible when associated with host, solitary, globose to subglobose, black, coriaceous, papillate, ostiolate. Papilla central, straight to curved. Peridium comprising outer layer of large, brown cells of *textura angularis* and inner layer of compressed, hyaline cells of *textura angularis*. Asci fusiform to obovoid, with short pedicel and J- apical ring. Ascospores obliquely uniseriate, fusiform, straight to curved, 1-median-septate, not constricted at septum, with 4–6 guttules in each cell, sometimes more than 6-guttulate. Appendages apical and basal, hyaline. Asexual morph – Conidiomata tiny, pycnidia, solitary, immersed to erumpent, black. Conidiophores reduced to conidiogenous cells. Conidiogenous cells elongate, conical, unbranched, hyaline. Conidia oval to ellipsoid, aseptate, 2-guttulate, hyaline (description based on Alexopoulos & Cation 1952).

Type species – *Paragnomonium fragariae* (Kleb.) Senan. & K.D. Hyde

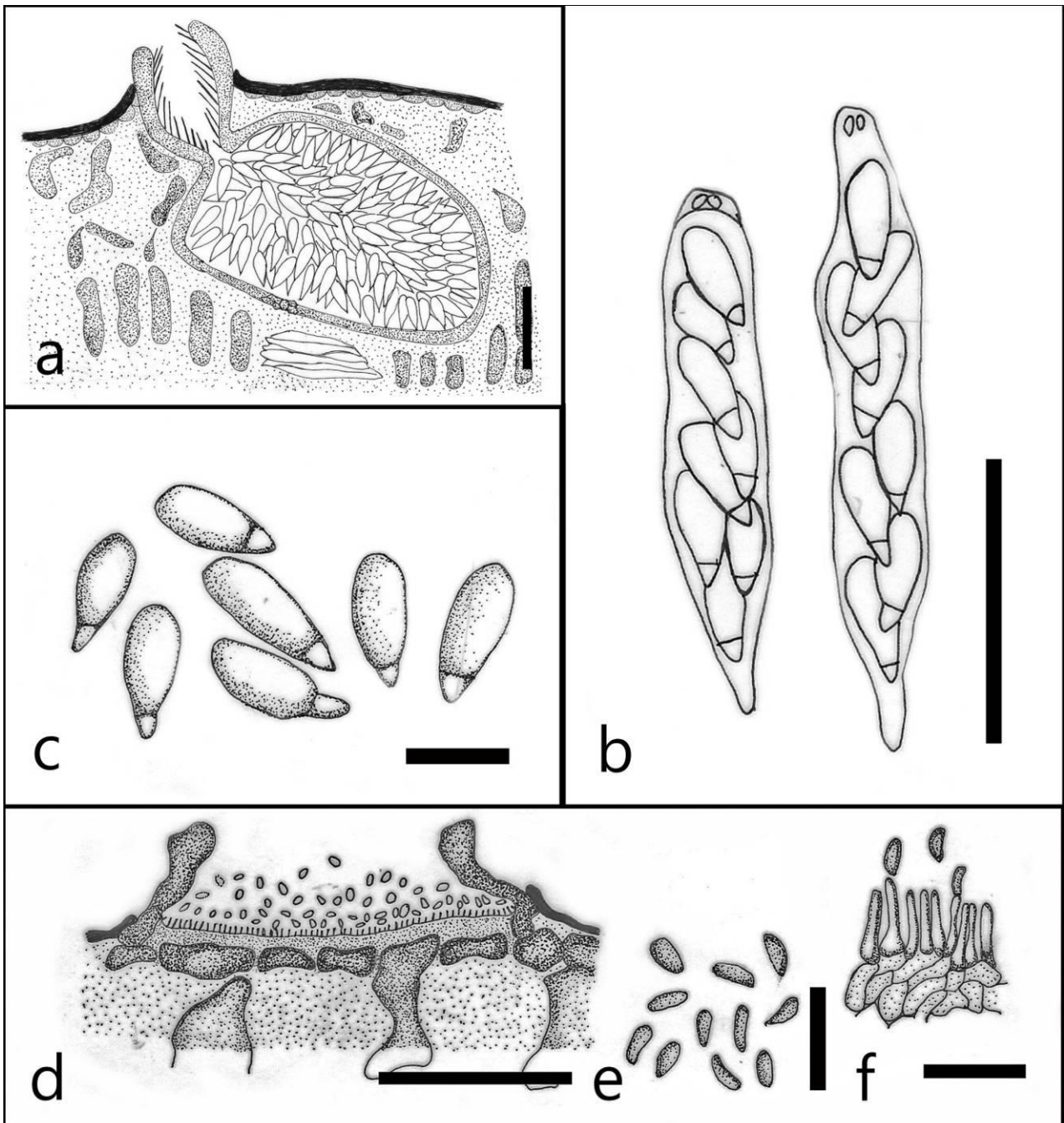


Figure 11 – *Lambro oharana* (drawing based on Kobayashi 1970) a Vertical section of ascomata. b Asci. c Ascospores. d Vertical section of conidiomata. e Conidia. f Conidiogenous cells attached to conidia. Scale bars – a, d = 100 µm. b, c, e, f = 10 µm.

Paragnomonium fragariae (Kleb.) Senan. & K.D. Hyde, *comb. nov.*

Index Fungorum number – IF552724, Facesoffungi number – FoF 2852

Figs 12, 13

= *Gnomonia fragariae* var. *fragariae* Kleb., Haupt- und Nebenfruchtformen der Ascomyzeten (Leipzig) 1: 285 (1918)

Pathogenic on plants. Sexual morph – Ascomata immersed on roots and petioles, papilla only visible on host, solitary, globose to subglobose, black, coriaceous, papillate, ostiolate. Necks central, straight to curved. Peridium comprising outer layer of large, brown cells of *textura angularis* and inner layer of compressed, hyaline cells of *textura angularis*. Asci 25–35 × 6–7 µm, fusiform to obovoid, with short pedicel and J- apical ring. Ascospores 8–11 × 2–4 µm, obliquely uniseriate, fusiform, straight to curved, 1-median septate, not constricted at the septum, with 4–6

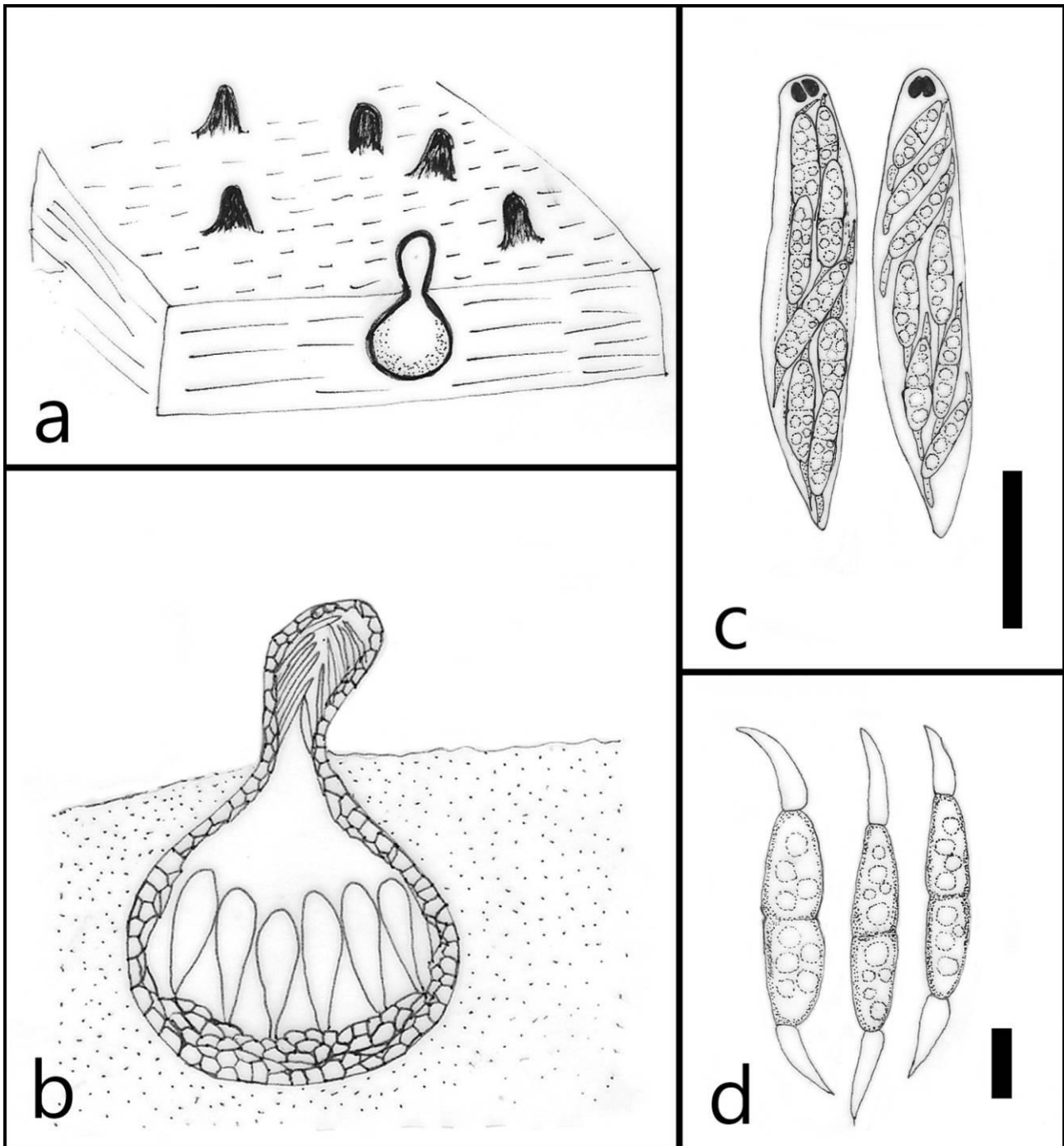


Figure 12 – *Paragnomonium fragariae* (drawing based on Morocko & Fatehi 2007). a Ascospores on substrate. b Vertical cross section of ascogonia. c Asci. d Ascospores. Scale bars: c, d = 10 μ m.

guttules, sometimes more than 6-guttulate. Appendages apical and basal, hyaline, elongate-conical. Asexual morph – Conidiomata tiny, pycnidial, solitary, immersed to erumpent, black. Conidiophores reduced to conidiogenous cells. Conidiogenous cells elongated, conical, unbranched, hyaline. Conidia oval to ellipsoid, aseptate, bi-guttulate, hyaline (description based on Alexopoulos & Cation 1952).

Notes – *Paragnomonium fragariae* is a poorly studied taxon, which was described by Klebahn (1918) from dead petioles and leaves of strawberry and causes strawberry decline in Germany. Klebahn (1918) considered this fungus as a saprobe of dead tissues of strawberry. Later, *P. fragariae* was recorded on dead tissues of pink barren strawberry (*Potentilla micrantha*), silver weed or goose grass (*P. anserina*), rock cinquefoil (*P. rupestris*), woodland strawberry (*Fragaria vesca*) and cultivated strawberry (*Fragaria xananassa*) collected in several localities of Switzerland

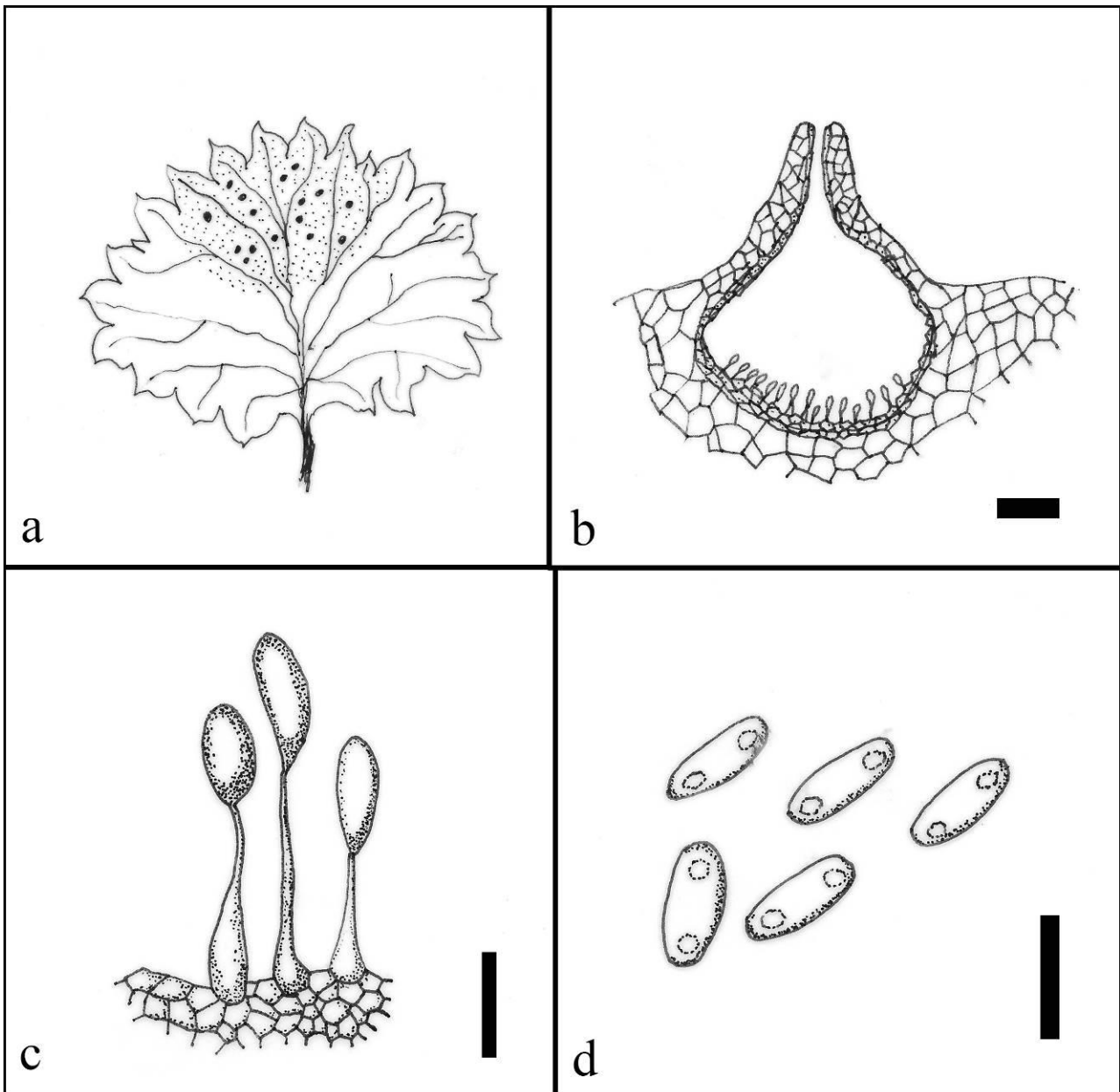


Figure 13 – *Paragnomonium fragariae* (drawing based on Alexopoulos & Cation 1952) a Conidiomata on host leaf. b Cross section of conidioma. c Conidiophore, conidiogenous cells attached to conidia. d Conidia. Scale bars – b = 100 μ m, c-d = 5 μ m.

(Bolay 1972). A severe strawberry petiole blight caused by *Gnomonia comari* was reported by van Adriechem and Boshier (1958) and is very similar to petiole blight caused by *P. fragariae*. However, *Gnomonia comari* did not cause any disease symptoms on roots, unlike *P. fragariae*. Morocko (2006) described the ascomata, asci and ascospores from cultures grown on artificial media and naturally infected plant tissues, with similar characteristics to *P. fragariae* (Klebahn 1918) and herbarium specimens collected by Bolay (1972) and Monod (1983). Morocko (2006) noted a great variation in length of the ascospore appendages.

Farr et al. (1989) and Maas (1998) suggested *P. fragariae* was a synonym of *Gnomonia comari* and Sogonov et al. (2008) placed *G. comari* in the newly introduced genus *Gnomoniopsis*. *Gnomoniopsis comari* has smaller asci and ascospores with a submedian septum and lacks appendages (Barr 1978). Morphologically *Gnomoniopsis comari* shows similarity to only *Gnomonia fragariae* var. *fructicola* (G. Arnaud) Fallahyan and not to *Gnomonia fragariae* var. *fragariae* Kleb. Morocko (2006) analyzed LSU and ITS sequence data of *Gnomonia* species and members of Diaporthales and showed that *G. fragariae* var. *fragariae* is phylogenetically

segregated from the generic type *G. gnomon*, and most other members of Gnomoniaceae. Morocko (2006) also suggested that *G. fragariae* f. *fragariae*, *G. rubi*, *G. rosae* and *Hapalocystis* species represents a genetically distinct group, possibly a new family, within Diaporthales.

Combined gene analyses of LSU, ITS, RPB2 and TEF sequence data in this study confirm the phylogenetic placement of *Gnomonia fragariae* var. *fragariae* in Sydowiellaceae. Hence, we exclude *Gnomonia fragariae* var. *fragariae* from *Gnomoniopsis comari* and introduce a new genus, *Paragnomonium* to accommodate *Gnomonia fragariae* var. *fragariae*.

Ranulospora Senan., Camporesi & K.D. Hyde, *gen. nov.*

Index Fungorum number – IF552725, Facesoffungi number – FoF 2853

Etymology – Name referring to the tadpole-like shape of ascospores.

Saprobic on dead branches of deciduous plants. Sexual morph – Appearing as clusters of black, ostiolate necks which are erumpent. Pseudostromata comprising sparse, brown, fungal hyphae spreading around the ascomata. Ascomata immersed, aggregated, globose to subglobose, coriaceous, dark brown to black, with 6–8 aggregated ascomata, with long ostiolar necks. Peridium composed of 4–6 outer layers of thick-walled, brown cells of *textura angularis* and inner, hyaline, thick-walled cells of *textura angularis*. Hamathecium comprising few, septate, thin-walled paraphyses, which are longer than the asci. Asci 8-spored, unitunicate, cylindrical to fusiform, short pedicellate, apex rounded, with J- apical ring. Ascospores uniseriate or biseriata, fusiform to ellipsoid, with long basal appendage. Asexual morph – Undetermined.

Type species – *Ranulospora alnii* Senan., Camporesi & K.D. Hyde

Ranulospora alnii Senan., Camporesi & K.D. Hyde, *sp. nov.*

Index Fungorum number – IF552726, Facesoffungi number – FoF 2854 Fig. 14

Etymology – Named after the host genus.

Holotype – MFLU 16–2868

Saprobic on dead branches of *Alnus incana* (L.) Moench. Sexual morph – Appearing as clusters of black, ostioles emerging through the cracked bark. Pseudostromata comprising sparse, brown, fungal hyphae spreading around ascomata. Ascomata 480–765 µm high, 280–345 µm diameter (\bar{x} = 640 × 315 µm, n = 20), immersed, aggregated, globose to subglobose, coriaceous, dark brown to black, with 6–8 ascomata in an aggregation, papillate, with long ostiolar necks. Papilla 320–380 µm high, 160–260 µm wide (\bar{x} = 349 × 207 µm, n = 20). Peridium 13–23 µm wide (\bar{x} = 16.8 µm, n = 20) composed of 4–6 outer layers of thick-walled, brown cells of *textura angularis* and inner, hyaline, thick-walled cells of *textura angularis*. Hamathecium comprising few, septate, hyaline, thin-walled paraphyses, longer than asci. Asci 85–120 × 16–22 µm (\bar{x} = 101.7 × 18.5 µm, n = 20), 8-spored, unitunicate, cylindrical to fusiform, short pedicellate, apex rounded, with J- apical ring. Ascospores 45–55 × 7–8 µm (\bar{x} = 48.6 × 7.3 µm, n = 20), uniseriate or biseriata, fusiform to ellipsoid, with long basal appendage, with 1 median and 1 basal septum, slightly constricted at the septa, smooth-walled, apical cell slightly wider than basal cell, appendage long filiform, straight or curved, with slight apical swelling, germ tubes emerging at the median septa and ascospores becoming olivaceous at germination. Asexual morph – Undetermined.

Culture characters – Colonies growing on MEA becoming 2 cm within 7 days, circular, flat to umbonate, margin filiform, dark green, tightly attached to the substrate, forming erect mycelium.

Material examined – ITALY, Province of Trento, Mezzana, Marilleva 900, on dead branch of *Alnus incana* (L.) Moench (Betulaceae), 15 August 2013, Erio Camporesi, IT 1415 (MFLU 16–2868 holotype; *ibid* BBH isotype); ex-type living cultures MFLUCC 13–0793, TBRC.

Notes – *Ranulospora alnii* was collected from bark of grey alder. This taxon appears to be a saprobe and several ascomata were grouped together with the necks combined by brown, fungal hyphae. The ascospore morphology is unique and we have not observed any taxon like this within Sydowiellaceae, although such appendages occur in other families (such as *Ceriospora* in Annulatasaceae (Campbell et al. 2013)). Phylogenetically this taxon forms a well-supported clade, which is sister to *Cainiella* and *Alborbis* (Fig. 1).

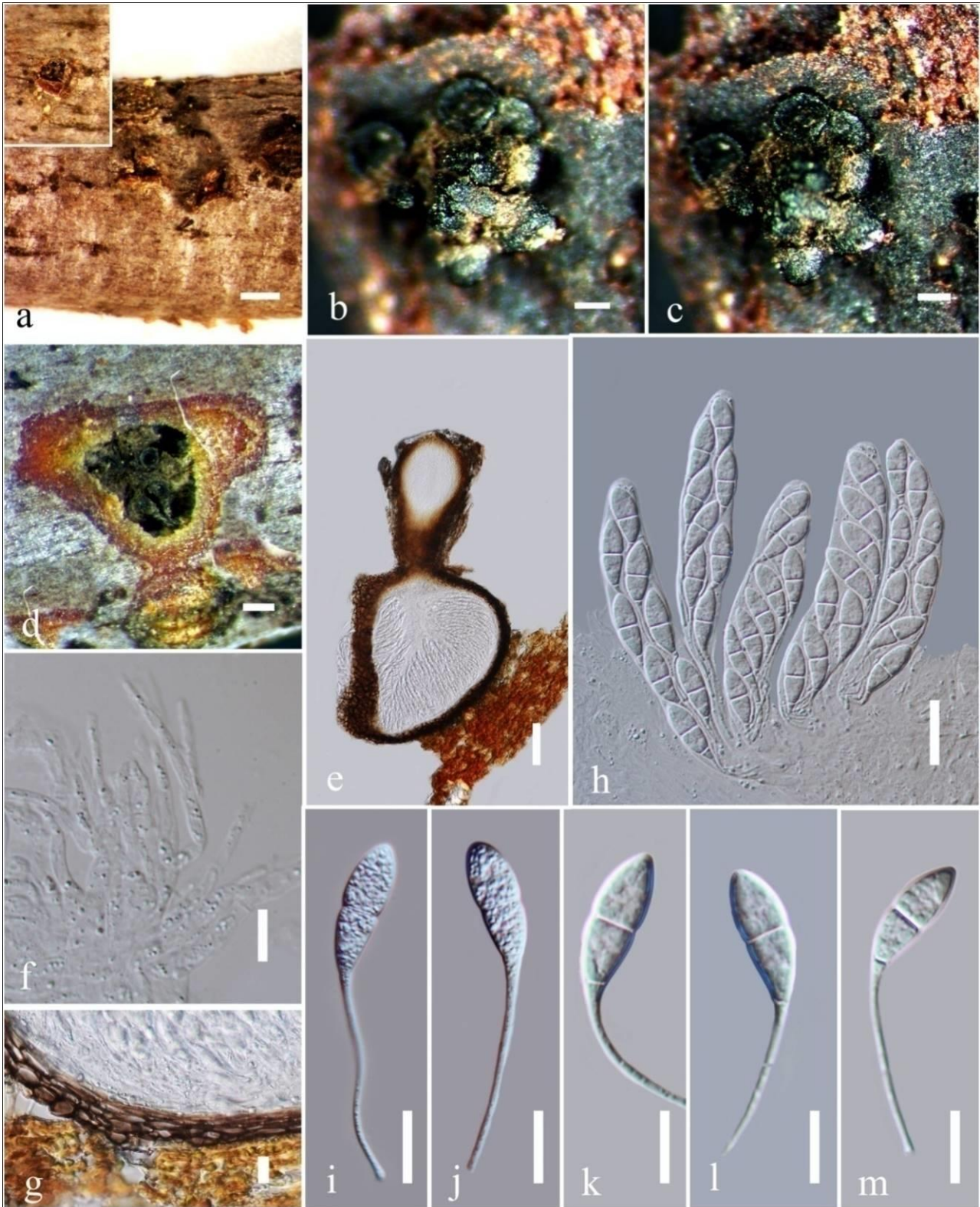


Figure 14 – *Ranulospora alnii* (holotype). a-d Appearance of ascomata on host substrate. e Vertical section of ascoma. f Paraphyses. g Peridium. h Asci. i-m Ascospores with basal appendage. Scale bars – a = 500 μ m, b-d = 200 μ m, d, e = 100 μ m, g, h = 20 μ m, f, i-m = 10 μ m.

Rossmania Lar.N. Vassiljeva, Mycoscience 42(4): 401 (2001)

Facesoffungi number – FoF 2855

Saprobic on dead woody bark. Sexual morph – Ascomata immersed under the bark, in clusters with convergent, long, stout erumpent necks, without an ectostromatic disc, globose, coriaceous, black. Necks wide, opening through the ostiole, internally covered by hyaline paraphyses, comprising

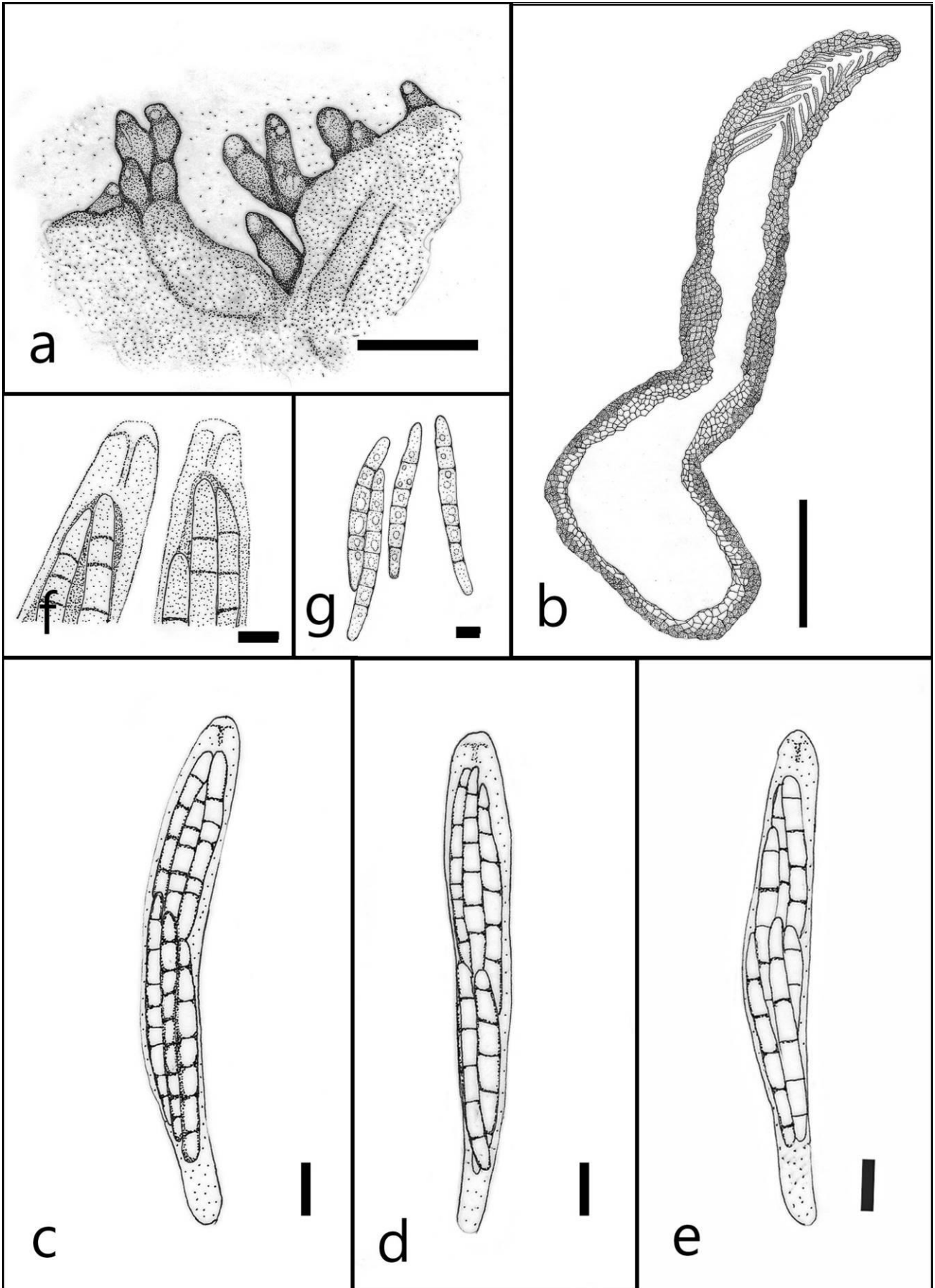


Figure 15 – *Rossmania ukurunduensis* (redrawn from Vasilyeva 2001). a Appearance of ascomata on substrate. b Vertical section of ascoma. c-e Asci. f Apical ring. g Ascospores. Scale bars – a = 1 mm, b = 200 μ m, c-e = 20 μ m, f, g = 10 μ m.

brown cells of *textura porrecta*. Peridium thick, comprising outer, thick-walled, brown cells of *textura angularis* and inner thick-walled, hyaline cells of *textura angularis* at the base. Hamathecium aparaphysate. Asci 8-spored, unitunicate, clavate to cylindrical, short pedicellate, apex rounded, lacking an apical ring. Ascospores 4–5-seriate to fasciculate, long fusoid to cylindrical, slightly curved, 0–11-septate, hyaline to light yellow. Asexual morph – Undetermined.

Type species – *Rossmania ukurunduensis* Lar.N. Vassiljeva, Mycoscience 42(4): 401 (2001)

Rossmania ukurunduensis Lar.N. Vassiljeva, Mycoscience 42(4): 401 (2001)

Facesoffungi number – FoF 2856

Fig. 15

Isotype – BPI 747566

Saprobic on dead bark of *Acer ukurunduense* Wall. Sexual morph – Ascomata immersed under the bark, with clusters of convergent, long, stout erumpent necks, without a ectostromatic disc, globose, coriaceous, black. Necks wide, opening through the ostiole, internally covered by hyaline periphyses, comprising brown cells of *textura porrecta*. Peridium thick, comprising outer, thick-walled, brown cells of *textura angularis* and inner thick-walled, hyaline cells of *textura angularis* at the base. Hamathecium aparaphysate. Asci 190–230 × 24–28 µm, 8-spored, unitunicate, clavate to cylindrical, short pedicellate, apex rounded, lacking an apical ring. Ascospores 76–125 × 7–9 µm, 4–5-seriate to fasciculate, long fusoid to cylindrical, slightly curved, 0–7-septate in Melzer's reagent, not constricted at the septa, hyaline, sometimes guttulate. Asexual morph – Undetermined.

Notes – *Rossmania* was introduced to accommodate taxa similar to *Diaporthe*, in its clusters of ascomata with long beaks and non-united ectostromatic disc, but differs in its septate elongate ascospores (Vasilyeva 2001). Therefore, superficially this genus is similar to *Diaporthe* or *Phragmodiaporthe*, but differs in having elongate *Winterella*-like ascospores. *Rossmania* comprises *R. ukurunduensis* and *R. aculeata* (Petch) Lar.N. Vassiljeva, the latter transferred from *Phragmodiaporthe aculeata* (Petch) Wehm., because it lacks true phragmospores (Vasilyeva 2001). *Rossmania ukurunduensis* differs from *R. aculeata* in having narrow, 5–7-septate ascospores, while *R. aculeata* has wider, 7–11-septate ascospores (Vasilyeva 2001). *Rossmania ukurunduensis* was collected in Russia associated with *Acer ukurunduense*, while *R. aculeata* was collected from Sri Lanka associated with Theaceae (Vasilyeva 2001). Vasilyeva (2001) placed *Rossmania* in Valsaceae. However, Rossman et al. (2007) and Lumbsch & Huhndorf (2010) placed *Rossmania* in Sydowiellaceae based on its morphology. The placement of *Rossmania* within Sydowiellaceae has been confirmed in phylogenetic studies (Fig. 1) (Kruys & Castlebury 2012, Maharachchikumbura et al. 2015). It differs from *Winterella* and *Sillia* by non stromatic ascoma and short cylindrical ascospores.

Sillia P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 20, 159, 251 (1873)

Facesoffungi number – FoF 2857

Saprobic on dead stems of deciduous trees. Sexual morph – Stroma erumpent through cracks in bark, hemisphaerical, black on the surface, dark yellow internally, becoming rouge in 10 % KOH. Ascomata immersed in stromatic tissues, arising as several layers, globose, coriaceous, black, with cylindrical necks, protruding above the surface of the stroma. Peridium comprising thick-walled, brown cells of *textura angularis*. Asci 8-spored, unitunicate, narrowly clavate, short pedicellate, with a distinct small apical structure. Ascospores fasciculate, narrowly fusiform, slightly curved, hyaline, with 3–5-transverse septa, sometimes guttulate. Asexual morph – Undetermined.

Type species – *Sillia ferruginea* (Pers.) P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 159 (1873)

Sillia karstenii Senan., Camporesi & K.D. Hyde, *sp. nov.*

Index Fungorum number – IF552727, Facesoffungi number – FoF 2858

Fig. 16

Etymology – in honour of late Prof Petter Adolf Karsten, an eminent mycologist who introduced the genus *Sillia*.

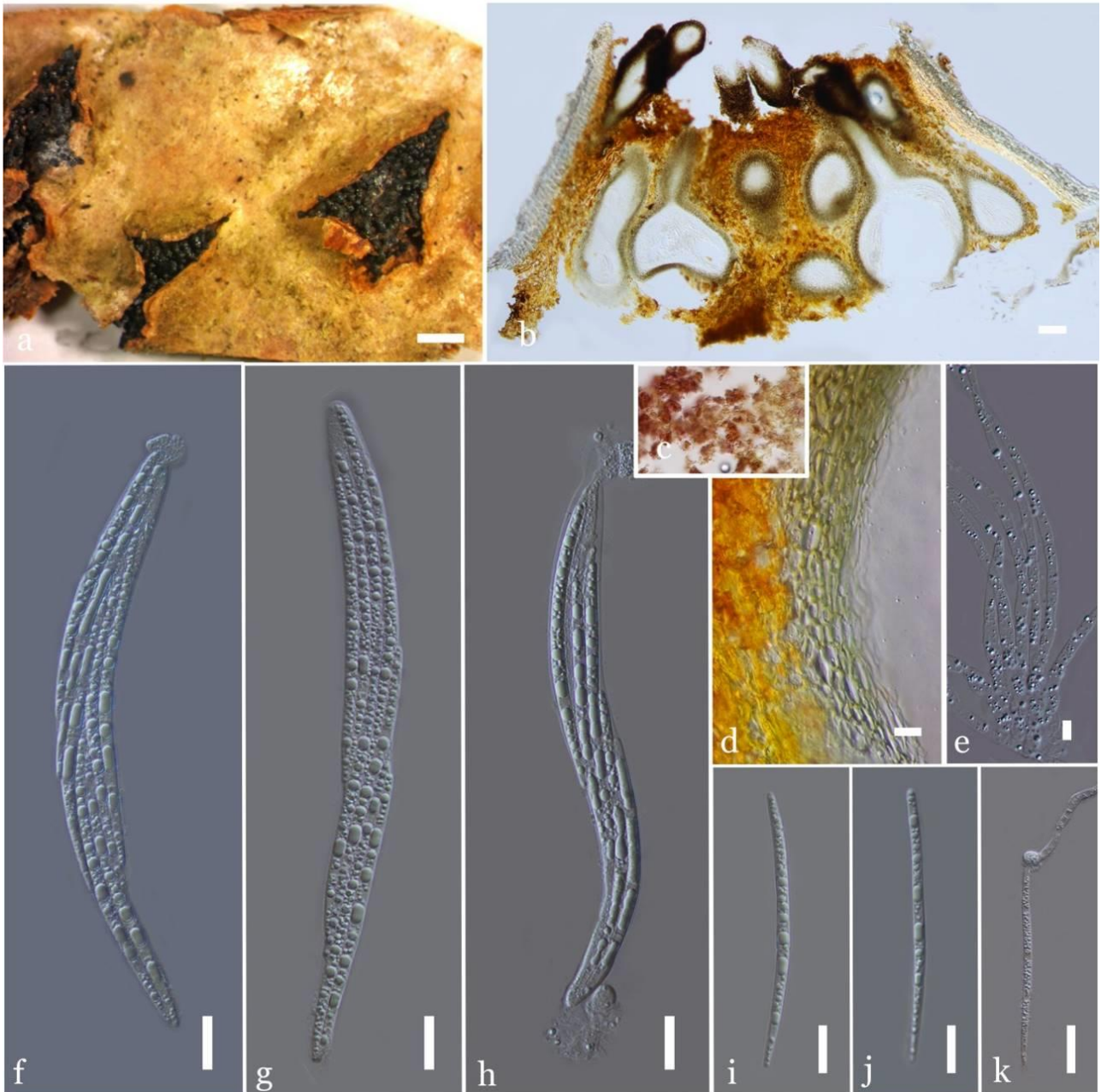


Figure 16 – *Sillia karstenii* (holotype). a Herbarium specimen. b Vertical section of stroma showing ascomata. c Stromatic tissues become umber in 10% KOH. d Peridium. e Paraphyses. f-h Asci. i-k Ascospores. Scale bars – a = 1 mm, b = 100 μ m, d, f-k = 20 μ m, e = 10 μ m.

Holotype – MFLU 16–2864

Saprobic on dead branches of *Corylus avellana* L. Sexual morph – Stromata poorly developed, pseudoparenchymatous, comprising yellowish brown cells of *textura angularis*, turning to umber in 10% KOH. Ascomata 720–1200 μ m high, 230–265 μ m diameter (\bar{x} = 1032 \times 255 μ m, n = 10), immersed to erumpent, gregarious, globose to subglobose, black, coriaceous, papillate, ostiolate. Neck 315–700 μ m long, 50–140 μ m wide (\bar{x} = 432 \times 70 μ m, n = 10), symmetrical, erumpent through host surface, internally covered by hyaline periphyses, darker than peridium cells at the base. Peridium 35–50 μ m thick (\bar{x} = 47 μ m, n = 15), comprising thick-walled, brown, compressed cells of *textura angularis*. Hamathecium comprising thin-walled, septate, unbranched, hyaline paraphyses 6–10 μ m wide (\bar{x} = 8 μ m, n = 15). Asci 175–230 \times 15–18 μ m (\bar{x} = 200 \times 17 μ m, n = 25), 8-spored, unitunicate, cylindrical, straight or somewhat curved, with a short obtuse pedicel. Ascospores 110–120 \times 4.5–6 μ m (\bar{x} = 114 \times 5.2 μ m, n = 30), overlapping bi-seriate,

filiform with pointed ends, 5–6-septate when mature, guttulate, smooth-walled, ends forming a swelling when germinating. Asexual morph – Undetermined.

Material examined – ITALY, Province of Forlì-Cesena, near Bertinoro, dead branch of *Corylus avellana* L (Corylaceae), 30 December 2013, Erio Camporesi, IT 1611 (MFLU 16–2864, holotype, *ibid* BBH, isotype).

Notes – Winter (1887) accommodated *Sillia* species with hyaline scolecosporous ascospores in the genus *Melogramma* which has brown phragmospores. Therefore, Lindau (1897) separated them again and placed *Sillia* in Melogrammataceae. Wehmeyer (1926) considered *Sillia* to be similar to *Cryptospora* Tul. (= *Ophiovalsa*), which was placed in Diaporthaceae. Ascospores of *Sillia* are filiform or acicular, scolecosporous and multi-septate. *Ophiovalsa* has unicellular, long-cylindric-fusoid ascospores. However, the presence or absence of septa is not thought to be a significant character in scolecosporous spores (Tibpromma et al. 2017). Hence *Sillia* was accepted as closely related to *Ophiovalsa* in Diaporthaceae. Munk (1953, 1957) and Dennis (1960) also treated *Sillia* as a separate genus of Diaporthaceae. However, Barr (1978) included *Sillia* in family Gnomoniaceae (Tribe Endothieae). Later, Rossman et al. (2007) transferred *Sillia* in Sydowiellaceae based on its morphology. Several phylogenetic studies supported the taxonomic placement of *Sillia* in Sydowiellaceae (De Silva et al. 2009, Kruys & Castlebury 2012). The type species *Sillia ferruginea* has been reported from various countries in the northern hemisphere, including Austria, Bulgaria, Canada, Czechoslovakia, Denmark, England, France, Germany, Ireland, Poland, Russia, Spain, Sweden, Ukraine and the USA (Farr & Rossman 2006).

Sillia karstenii is the second species reported from Italy. There are six *Sillia* species listed in Index Fungorum (2017). *Sillia theae* Hara (on *Camellia sinensis* (L.) Kuntze in Japan), *S. kamatii* Tilak, S.B. Kale & S.V.S. Kale (on dead stem of *Gymnema sylvestre* (Retz.) Schult. in India), *S. celastrina* R. Rao (on dead stems of *Celastrus paniculata* Willd. in Brazil) and *S. biformis* Rick from Brazil. *S. albofusca* Höhn. has fused papilla and thus is quite distinct from *S. karstenii*. The type species *S. ferruginea* (Pers.) P. Karst., *S. italica* de Silva, Camporesi & K.D. Hyde and the new species *S. karstenii* were associated with *Corylus* species. *Sillia karstenii* also differs in having large ascomata with very poorly developed stromata. Phylogenetically, *Sillia karstenii* is relatively distinct from sequenced species with strong support and its establishment as a new species is justified.

Tenuiappendicula Senan., Camporesi & K.D. Hyde, *gen. nov.*

Index Fungorum number – IF552728, Facesoffungi number – FoF 2859

Etymology – Name comprising two Latin words "tenuis" and "appendicula", referring to the slender ascospore appendages.

Saprobic on branches *Alnus cordata* (Loisel.) Duby. Sexual morph – Pseudostromata parenchymatous, comprising thin-walled, light brown cells of *textura globosa*. Ascomata aggregated, immersed, globose to subglobose, black, coriaceous, ostiolate, papillate. Papilla slanted to horizontal in substrate, curved, asymmetrical, sometimes convergent, widening towards the apex, internally covered by hyaline, filamentous periphyses. Peridium comprising an outer, thick-walled, light brown layer of very few compressed layers of cells of *textura angularis* and inner thin-walled, hyaline layer of compressed cells of *textura angularis*. Hamathecium aparaphysate. Asci 8-spored, unitunicate, fusiform to clavate, with short pedicel, apex blunt, lacking apical ring. Ascospores biseriate to overlapping biseriate, oval, 1-septate, thick-walled. Appendages at both ends, slender, long, hyaline. Asexual morph – Coelomycetous. Conidiomata acervuli, scattered, solitary, immersed, subglobose, unilocular, dark brown. Conidiomatal wall multi-layered, comprising thick-walled, brown, small cells of *textura angularis*. Conidiophores branched at the base, cylindrical, septate, hyaline, formed from the upper pseudoparenchyma, smooth-walled. Conidiogenous cells holoblastic, terminal, discrete, with 1–2 percurrent proliferations, indeterminate, cylindrical, simple, hyaline, smooth-walled. Conidia cylindrical, narrowing towards ends, with small spine at upper end, (4)–5–(6)-septate, hyaline, sometimes guttulate, thick-walled.

Type species – *Tenuiappendicula alnicola* Senan., Camporesi & K.D. Hyde

Tenuiappendicula alnicola Senan., Camporesi & K.D. Hyde, *sp. nov.*

Index Fungorum number – IF552729, Facesoffungi number – FoF 2860

Figs 17, 18

Etymology – Name after the host genus.

Holotype – MFLU 16–1265A

Saprobic on branch of *Alnus cordata* (Loisel.) Duby. Sexual morph – Pseudostromata parenchymatous, comprising thin-walled, light brown cells of *textura globosa*. Ascumata 180–200 × 50–80 μm (\bar{x} = 191 × 78 μm, n = 20), aggregated, immersed, globose to subglobose, black, coriaceous, ostiolate, papillate. Papilla 85–115 × 30–40 μm (\bar{x} = 93 × 36 μm, n = 15), slanted to horizontal in the substrate, curved, asymmetrical, sometimes convergent, widening towards the apex, internally covered by hyaline, filamentous periphyses. Peridium 12–16 μm (\bar{x} = 14 μm, n = 15), comprising an outer layer of thick-walled, light brown, compressed cells of *textura angularis* and inner thin-walled, hyaline layer of compressed cells of *textura angularis*. Hamathecium 5–9 μm (\bar{x} = 7.8 μm, n = 15), comprising cellular, wide, septate, thin-walled paraphyses. Asci 105–120 × 25–35 μm (\bar{x} = 116 × 33 μm, n = 25), 8-spored, unitunicate, fusiform to clavate, with short pedicel, apex blunt, lacking an apical ring. Ascospores 25–30 × 7–10 μm (\bar{x} = 27 × 8.8 μm, n = 25), biseriate to overlapping biseriate, oval, 1-septate, constricted at septum, thick-walled, appendaged. Appendages slender, long 20–30 × 1.5–2.5 μm (\bar{x} = 27 × 2 μm, n = 20), one each at each end, hyaline. Asexual morph – Conidiomata 30–45 × 120–135 μm (\bar{x} = 35 × 130 μm, n = 15), acervuli, scattered, solitary, immersed, subglobose, unilocular, dark brown. Conidiomatal wall 35–50 μm (\bar{x} = 37 μm, n = 15), multi-layered, comprising thick-walled, brown, small cells of *textura angularis*. Conidiophores 16–21 × 2.5–6 μm (\bar{x} = 18 × 4.7 μm, n = 15), branched at the base, cylindrical, septate, hyaline, formed from the upper pseudoparenchyma, smooth-walled. Conidiogenous cells 14–16 × 4.5–5.5 μm (\bar{x} = 15 × 4.8 μm, n = 25), holoblastic, terminal, discrete, with 1–2 percurrent proliferations, indeterminate, cylindrical, simple, hyaline, smooth-walled. Conidia 35–45 × 4.5–5.5 μm (\bar{x} = 40 × 5 μm, n = 25), cylindrical, narrowing towards the ends, with a small spine at upper end, (4)–5–(6)-septate, hyaline, sometimes guttulate, thick-walled.

Culture characters – Colonies growing on MEA attained 1 cm within 7 days when incubated at 18 °C, flat, circular, irregular, white to off-white, woolly, sometimes mycelium in tufts.

Material examined – ITALY, Province of Forlì-Cesena, Fiumicello di Premilcuore, on dead branch of *Alnus cordata* (Loisel.) Duby (Betulaceae), 24 April 2013, Erio Camporesi, IT 1199 (MFLU 16–1265A, holotype), ex-type living culture MFLUCC 16–1452; *ibid* BBH isotype, TBRC.

Notes – *Tenuiappendicula* forms a well-supported clade as a sister taxon to *Chapeckia*. *Tenuiappendicula* is characterized by 1-septate ascospores with long, thin appendages and asci without an apical ring. We observed the asexual morph of *Tenuiappendicula* associated with ascumata and we extracted genomic DNA from the conidiomata. LSU and ITS sequences derived from both sexual and asexual morphs are identical and hence the holomorph is illustrated.

Tortilispora Senan. & K.D. Hyde, *gen. nov.*

Etymology – Name based on two Latin words “*tortilis*” and “*spora*” referring to the twisted ascospores.

Index Fungorum number – IF552802, Facesoffungi number – FoF 2863

Saprobic on dead twigs and branches. Sexual morph – Stromata forming angular, rather prominent pustules, with grey-brown to orange-brown ectostromatic discs, with 2–15 ascumata embedded in a well-developed ectostroma in a valsoid configuration. Ascumata immersed, aggregated, globose to subglobose, coriaceous, dark brown to black, ostiolate, papillate, paraphysate. Papilla black with periphyses. Peridium comprising thick-walled, dark brown to black, small cells of *textura angularis*. Asci 8-spored, unitunicate, cylindrical, sessile, apex rounded, with a J-, apical ring. Ascospores fasciculate, narrowly fusiform to long cylindrical, hyaline, trans-septate. Asexual morph – Undetermined.

Type species – *Tortilispora aurantiaca* (Wehm.) Senan. & K.D. Hyde

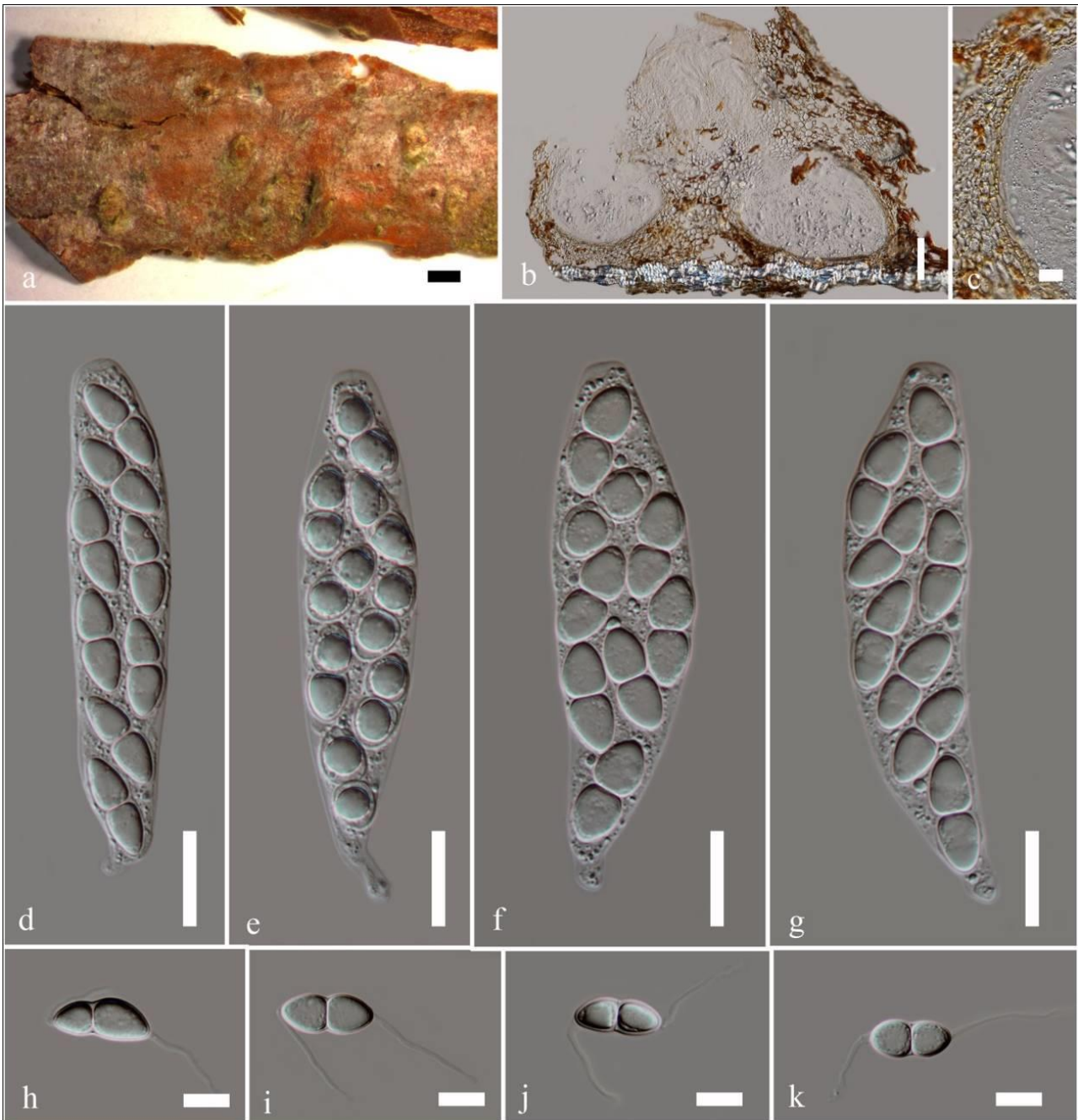


Figure 17 – *Tenuiappendicula alnicola* (holotype). a Herbarium specimen. b Vertical section of ascomata. c Peridium. d-g Asci. h-k Ascospores. Scale bars – a = 500 µm, b = 100 µm, c = 20 µm, d-g = 20 µm, h-k = 10 µm.

Tortilispora aurantiaca (Wehm.) Senan. & K.D. Hyde, *comb. nov.*

Index Fungorum number – IF552803, Facesoffungi number – FoF 2864 Fig. 19

Basionym – *Cryptospora aurantiaca* Wehm., Canadian Journal of Research, Section C 20(12): 589 (1942)

Holotype (part) – MICH 13964

Saprobic on dead twigs and branches. Sexual morph – Stromata 0.8–3 mm diameter, forming angular, rather prominent pustules, with grey-brown to orange-brown ectostromatic discs, immersed, scattered, solitary, black, parenchymatous, with 2–15 ascomata embedded in a well-developed ectostroma, which consists of hyaline to subhyaline, densely compact, thin-walled hyphae, with a valsoid configuration. Ascomata 675–875 µm high, 225–300 µm wide (\bar{x} = 765 × 275 µm, n = 25), immersed, aggregated, globose to subglobose, coriaceous, dark brown to black,

ostiolate, papillate. Papilla 375–500 μm high, 100–125 μm wide ($\bar{x} = 107 \times 466 \mu\text{m}$, $n = 20$), black, comprising parallel to interwoven, thick-walled, light to dark brown hyphae, internally covered by hyaline, filamentous periphyses. Peridium 10–15 μm wide ($\bar{x} = 13 \mu\text{m}$, $n = 25$), comprising thick-walled, dark brown to black, small cells of *textura angularis*. Hamathecium comprising broad, tapering band-like, septate paraphyses. Asci 90–100 \times 11–13 μm ($\bar{x} = 93 \times 12 \mu\text{m}$, $n = 25$), 8-spored, unitunicate, cylindrical, sessile, apex rounded at apex, with a J- apical ring, comprising two refractive bodies. Ascospores 85–95 \times 3–4 μm ($\bar{x} = 93 \times 3.5 \mu\text{m}$, $n = 25$), fasciculate, narrowly fusiform to long cylindrical, hyaline, 1–7-septate, smooth-walled. Asexual morph – Undetermined.

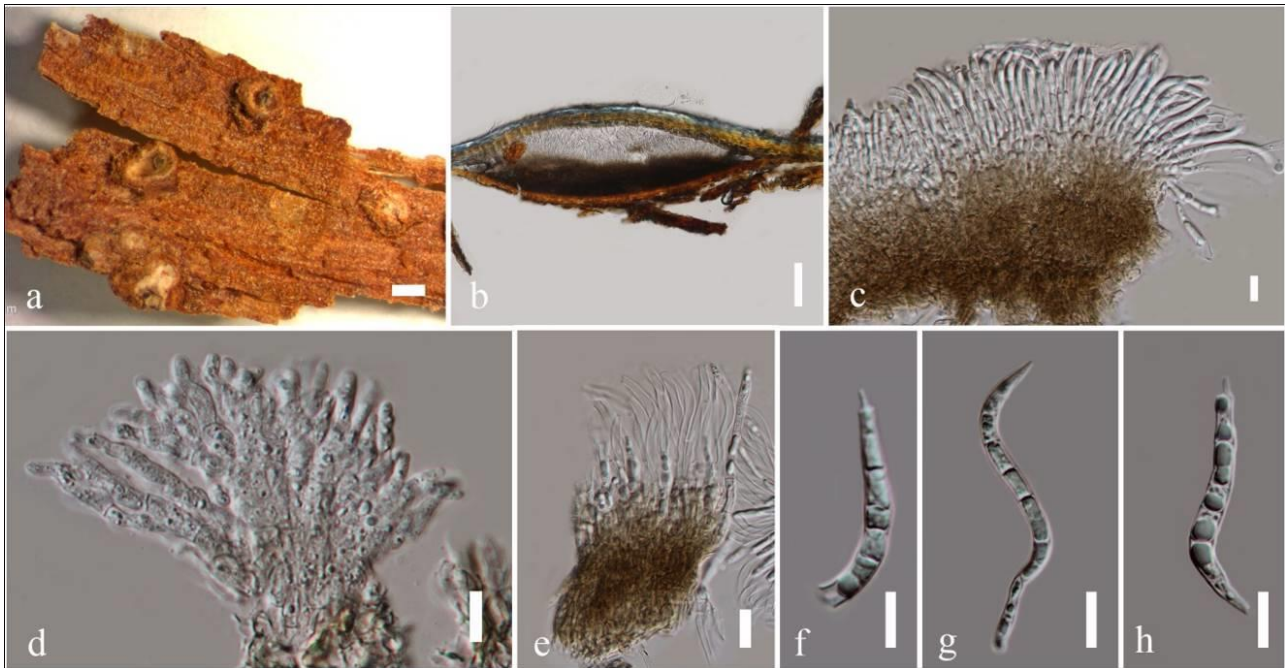


Figure 18 – *Tenuiappendicula alnicola* (holotype). a Herbarium specimen. b Vertical section of conidioma. c, d Conidiophores, conidiogenous cells and conidia. e Broken conidial wall attached to conidiogenous cells. f-h Conidia. Scale bars – a = 500 μm , b = 100 μm , c-e = 10 μm , f-h = 10 μm .

Material examined – CANADA, Nova Scotia, on *Alnus* sp. Mill. (Betulaceae), 09 July 1933, L.W. Wehmeyer, (1624), MICH (13964), holotype.

Notes – *Winterella* was accepted in Sydowiellaceae by Maharachchikumbura et al. (2016). There is, however, some confusion surrounding *Winterella* and we follow Mejia et al. (2008) and treat *Ophiovalsa* and *Winterella* as synonyms of *Cryptosporella* (Gnomoniaceae). *Winterella albofusca*, *W. aurantiaca*, and *W. cinctula* were excluded from *Cryptosporella* by Mejia et al. (2008) based on morphological and molecular data. LSU data (not shown) indicated that *W. albofusca* and *W. aurantiaca* belonged in the Diaporthales, although outside Gnomoniaceae. The above-mentioned species are characterized by multi-septate ascospores, and are placed in Sydowiellaceae in our phylogenetic analyses (Fig. 1). Since they do not cluster with *Sillia* species and are not typical of *Rossmania* species, genera with filiform ascospores, there is no obvious place to accommodate them. We thus introduce a new genus *Tortilispora* to accommodate these taxa with *T. aurantiaca* as the type species and we proposed *T. albofusca* (IF 552807), *T. cinctula* (IF552808) for other species.



Figure 19 – *Tortilispora aurantiaca* (holotype). a, b Herbarium packet. d Herbarium specimen. c Ascomata on substrate. e Horizontal cross section of stromata. f, g Cross sections of ascomata. h Papilla. i Paraphyses. j Peridium. k-m Asci in water. n-q Ascospores. Scale bars: c, e = 500 μm , f-h = 100 μm , i = 20 μm , j-q = 10 μm . Note – Rouge stromatic tissues in 10 % KOH, arrowed in g.

Diaporthales genera, *incertae sedis*

In this section, we deal with *Uleoporthe* which appears to be atypical of Sydowiellaceae.

Uleoporthe Petr., *Annls mycol.* 39(4/6): 279 (1941)

Facesoffungi number – FoF 2861

Saprobic or biotrophic on recently dead plant tissues. Sexual morph – Stromata roughly circular, on the surface of leaves. Ascumata surrounding the conidiomata, deeply immersed in stromatic tissues, globose to subglobose, ostiolate, papillate, with copious paraphyses. Peridium of strongly flattened, pale brown cells of *textura angularis* at the base and thick-walled, hyaline cells of *textura angularis* in the papilla region. Asci 8-spored, unitunicate, short-pedicellate to almost sessile, apex rounded. Ascospores overlapping uniseriate to biseriata, clavate, 2-celled, hyaline. Asexual morph – Conidiomata loculate, irregular in shape, ostiolate. Peridium comprising layers of brown, thin-walled cells of *textura epidermoidea*. Conidiophores poorly differentiated, thin-walled, ellipsoidal. Conidiogenous cells in small clusters or short branched chains of cells, irregular or narrowly flask-shaped, tapering towards the upper region, both percurrent and sympodial proliferation, minute, slightly flared collarettes where percurrent proliferation occurs. Conidia ellipsoidal to fusiform, hyaline, aseptate (description of asexual morph from Cannon 2001).

Type species – *Uleoporthe orbiculata* (Syd. & P. Syd.) Petr., *Annls mycol.* 39(4/6): 280 (1941)

Uleoporthe orbiculata (Syd. & P. Syd.) Petr., *Annls mycol.* 39(4/6): 280 (1941)

Basionym – *Valsonectria orbiculata* Syd. & P. Syd., *Annls mycol.* 14(1/2): 86 (1916)

Facesoffungi number – FoF 2862

Fig. 20

Lectotype – W (E. Ule 3389)

Saprobic or biotrophic on recently dead plant tissues. Sexual morph – Stromata 3–7 mm diameter, roughly circular in external view, epigenous on leaves, occupying the upper epidermis and palisade layers of the leaf, erumpent, convex, initially with simple stellate splits, later becoming more complex and branched, mostly coalescing with yellow-brown host tissue at the surface, with poorly to well-developed black line around the stroma and internal eustromatic tissue with thick-walled, glassy hyaline cells of *textura globulosa* to *textura angularis* around the basal region of ascumata and dark brown cells of *textura globulosa* to *textura angularis* around the ostioles. Ascumata 435–450 µm high, 400–460 µm wide (\bar{x} = 445 × 450 µm, n = 15), surrounding the conidiomata, deeply immersed in stromatic tissues, solitary, globose to subglobose, coriaceous, light brown, ostiolate. Papilla 190–200 µm high, 80–90 µm wide (\bar{x} = 195 × 85 µm, n = 15), conical, slightly eccentric, hyaline, filamentous periphysate. Peridium 15–20 µm wide (\bar{x} = 19 µm, n = 15), comprising 5–6 layers of strongly flattened, pale brown cells of *textura angularis* at the base and thick-walled, hyaline cells of *textura angularis* in the ostiolar region. Hamathecium comprising copious, very thin-walled, persistent paraphyses, swollen at the base and gradually tapering towards the apex. Asci 60–80 × 10–20 µm (\bar{x} = 65 × 14 µm, n = 25), 8-spored, unitunicate, narrowly clavate, short-pedicellate to almost sessile, apex rounded, sometimes slightly attenuate. Ascospores 16–20 × 5–6.5 µm (\bar{x} = 18 × 5.4 µm, n = 15), overlapping uniseriate to biseriata, clavate, upper cell ellipsoidal and the lower cylindrical-ellipsoidal, with a median to slightly suprmedian septum, thick-walled, hyaline, smooth-walled, each cell sometimes biguttulate. Asexual morph – Conidiomata loculate, irregularly-shaped, ostiolate. Peridium comprising 2–3 layers of brown, thin-walled cells of *textura epidermoidea*. Conidiophores poorly differentiated, thin-walled, ellipsoidal. Conidiogenous cells in small clusters or short branched chains of cells, irregular or narrowly flask-shaped, tapering towards the upper region, both percurrent and sympodial proliferation, minute, with slightly flared collarettes where percurrent proliferation occurs. Conidia ellipsoidal to fusiform, apex acute to obtuse, base narrowly truncate, thick-walled, hyaline, aseptate, smooth-walled.

Material examined – VENEZUELA, Miliquebe, Rio Cuquenau, in living leaves of *Cybianthus fulvopulverulentus* Mart. (Primulaceae), February 1910, E. Ule, 3389, W, lectotype.

Notes – The asexual morph of *Uleoporthe* was described by Sydow & Sydow (1916) connected to *Valsonectria orbiculata* (= *Uleoporthe orbiculata*). However, *Valsonectria* is now considered a member of the Bionectriaceae and its type species, *Valsonectria pulchella* Speg., is clearly not conspecific with *U. orbiculata* (Hawksworth et al. 1995). Muller & von Arx (1962) treated *Uleoporthe* as a synonym of *Phylloporthe*. However, *Uleoporthe* is characterized by a

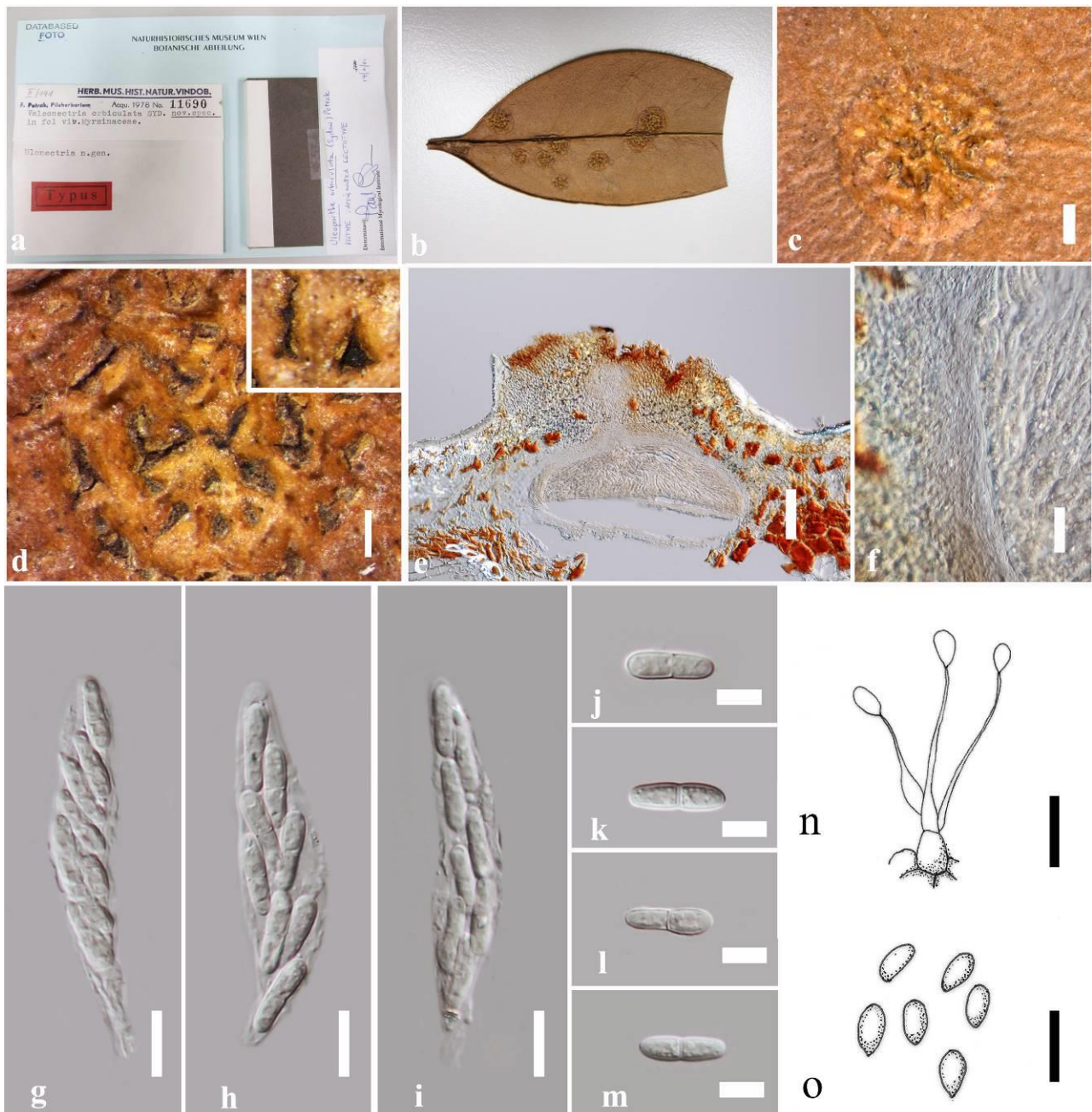


Figure 20 – *Uleoporthe orbiculata* (holotype). a Herbarium packet. b-d Herbarium specimen and stromata. e Cross section of ascoma. f Peridium. g-i Asci. j-m Ascospores. n Conidiophores, conidiogenous cells attached to conidia. o Conidia. Scale bars – c = 1 mm, d = 500 μ m, e = 100 μ m, f = 10 μ m, g-i, n-o = 20 μ m, j-m = 10 μ m.

prosenchymatous stroma and hyaline, 2-celled ascospores, while *Phylloporthe* has a plectenchymatous to pseudoparenchymatous stroma. *Phylloporthe* also has strongly erumpent stromata composed mostly of fungal tissue, short pedicellate asci which are evanescent at the base, an aparaphysate centrum and periphysate ostioles (Cannon 2001). Petrak (1941) reported characters of the asexual morph of *Uleoporthe* as similar to *Phomopsis*. We could not observe the asexual morph from the lectotype. Barr (1978) did not include *Uleoporthe* as a synonym of *Phylloporthe* but placed *Uleoporthe* as a member of Gnomoniaceae (subfamily Stegophoroideae, tribe Stegophoreae). However, this was not accepted by Cannon (2001) based on the stromatic development and the small, acervular, spermatial asexual morph. Cannon (2001) placed *Uleoporthe* in Melanconidaceae, but this is problematic because the classification was developed based on exclusively temperate taxa, which may show different patterns of evolution to tropical taxa, and

fewer asexual morph characters (Cannon 2001). Lumbsch & Huhndorf (2010) and Maharachchikumbura et al. (2015) placed *Uleoporthe* in Sydowiellaceae. Sequence data for *Uleoporthe* is unavailable in GenBank to clarify the correct phylogenetic position. Thus, fresh collections and sequence data are needed to establish the true affinities of this taxon.

We examined the holotype of *Uleoporthe orbiculata*. We could not observe an apical ring in the ascus as it has a delicate wall. Morphologically, *U. orbiculata* is atypical of other taxa in Sydowiellaceae. *Uleoporthe orbiculata* is a leaf epiphyte forming circular, erumpent to superficial stromata, while other taxa form immersed stromata on bark. Therefore, we exclude *Uleoporthe* from Sydowiellaceae and place it in Diaporthales genera, *incertae sedis*, until sequence data is available.

Acknowledgements

K.D. Hyde thanks Kunming Institute of Botany for the award of Visiting Professor.

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