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Article

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Hyaline-spored chaetosphaeriaceous hyphomycetes from Thailand and China, with a review of the family Chaetosphaeriaceae

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Abstract

Chaetosphaeriaceae is a genus-rich, but taxonomically confused family and there is a need of more detailed studies on their asexual and sexual morphs and investigation of phylogenetic relationships to similar genera in other families. In this study, a survey of hyaline-spored chaetosphaeriaceous hyphomycetes yielded ten new taxa, including one new genus (*Multiguttulispora*) and nine new species (*Dictyochaeta brevis*, *D. terminaliae*, *Kionochaeta castaneae*, *K. microspora*, *Menisporopsis breviseta*, *M. dushanensis*, *Multiguttulispora sympodialis*, *Tainosphaeria aseptata* and *T. monophialidica*). In addition, *Cryptophiale udagawae* and *Dictyochaeta simplex* are described and illustrated. Support for the new taxa are provided by morphological comparison and DNA sequence data analyses. Phylogenetic analysis of SSU, ITS and LSU sequence data showed that *Kionochaeta* is polyphyletic and species are phylogenetically located in two groups (*Kionochaeta 1* and *Kionochaeta 2*). In addition, a synopsis for *Kionochaeta* and *Menisporopsis* species, an updated phylogenetic tree and outline for Chaetosphaeriaceae are provided.

Key words – 10 new taxa – asexual morph – phylogeny – Sordariomycetes – Sordariomycetidae – taxonomy

Introduction

The family *Chaetosphaeriaceae* was introduced by Locquin (1984) for *Chaetosphaeria* Tul. & C. Tul., *Loramyces* W. Weston, *Niesslia* Auersw., *Rhagadostoma* Körb. and *Zignoëlla* Sacc., but was not validly published (Réblová et al. 1999). Réblová et al. (1999) re-described the family *Chaetosphaeriaceae* and accepted *Ascocodinaea* Samuels, Cand. & Magni, *Chaetosphaeria*, *Melanochaeta* E. Müll., Harr & Sulmont, *Melanopsammella* Höhn., *Porosphaerella* E. Müll. & Samuels, *Porosphaerellopsis* Samuels & E. Müll. and *Striatosphaeria* Samuels & E. Müll. Presently, 38 genera are accepted within the family *Chaetosphaeriaceae* (Maharachchikumbura et al. 2016, Wijayawardene et al. 2018).

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Cryptophiale Piroz. was introduced by Pirozynski (1968) to accommodate *C. kakombensis* Piroz. and *C. udagawae* Piroz. & Ichinoe and subsequently 20 species are accepted (Whitton et al. 2012). *Cryptophiale* is most similar to *Cryptophialoidea* Kuthub. & Nawawi, but differs by its conidiogenous cells encircling the conidiophores, protected by shield cells, which are on one side of the conidiophore and are not covered by sterile shield cells (Whitton et al. 2012).

Dictyochaeta was established by Spegazzini (1923) to accommodate *D. fuegiana* Speg. It is characterized by unbranched or branched, brown conidiophores with or without unbranched setae, monophialidic or polyphialidic, brown conidiogenous cells which produce aseptate and hyaline conidia. There are 104 epithets listed in Index Fungorum (July, 2019). Kuthubutheen & Nawawi (1991b) provided a key to *Dictyochaeta* and *Codinaea* species.

Kionochaeta P.M. Kirk & B. Sutton was introduced by Kirk & Sutton (1985) when they amended the genus *Chaetopsina* Rambelli. *Kionochaeta* is similar to *Zanclospora*, but differs by its conidiogenous cells borne on variously arranged branches of conidiophores, however, the conidiogenous cells are sessile, arranged in whorls on a conidiophore in *Zanclospora* (Kirk & Sutton 1985).

Menisporopsis S. Hughes was established by Hughes (1952) to accommodate *M. theobromae* S. Hughes. Liu et al. (2016) provided a detailed description of *M. theobromae* along with DNA sequence data and phylogeny for the first time for this genus. There are 11 epithets listed in Index Fungorum (July, 2019). Keys to the *Menisporopsis* species were provided by Tsui et al. (1999) and Castañeda Ruíz et al. (2001).

Tainosphaeria F.A. Fernández & Huhndorf was introduced by Fernández & Huhndorf (2005) with *T. crassiparies* F.A. Fernández & Huhndorf as the type species, and placed within the family *Chaetosphaeriaceae*. Three species are accepted within this genus (Fernández & Huhndorf 2005, Liu et al. 2016, Lu et al. 2016). Its placement in *Chaetosphaeriaceae* was confirmed by phylogenetic analyses (Fernández et al. 2006, Liu et al. 2016, Lu et al. 2016).

During a survey of hyphomycetes in China and Thailand, several hyaline-spored chaetosphaeriaceous species were collected. In this study, we introduce one new genus *Multiguttulispora* with its type species *M. sympodialis*, two new *Dictyochaeta* species (*D. brevis* and *D. terminaliae*), two new *Kionochaeta* species (*K. castaneae* and *K. microspora*), two new *Menisporopsis* species (*M. breviseta* and *M. dushanensis*), two new *Tainosphaeria* species (*T. aseptata* and *T. monophialidica*) along with two previously described species, *Cryptophiale udagawae* and *Dictyochaeta simplex* based on morphology and phylogenetic analyses.

Materials & Methods

Collection and isolation of fungi

Dead wood from a variety of plants in forests were collected in Krabi Province, Thailand and Guizhou Province, China. Samples were taken to the laboratory in Zip-lock plastic bags for examination. The specimens were incubated in sterile moist chambers and examined using a Motic SMZ 168 series microscope. Fungi were removed with a needle and placed in a drop of distilled water on a slide for morphological study. Photomicrographs of fungal structures were captured with a Canon 600D digital camera attached to a Nikon ECLIPSE Ni compound microscope. All measurements were made using the Tarosoft (R) Image FrameWork program (Liu et al. 2010). Photo-plates were made with Adobe Photoshop CS3 (Adobe Systems, USA). Isolation onto potato dextrose agar (PDA) was performed by the single spore isolation method (Chomnunti et al. 2014). Dried material was deposited in the Herbarium of Mae Fah Luang University (MFLU), Chiang Rai, Thailand and herbarium of Kunming Institute of Botany, Chinese Academy of Sciences (HKAS), Kunming, China. Cultures were deposited at Mae Fah Luang University Culture Collection (MFLUCC), Chiang Rai, Thailand and Guizhou Culture Collection, China (GZCC). Faces of Fungi and Index Fungorum numbers were registered (Jayasiri et al. 2015, Index Fungorum 2019).

DNA extraction, PCR amplification and sequencing

Genomic DNA was extracted from pure fungal mycelium grown on PDA or malt extract agar (MEA) at room temperature using the Fungal gDNA Kit (BioMIGA, USA) according to the manufacturer's instructions. The internal transcribed spacer region of ribosomal DNA (ITS), large subunit nuclear ribosomal DNA (LSU) and small subunit nuclear ribosomal DNA (SSU) genes regions were amplified via polymerase chain reaction (PCR) using the following primers: ITS5 and ITS4 (White et al. 1990) for ITS, LR0R and LR5 (Vilgalys & Hester 1990) for LSU, and NS1 and NS4 for SSU (White et al. 1990). The PCR products were sequenced with the same primers. The PCR amplification was performed in a 25 µL reaction volume containing 12.5 µL of 2 × Power Taq PCR MasterMix (a premix and ready to use solution, including 0.1 Units/µL Taq DNA Polymerase, 500 µM dNTP Mixture each [dATP, dCTP, dGTP, dTTP], 20 mM Tris-HCl pH 8.3, 100 Mm KCl, 3 mM MgCl2, stabilizer and enhancer), 1 µL of each primer (10 µM), 1 µL genomic DNA extract and 9.5 µL deionised water. The PCR thermal cycle program of ITS and LSU were: initially 94 °C for 3 min., followed by 35 cycles of denaturation at 94 °C for 30 s, annealing at 55 °C for 50 s, elongation at 72 °C for 1 min., and final extension at 72 °C for 10 min.

Phylogenetic analyses

Original sequences were checked using BioEdit version 7.0.5.3 (Hall 1999), along with reference sequences originated from previous publications. The remaining homogenous sequences were obtained by BLAST searches (Altschul et al. 1990) from GenBank. All sequences used in this study are listed in Table 1. Alignments for each locus were done in MAFFT v7.307 online version (Katoh & Standley 2016) and manually verified in MEGA 6.06 (Tamura et al. 2013). Conserved blocks were selected from the initial alignments with Gblocks 0.91b (Castresana 2000). The interleaved NEXUS files for Bayesian inference analyses were formatted with AliView v1.19-beta1k (Larsson 2014). Bayesian inference (BI), maximum parsimony (MP) and maximum likelihood (ML) were used for phylogenetic analyses. For Bayesian inference analysis, the best model of evolution was determined using MrModeltest v2 (Nylander 2004). Bayesian inference analysis was done with MrBayes v 3.2.6 (Ronquist et al. 2012). Maximum parsimony analysis was performed in PAUP*4.0b10 (Swofford 2002). Maximum likelihood analysis was performed in raxmlGUI v 1.3.1 (Silvestro & Michalak 2012). Phylogenetic trees were drawn with TreeView 1.6.6 (Page 1996) or FigTree v1.4.3 (Rambaut 2017).

Results

Molecular phylogeny

The combined LSU and ITS sequence dataset included 214 taxa (ingroup) and two outgroup taxa with a total of 1670 characters (954 characters for LSU, 716 characters for ITS) after alignment including the gaps, of which 722 were parsimony informative, 228 were parsimony-uninformative, and 720 characters were constant. The tree was rooted with *Gelasinospora tetrasperma* (AFTOL-ID 1287) and *Sordaria fimicola* (CBS 508.50). The ML and BI analyses based on combined LSU and ITS sequence data provided similar tree topologies, and the result of ML analysis with a final likelihood value of -32807.818894 is shown in Fig. 1. The matrix had 1149 distinct alignment patterns, with 29.85% undetermined characters or gaps. Estimated base frequencies were: A = 0.233314, C = 0.262649, G = 0.309421, T = 0.194616; substitution rates AC = 1.000000, AG = 3.741518, AT = 1.000000, CG = 1.000000, CT = 3.741518, GT = 1.000000; gamma distribution shape parameter $\alpha = 0.303701$. For the Bayesian analysis, two parallel runs with six chains were run for 100000000 generations and trees were sampled every 10000th generation and the run was stopped automatically when standard deviation of split frequencies fell below 0.01. The run automatically stopped at 31790000 generations, resulting in 6360 trees from two runs of which 4770 trees were used to calculate the posterior probabilities (each run resulted in 3180 trees of which 2385 trees were sampled).

Eleven isolates of hyaline-spored chaetosphaeriaceous hyphomycetes from China and Thailand were identified in the family Chaetosphaeriaceae and located in the genera *Cryptophiale*, *Dictyochaeta*, *Kionochaeta*, *Menisporopsis*, *Tainosphaeria* and the new genus *Multiguttulispora* (Fig. 1).

On the ML tree (Fig. 1), *Chaetosphaeria* species are located in 14 different groups, and some of them grouped with the asexual genera, e.g. *Chloridium* (group *Chloridium 3*), *Dictyochaeta* (group *Dictyochaeta 4* and *Dictyochaeta 5*), *Exserticlava* (group *Chaetosphaeria 3*), *Menispora* (group *Menispora*) and *Umbrinosphaeria* (group *Chaetosphaeria 3*).

Dictyochaeta species are phylogenetically located in five different groups (Fig. 1), which are the same as reported by Liu et al. (2016), Perera et al. (2016), Hernández-Restrepo et al. (2017), Tibpromma et al. (2018), Yang et al. (2018) and Luo et al. (pers. comm.).

To analyse the genus *Kionochaeta*, a combined SSU, ITS and LSU sequence dataset was also analyzed (Fig. 2). This dataset included 33 taxa (ingroup) and one outgroup taxon with a total of 2480 characters (1036 characters for SSU, 602 characters for ITS, 842 characters for LSU) after alignment including the gaps, of which 524 were parsimony informative, 307 were parsimony-uninformative, and 1649 characters were constant. The tree was rooted with *Gelasinospora tetrasperma* (AFTOL-ID 1287). The MP, ML and BI analyses based on combined SSU, ITS and LSU sequence data provided similar tree topologies, and the result of ML analysis with a final likelihood value of -14301.378740 is shown in Fig. 2. The matrix had 922 distinct alignment patterns, with 20.33% undetermined characters or gaps. Estimated base frequencies were: A = 0.241157, C = 0.247000, G = 0.286422, T = 0.225421; substitution rates AC = 1.270116, AG = 1.760629, AT = 1.010454, CG = 0.828899, CT = 5.543715, GT = 1.000000; gamma distribution shape parameter $\alpha = 0.428282$. For the Bayesian analysis, two parallel runs with six chains were run for 1000000 generations and trees were sampled every 100th generation, resulting in 20002 trees from two runs of which 15002 trees were used to calculate the posterior probabilities (each run resulted in 10001 trees of which 7501 trees were sampled).

Our two newly collected *Kionochaeta* isolates grouped together with another three *Kionochaeta* isolates (*K. ramifera* (Matsush.) P.M. Kirk & B. Sutton (JCM9756) and *K. spissa* P.M. Kirk & B. Sutton (JCM9817 and JCM9818)) (Fig. 2), however, this group is separate from the group comprising the ex-type strain of *K. ivoriensis* (Rambelli & Lunghini) P.M. Kirk & B. Sutton (CBS 374.76). *Kionochaeta* is similar to *Zanclospora*, but they are phylogenetically different (Fig. 2).

Taxonomy

Cryptophiale udagawae Piroz. & Ichinoe, in Pirozynski, Can. J. Bot. 46: 1126 (1968) Fig. 3

Facesoffungi number: FoF06284

Saprobic on decaying wood. Asexual morph: *Colonies* on plant substrate effuse, hairy, scattered, glistening. *Mycelium* mostly immersed, partially superficial. *Conidiophores* macronematous, mononematous, setiform, scattered, erect, straight or slightly curved, dark brown, smooth, thick-walled, septate below the branches, 150–290 × 10–33 µm, 1–2 times dichotomously branched towards the apex and generally above the fertile region; terminal branches dark brown, 9.5–51.5 µm long, 2.9–6.2 µm wide at the base, acutely pointed above. *Fertile region* from middle up to the first dichotomy, 36.5–92 × 10–17 µm, consisting of two rows of phialides one on each side of the conidiophore with each cell narrowly ellipsoid, covered by sterile shield cells. *Conidiogenous cells* not observed. *Conidia* produced in slime and adhering to the fertile region, hyaline, smooth, clavate, aseptate, basal end rounded, with a short appendage at the base, 19.9–28.1 × 1.6–2.8 µm (av. = 24.9 × 2.05 µm, n = 30). Sexual morph: Undetermined.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 1-36 (MFLU 19–0209, HKAS 105133), living culture GZCC 18–0047.

Table 1 GenBank accession numbers of isolates included in this study.

Taxa	**Isolate**[a, b]	**Status**[c]	**LSU**	**ITS**	**SSU**	**Note**
Adautomilanezia caesalpiniae	HUEFS 216632 = LAMIC010212 = CC-LAMIC 102/12	T	NG_058594	NR_153560	-[d]	
Anacacumisporium appendiculatum	HMAS 245593	T	KT001553	KT001555	-	
Anacacumisporium appendiculatum	HMAS 245602		KT001554	KT001556	-	
Bahusutrabeeja dwaya	CBS 261.77 = JCM 6357	T	MH872829	MH861059	-	
Brunneodinemasporium brasiliense	CBS 112007	T	JQ889288	JQ889272	-	
Brunneodinemasporium jonesii	GZCC 16–0050	T	KY026055	KY026058	-	
Cacumisporium capitulatum	FMR 11339		HF677190	HF677176	-	Sexual morph *Chaetosphaeria decastyla*
Cacumisporium capitulatum	SMH 3766		AY017374	-	-	Sexual morph *Chaetosphaeria decastyla*
Chaetosphaeria acutata	CBS 101312		AF178553	AF178553	-	
Chaetosphaeria albida	PDD 92537	T	NG_058756	NR_119666	-	
Chaetosphaeria biapiculata	SMH 3074		AF466065	-	-	
Chaetosphaeria caesariata	SMH 2794		AF466060	-	-	Now known as *Stanjehughesia hormiscioides*
Chaetosphaeria callimorpha	CBS 525.88		AF178555	AF178555	-	
Chaetosphaeria callimorpha	SMH 2791		AF466062	-	-	
Chaetosphaeria capitata	SMH 3239		AF466061	-	-	
Chaetosphaeria chalaroides	SMH 2018		AY017372	-	-	
Chaetosphaeria chalaroides	SMH 2223		AF466063	-	-	
Chaetosphaeria chlorotunicata	SMH 1565		AF466064	-	-	
Chaetosphaeria ciliata	CBS 122131	T	MH874726	MH863180		Asexual morph *Menispora ciliata*
Chaetosphaeria ciliata	ICMP 18253		GU180637	-	GU180614	Asexual morph *Menispora ciliata*
Chaetosphaeria conirostris	SMH 2183		AF466066	-	-	
Chaetosphaeria cubensis	SMH 3258		AF466067	-	-	
Chaetosphaeria curvispora	CBS 125555		MH875040	MH863562	-	
Chaetosphaeria curvispora	CBS 125782		MH875199	MH863736	-	
Chaetosphaeria curvispora	ICMP 18255		GU180636	-	-	
Chaetosphaeria cylindrospora	SMH 3568	T	AY017373	-	-	
Chaetosphaeria decastyla	SMH 2629		AF466068	-	-	
Chaetosphaeria dilabens	CBS 712.88		AF178557	AF178557	-	

Table 1 Continued.

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU	Note
Chaetosphaeria dilabens	CBS 734.83		MH873395	MH861683	-	
Chaetosphaeria fennica	CBS 101641		AF178562	AF178562	-	
Chaetosphaeria fuegiana	CBS 114553		MH874528	-	-	
Chaetosphaeria fusiformis	CBS 101429		AF178554	AF178554	-	
Chaetosphaeria garethjonesii	MFLUCC 15–1012	T	NG_059017	NR_154840	-	
Chaetosphaeria hebetiseta	MR 938		AF178549	AF178549	-	
Chaetosphaeria hebetiseta	SMH 2729		AF466069	AY906955	-	
Chaetosphaeria inaequalis	MR 1450		AF178564	AF178564	-	
Chaetosphaeria innumera	MR 1175		AF178551	AF178551	-	
Chaetosphaeria innumera	SMH 2748		AY017375	AY906956	-	
Chaetosphaeria jonesii	MFLUCC 15–1015	T	KY212761	NR_154841	-	
Chaetosphaeria lateriphiala	SMH 2629-1		AF466070	-	-	
Chaetosphaeria lateriphiala	SMH 3294		AF466071	-	-	
Chaetosphaeria lateriphiala	SMH 3320		AF466072	-	-	
Chaetosphaeria lentomita	MR 1265		AF178548	AF178548	-	
Chaetosphaeria lignomollis	SMH 3015		AF466073	EU037896	-	
Chaetosphaeria longiseta	SMH 1725		AF279416	-	-	
Chaetosphaeria longiseta	SMH 3854		AF279417	-	-	
Chaetosphaeria luquillensis	SMH 2973		AF466074	-	-	
Chaetosphaeria mangrovei	MCD 069	T	MG813820	MG813821	-	
Chaetosphaeria metallicans	PDD 92539	T	NG_058757	NR_119668	-	
Chaetosphaeria minuta	SMH 3396		AF466075	-	-	
Chaetosphaeria myriocarpa	CBS 116.57		MH869208	MH857668	-	
Chaetosphaeria myriocarpa	CBS 141.53		MH868672	MH857137	-	
Chaetosphaeria myriocarpa	CBS 143389		MH107931	MH107883	-	
Chaetosphaeria myriocarpa	CBS 241.75B		MH872648	MH860912	-	
Chaetosphaeria myriocarpa	CBS 264.76		AF178552	AF178552	-	
Chaetosphaeria myriocarpa	MUCL 34784		AF466076	-	-	
Chaetosphaeria panamensis	MFLUCC 15–1011		KY212760	KY212752	-	Asexual morph *Craspedodidymum*-like
Chaetosphaeria preussii	CBS 262.76		AF178561	AF178561	-	
Chaetosphaeria pygmaea	UPSC 2523		AF466077	-	-	

Table 1 Continued.

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU	Note
Chaetosphaeria pygmaea	MR 1365		AF178545	AF178545	-	
Chaetosphaeria raciborskii	SMH 2017		AF466078	AY906949	-	Asexual morph *Craspedodidymum*-like
Chaetosphaeria raciborskii	SMH 3119		AY436402	AY906953	-	Asexual morph *Craspedodidymum*-like
Chaetosphaeria rivularia	CBS 127686	T	KR347357	KR347356	-	
Chaetosphaeria spinosa	SMH 2754		AF466079	-	-	
Chaetosphaeria sylvatica	SMH 2893		AF279419	-	-	
Chaetosphaeria tropicalis	SMH 1267		AF279418	-	-	
Chaetosphaeria tropicalis	SMH 2250		AF466080	-	-	
Chloridium aquaticum	HKAS 96226	T	MH476567	MH476570	MH476573	
Chloridium aseptatum	MFLUCC 11–0216	T	MH476568	NR_158365	MH476574	
Chloridium botryoideum	CBS 131270		MH877338	-	-	
Chloridium botryoideum var. *botryoideum*	CBS 259.76		MH878530	-	-	
Chloridium botryoideum var. *botryoideum*	CBS 246.76		MH878531	-	-	
Chloridium chloroconium	FMR 11940		KY853495	KY853435	-	Before known as *Gonytrichum chlamydosporoides* var. *simile*
Chloridium lignicola	CBS 143.54	IT	MH857273	MH857273	-	Before known as *Bisporomyces lignicola*
Chloridium sp.	HGUP1806		MK372068	MK372070	-	
Chloridium sp.	HGUP1805		MK372067	MK372069	-	
Chloridium virescens	MR 1148		AF178550	AF178550	-	
Chloridium virescens	NRRL 37636		GU183124	GU183124	-	
Chloridium virescens var. *caudigerum*	CBS 152.53		MH868678	MH857142	-	
Chloridium virescens var. *caudigerum*	CBS 141.54		MH868805	MH857272	-	
Chloridium virescens var. *caudigerum*	CBS 126073		MH875524	MH864068	-	
Chloridium virescens var. *chlamydosporum*	CBS 345.67		MH870689	MH858992	-	Before known as *Bisporomyces chlamydosporus*, now known as *Chaetosphaeria vermicularioides*

Table 1 Continued.

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU	Note
Chloridium virescens var. *chlamydosporum*	CBS 126074		MH875525	MH864069	-	Before known as *Bisporomyces chlamydosporus*, now known as *Chaetosphaeria vermicularioides*
Chloridium virescens var. *chlamydosporum*	CBS 142.61		MH869557	-	-	Before known as *Bisporomyces chlamydosporus*, now known as *Chaetosphaeria vermicularioides*
Chloridium virescens var. chlamydosporum	CBS 114.41	T	MH867576	-	-	Before known as *Bisporomyces chlamydosporus*, now known as *Chaetosphaeria vermicularioides*
Chloridium virescens var. *virescens*	CBS 239.75B		MH878291	-	-	
Codinaea lambertiae	CBS 143419 = CPC 32289	T	NG_059053	NR_156389	-	
Codinaea pini	CBS 138866	T	NG_058902	NR_137943	-	
Codinaeopsis gonytrichoides	CBS 593.93		AF178556	AF178556	-	
Conicomyces pseudotransvaalensis	HHUF 29956 = GS20	T	LC001708	NR_138015	-	
Cryptophiale hamulata	MFLUCC 18–0098		MG386756	-	MG386757	
Cryptophiale udagawae	MFLUCC 18–0422		MH758211	MH758198	MH758205	
Cryptophiale udagawae	MFLUCC 18–0428		MH758210	MH758197	MH758204	
Cryptophiale udagawae	**GZCC 18–0047**		**MN104619**	**MN104608**	**MN104628**	
Cryptophialoidea fasciculata	MFLUCC 17–2119		MH758208	MH758195	MH758202	
Dendrophoma cytisporoides	CBS 223.95	T	JQ889289	JQ889273	-	
Dictyochaeta aquatica	MFLUCC 15–0983	T	MH476569	NR_158452	MH476575	
Dictyochaeta assamica	CBS 242.66		MH870426	MH858788	-	
Dictyochaeta brevis	**GZCC 18–0096**	**T**	**MN104625**	**MN104614**	**MN104634**	
Dictyochaeta fuegiana	FMR 13126		KY853500	KY853440	-	Sexual morph *Chaetosphaeria fuegiana*
Dictyochaeta fuegiana	ICMP 15153		EF063574	-	-	Sexual morph *Chaetosphaeria fuegiana*
Dictyochaeta mimusopis	CBS 143435		MH107935	MH107888	-	
Dictyochaeta pandanicola	KUMCC 16–0153 = MFLUCC 17–0563	T	MH376710	MH388338	MH388307	
Dictyochaeta septata	CBS 143386		MH107936	MH107889	-	
Dictyochaeta siamensis	MFLUCC 15–0614	T	KX609952	KX609955	-	
Dictyochaeta siamensis	MFLUCC 16–0371		MH376711	MH388339	MH388308	
Dictyochaeta simplex	CBS 966.69		AF178559	AF178559	-	Before known as *Codinaea simplex*

Table 1 Continued.

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU	Note
Dictyochaeta simplex	**GZCC 18–0017**		**MN104620**	**MN104609**	**MN104629**	
Dictyochaeta terminalis	**GZCC 18–0085**	**T**	**MN104624**	**MN104613**	**MN104633**	
Dinemasporium decipiens	CBS 592.73		JQ889291	JQ889275	-	
Dinemasporium morbidum	CBS 129.66	T	JQ889296	JQ889280	-	
Dinemasporium morbidum	CBS 995.97		JQ889297	JQ889281	-	
Dinemasporium nelloi	MFLUCC 13–0482	T	KP711363	KP711358	KP711368	
Dinemasporium polygonum	CBS 516.95	T	NG_059109	NR_137786	-	
Dinemasporium pseudoindicum	CBS 127402	T	JQ889293	NR_137787	-	
Echinosphaeria canescens	SMH 4791		AY436403	-	-	Helminthosphaeriaceae
Ellisembia brachypus	HKUCC 10555		DQ408563	-	-	*?Sporidesmium brachypus*
Eucalyptostroma eucalypti	CBS 142074 = CPC 28764	T	NG_059257	NR_154027	-	
Eucalyptostroma eucalypti	CBS 142075 = CPC 28748		KY173499	KY173407	-	
Eucalyptostroma eucalyptorum	CPC 31800	T	MH327838	NR_159834	-	
Exserticlava vasiformis	TAMA 450		AB753846	-	-	
Gelasinospora tetrasperma	CBS 178.33 = AFTOL-ID 1287		DQ470980	NR_077163	DQ471032	Outgroup
Gonytrichum caesium	CBS 696.74		MH872625	-	-	
Gonytrichum caesium var. *chloridioides*	CBS 129.72		MH872151	MH860413	-	
Gonytrichum macrocladum	CBS 201.55		MH868989	MH857448	-	
Gonytrichum macrocladum	CBS 195.60		MH869503	MH857954	-	
Gonytrichum macrocladum	CBS 875.68		MH870968	MH859240	-	
Gonytrichum mirabile	CBS 408.76		MH872760	MH860990	-	
Helminthosphaeria clavariarum	SMH 4609	T	AY346283	-	-	Helminthosphaeriaceae
Infundibulomyces cupulata	BCC 11929	T	EF113979	EF113976	EF113982	
Infundibulomyces oblongisporus	BCC 13400	T	EF113980	EF113977	EF113983	
Kionochaeta castaneae	**GZCC 18–0025**	**T**	**MN104621**	**MN104610**	**MN104630**	
Kionochaeta ivoriensis	CBS 374.76 = JCM 9876	T	MH872758	NR_160149	NG_063387	
Kionochaeta microspora	**GZCC 18–0036**	**T**	**MN104618**	**MN104607**	**MN104627**	
Kionochaeta ramifera	JCM9756		-	-	AB003788	
Kionochaeta spissa	JCM9817		-	-	AB003789	
Kionochaeta spissa	JCM9818		-	-	AB003790	
Lecythothecium duriligni	CBS 101317		AF261071	-	-	

Table 1 Continued.

Taxa	**Isolate[a, b]**	**Status[c]**	**LSU**	**ITS**	**SSU**	**Note**
Leptosporella arengae	MFLUCC 15–0330	T	MG272246	MG272255	MG366594	Leptosporellaceae
Leptosporella gregaria	SMH 4290	T	AY346290	-	-	Leptosporellaceae
Linocarpon arengae	MFLUCC 15–0331	T	MG272247	-	MG366596	Linocarpaceae
Linocarpon cocois	MFLUCC 15–0812	T	MG272248	MG272257	MG272253	Linocarpaceae
Melanochaeta aotearoae	SMH 1655		AF466081	-	-	
Melanochaeta aotearoae	SMH 3551		AF466082	-	-	
Melanopsammella gonytrichii	SMH 3785		AF466085	-	-	Now known as *Chloridium gonytrichii*
Melanopsammella vermicularioides	SMH 1985		AF064644	-	-	
Melanopsammella vermicularioides	SMH 3883		AF466086	-	-	
Melanopsammella vermicularioides	FC 404		AF466087	-	-	Now known as *Chloridium vermicularioides*
Menispora glauca	FMR 12089		HF678538	HF678528	-	
Menispora tortuosa	CBS 214.56		AF178558	AF178558	-	
Menispora tortuosa	DAOM 231154 = AFTOL-ID 278		AY544682	KT225527	AY544723	
Menisporopsis anisospora	CBS 109475	T	MH874421	MH862827	-	
Menisporopsis breviseta	**GZCC 18–0071**	**T**	**MN104623**	**MN104612**	**MN104632**	
Menisporopsis dushanensis	**GZCC 18–0084**	**T**	**MN104626**	**MN104615**	**MN104635**	
Menisporopsis pandanicola	KUMCC 17–0271	T	MH376726	MH388353	MH388320	
Menisporopsis theobromae	MFLUCC 15–0055		KX609954	KX609957	-	
Morrisiella indica	HKUCC 10827		DQ408578	-	-	
Multiguttulispora sympodialis	**MFLUCC 18–0153**	**T**	**MN104617**	**MN104606**	-	
Nawawia filiformis	MFLUCC 16–0853		MH758206	-	MH758200	
Nawawia filiformis	MFLUCC 17–2394		MH758209	MH758196	MH758203	
Nawawia malaysiana	CPC 16757 = CBS 125544	T	GU229887	GU229886	-	Now known as *Neonawawia malaysiana*
Neopseudolachnella acutispora	HHUF 29727	T	NG_059404	NR_154223	-	
Neopseudolachnella magnispora	MAFF 244359	T	AB934042	AB934066	-	
Neopseudolachnella uniseptata	MAFF 244360	T	AB934043	AB934067	-	
Paliphora intermedia	CBS 896.97	T	NG_057766	NR_160203	EF204518	
Paliphora intermedia	CBS 199.95		EF204500	-	EF204517	
Phaeostalagmus cyclosporus	CBS 663.70		MH871680	MH859892	-	

Table 1 Continued.

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU	Note
Phaeostalagmus cyclosporus	CBS 312.75		MH872661	-	-	
Phialosporostilbe scutiformis	MFLUCC 17–0227	T	MH758207	MH758194	MH758201	
Phialosporostilbe scutiformis	MFLUCC 18–1288		MH758212	MH758199	-	
Polynema podocarpi	CPC 32761	T	MH327833	MH327797	-	
Pseudodinemasporium fabiforme	MAFF 244361	T	AB934044	AB934068	-	
Pseudolachnea fraxini	CBS 113701	T	JQ889301	JQ889287	-	
Pseudolachnea hispidula	MAFF 244364		AB934047	AB934071	-	
Pseudolachnella asymmetrica	MAFF 244366	T	AB934049	AB934073	-	
Pseudolachnella botulispora	MAFF 244367	T	AB934050	AB934074	-	
Pseudolachnella guaviyunis	CBS 134695 = CMW 39055	T	NG_058879	NR_153892	-	Now known as *Calvolachnella guaviyunis*
Pyrigemmula aurantiaca	CBS 126743	T	HM241692	HM241692	-	
Pyrigemmula aurantiaca	CBS 126744		HM241693	HM241693	-	
Rattania setulifera	GUFCC 15501		HM171322	GU191794	-	
Ruzenia spermoides	SMH 4606		AY436422	-	-	Helminthosphaeriaceae
Sordaria fimicola	CBS 508.50		MH868251	MH856730	-	Outgroup
Sporoschisma hemipsilum	MFLUCC 15–0615		KX358074	KX505869	-	
Sporoschisma hemipsilum	SMH 2125		AF466083	-	-	
Sporoschisma hemipsilum	SMH 3251		AF466084	-	-	
Sporoschisma longicatenatum	MFLUCC 16–0180		KX358077	KX505871	-	
Sporoschisma mirabile	FMR 11247		HF677183	HF677174	HF937358	
Sporoschisma palauense	MFLUCC 15–0616	T	KX358075	KX505870	-	
Stanjehughesia vermiculata	HKUCC 10840		DQ408570	-	-	
Striatosphaeria codinaeophora	MR 1230		AF178546	AF178546	-	
Striatosphaeria codinaeophora	SMH 1524		AF466088	-	-	
Synaptospora plumbea	SMH3962		KF765621	-	-	Helminthosphaeriaceae
Tainosphaeria aseptata	**GZCC 18–0044**	**T**	**MN104622**	**MN104611**	**MN104631**	
Tainosphaeria crassiparies	SMH 1934	T	AF466089	-	-	
Tainosphaeria jonesii	GZCC 16–0053		KY026056	KY026059	-	
Tainosphaeria jonesii	GZCC 16–0065		KY026057	KY026060	-	
Tainosphaeria monophialidica	**MFLUCC 18–0146**	**T**	**MN104616**	-	-	
Tainosphaeria siamensis	MFLUCC 15–0607	T	KX609953	KX609956	-	

Table 1 Continued.

Taxa	Isolate[a, b]	Status[c]	LSU	ITS	SSU	Note
Thozetella fabacearum	MFLUCC 15–1020	T	NG_059767	KY212754	-	
Thozetella nivea			EU825200	EU825201	-	
Thozetella pandanicola	MFLUCC 16–0253	T	MH376740	MH388366	-	
Thozetella pinicola	RJ-2008		EU825195	EU825197	EU825198	
Thozetella tocklaiensis	CBS 378.58	T	MH869349	MH857817	-	Before known as *Thozetellopsis tocklaiensis*
Umbrinosphaeria caesariata	CBS 102664		AF261069	-	-	Now known as *Stanjehughesia hormiscioides*
Verhulstia trisororum	CBS 143234	T	MG022160	MG022181	-	
Zanclospora iberica	FMR 11584 = CBS 130426	T	KY853544	KY853480	HF937360	
Zanclospora iberica	FMR 12186		KY853545	KY853481	HF937361	
Zanclospora novae-zelandiae	CBS 130280 = FMR 11022		MH877214	-	-	
Zignoëlla ovoidea	SMH 2605		AF064641	-	-	Now known as *Menispora ovoidea*
Zignoëlla pulviscula	MUCL 15710		AF466090	-	-	Now known as *Menispora pulviscula*
Zignoëlla pulviscula	SMH 3289		AF466091	-	-	Now known as *Menispora pulviscula*

[a] Newly generated sequences are indicated in bold.

[b] Abbreviations of culture collections (where known): **AFTOL**, Assembling the Fungal Tree of Life; **BCC**, BIOTEC Culture Collection, National Center for Genetic Engineering and Biotechnology (BIOTEC), Bangkok, Thailand; **CBS**, Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; **CPC**, Culture collection of Pedro Crous, housed at CBS; **CMW**, Culture collection of the Forestry and Agricultural Biotechnology Institute (FABI) of the University of Pretoria, Pretoria South Africa; **DAOM**, Canadian Collection of Fungal Cultures, Agriculture and Agri-Food Canada, Ottawa, Canada; **FMR**, Facultad de Medicina, Universitat Rovira i Virgili, Reus, Tarragona, Spain; **GUFCC**, Fungus Culture Collection of Goa University, India; **GZCC**, Guizhou Culture Collection, Guiyang, China; **HGUP**, Herbarium of Guizhou University, Plant Pathology, China; **HHUF**, Herbarium of Hirosaki University, Fungi; **HKAS**, Herbarium of Kunming Institute of Botany, Chinese Academy of Sciences, Kunming, China; **HKUCC**, University of Hong Kong Culture Collection, Department of Ecology and Biodiversity, Hong Kong, China; **HMAS**, Herbarium of Mycology, Chinese Academy of Sciences, China; **HUEFS**, Herbarium of the State University of Feira de Santana, Bahia, Brazil; **ICMP**, International Collection of Micro-organisms from Plants, Landcare Research, Auckland, New Zealand; **JCM**, Japan Collection of Microorganism, RIKEN BioResource Center, Japan; **KUMCC**, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming, China; **MAFF**, Ministry of Agriculture, Forestry and Fisheries, Tsukuba, Ibaraki, Japan; **MFLUCC**, Mae Fah Luang University Culture Collection, Chiang Rai, Thailand; **MUCL**, Mycothèque de l'Université Catholique de Louvian, Laboratoire de Mycologie Systematique et Appliquee, Universite catholique de Louvain, Louvain-la-Neuve, Belgium; **NRRL**, Agriculatural Research Service Culture Collection, USA; **PDD**, New Zealand Fungus Herbarium, New Zealand; **SMH**, Collection of S.M. Huhndorf; **UPSC**, Uppsala University Culture Collection, Uppsala University, Uppsala, Sweden

[c] Status: T: ex-type; IT: ex-isotype.

[d] No data in GenBank.

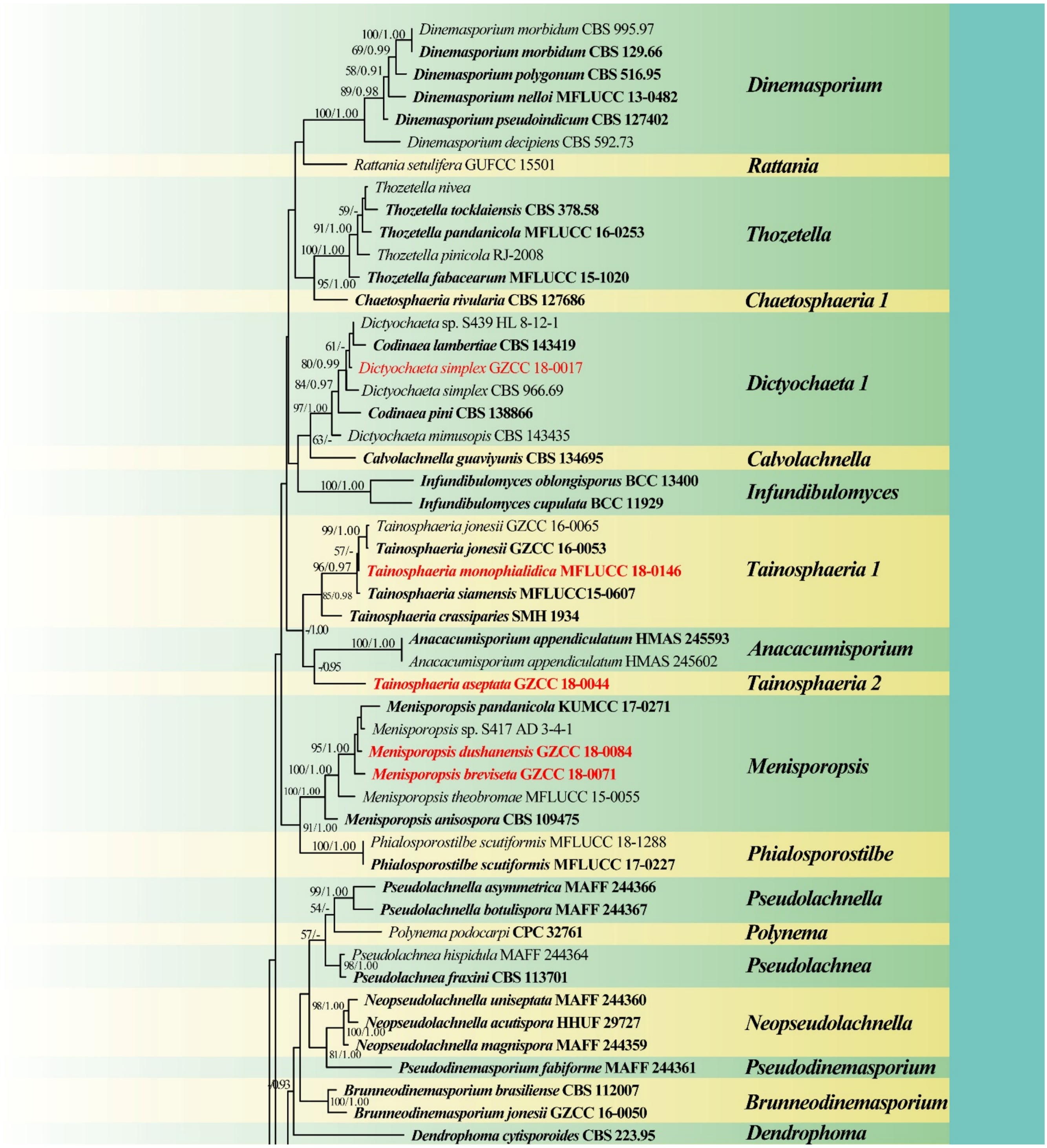

Figure 1 – Phylogenetic tree generated from maximum likelihood (ML) analysis based on combined LSU and ITS sequence data for the family Chaetosphaeriaceae. Bootstrap support values for maximum likelihood greater than 50% and Bayesian posterior probabilities (PP) greater than 0.8 are indicated above or below the nodes as ML/PP. Ex-type strains are in bold, the new isolates are in red. The tree is rooted with *Gelasinospora tetrasperma* (AFTOL-ID 1287) and *Sordaria fimicola* (CBS 508.50).

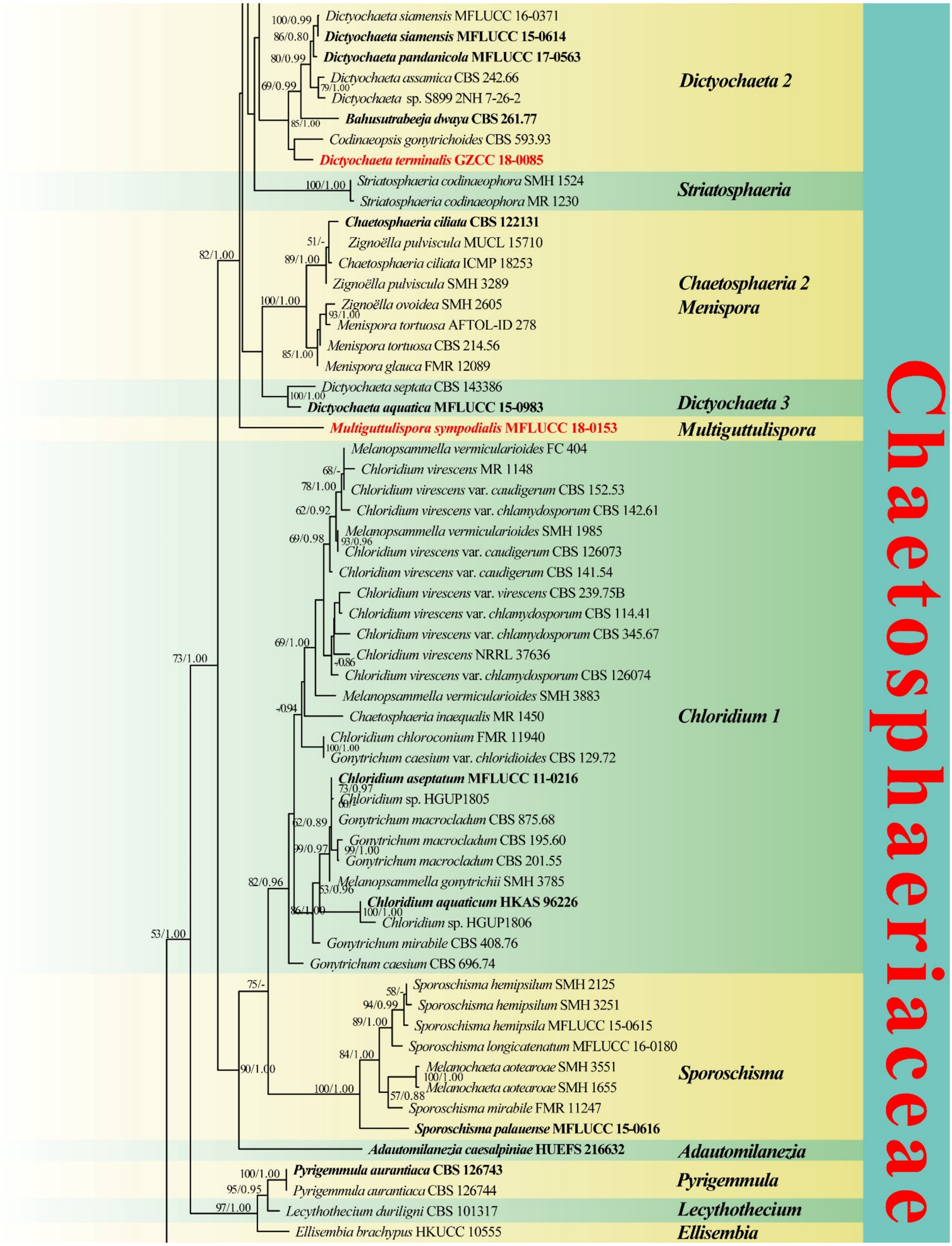

Figure 1 – Continued.

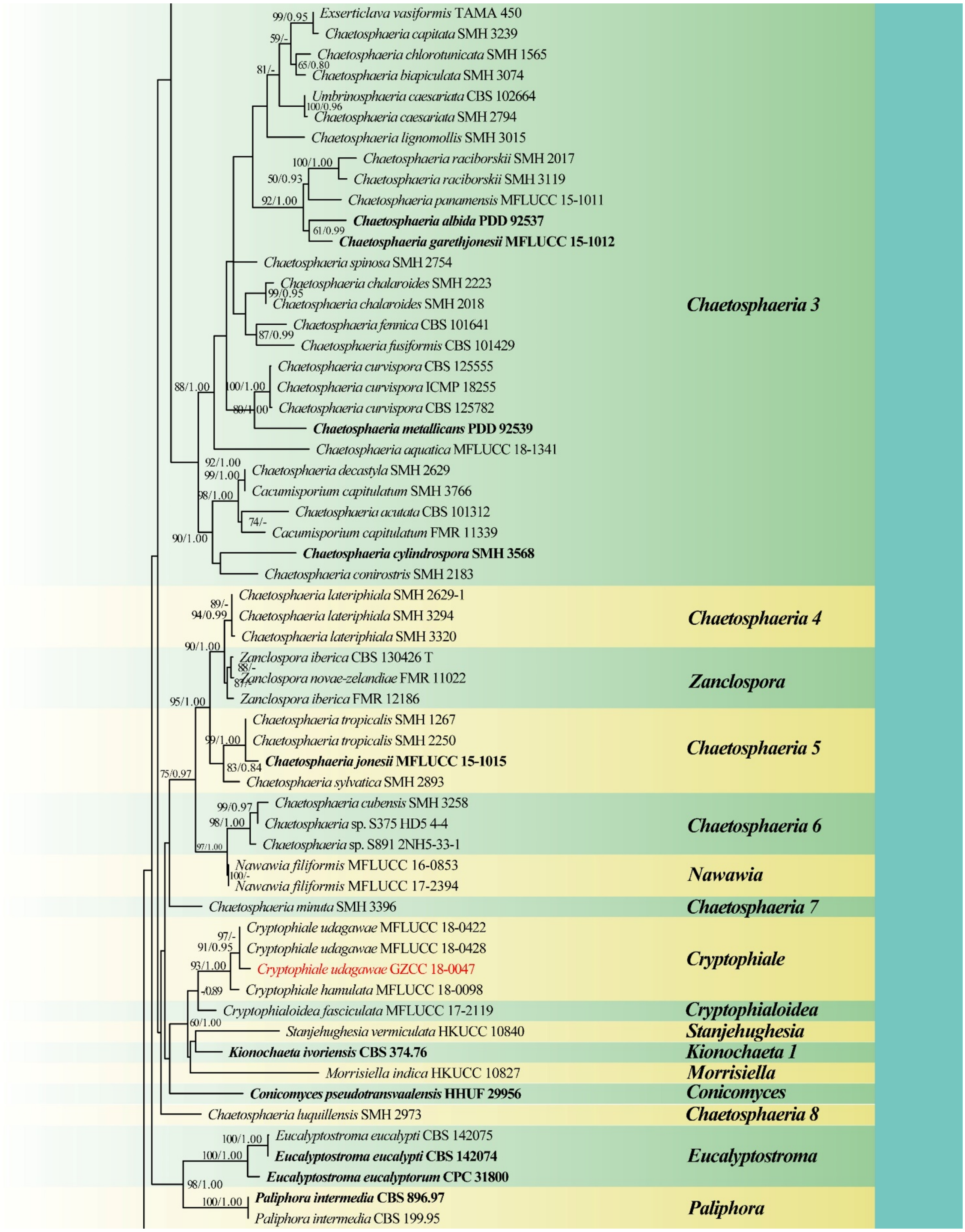

Figure 1 – Continued.

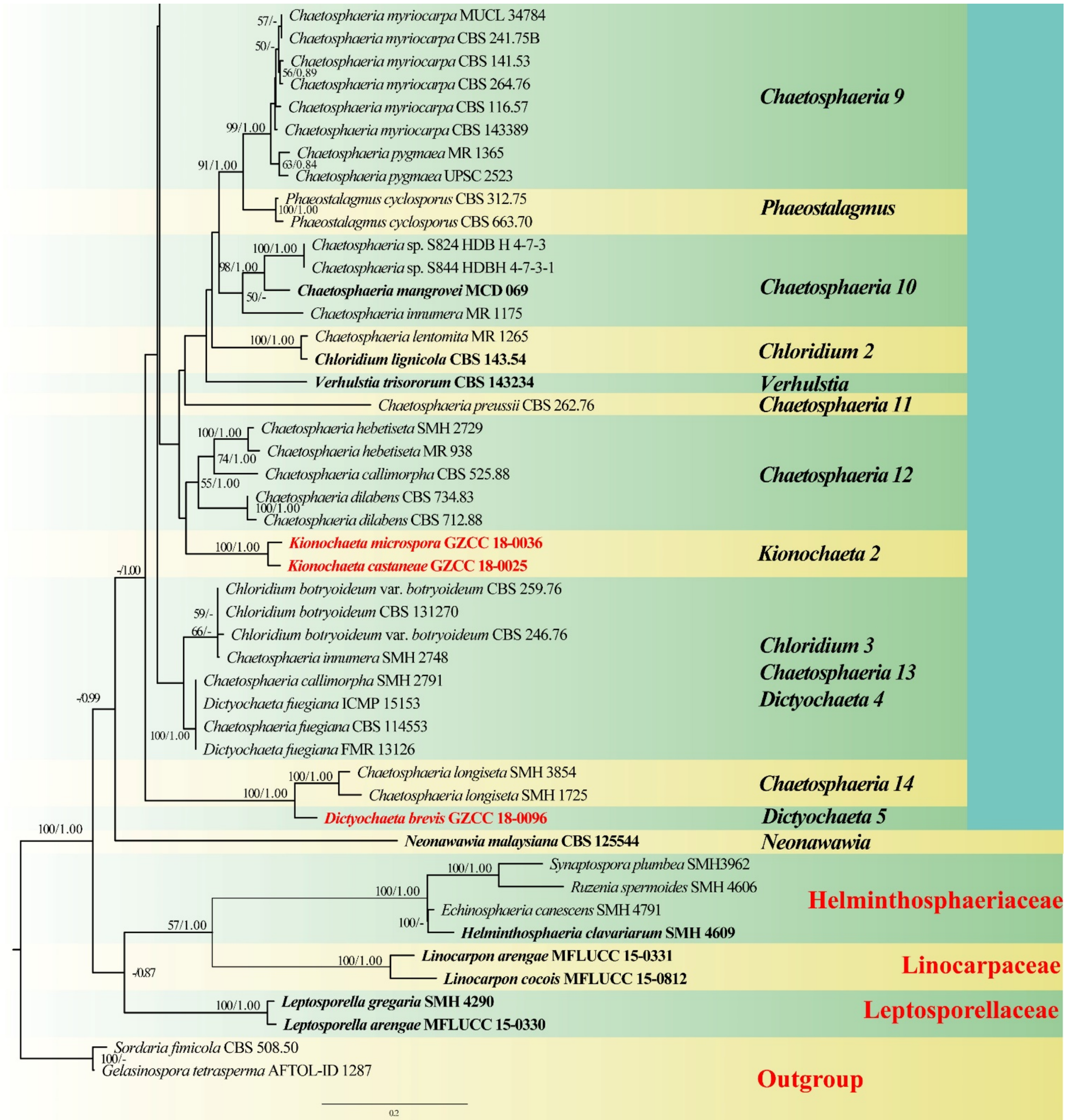

Figure 1 – Continued.

Notes – This is the second report of *Cryptophiale udagawae* from China and we provide description, sequences data and phylogenetic analysis for this species. This collection fits well with the description of Pirozynski (1968) and with the first description of a Chinese isolate by Yang et al. (2018). The phylogenetic result (Fig. 1) showed that our isolate clustered with *C. udagawae* (MFLUCC 18–0422 and MFLUCC 18–0428) with high support (91% MLBS, 0.95 PP). Thus, we identify our collection as *C. udagawae*.

Dictyochaeta brevis C.G. Lin & K.D. Hyde, sp. nov. Fig. 4

Index Fungorum number: IF556705; Facesoffungi number: FoF06285

Etymology – Referring to its short conidiophores.

Holotype – MFLU 19–0216

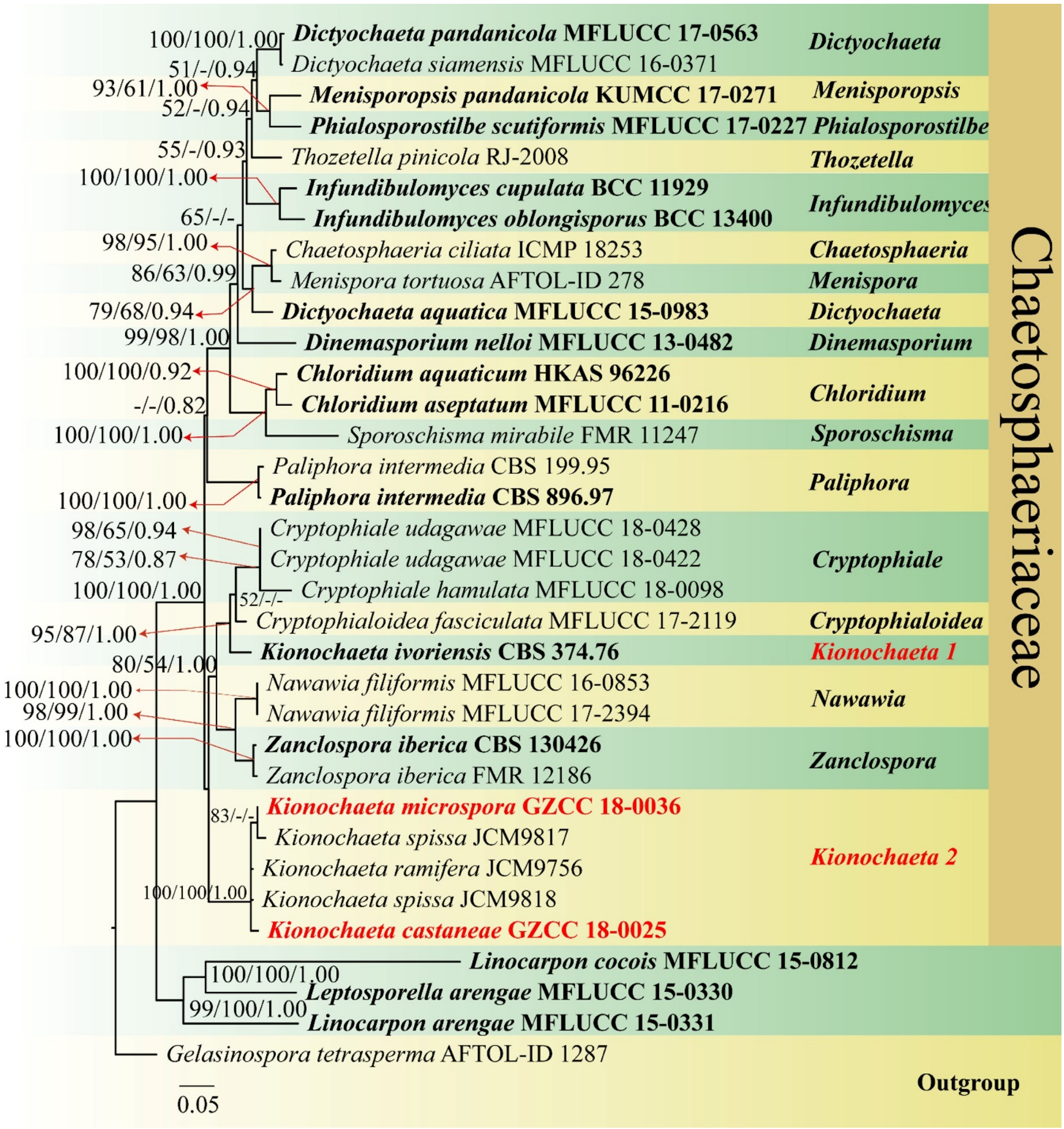

Figure 2 – Phylogenetic tree generated from maximum likelihood (ML) analysis based on combined SSU, ITS and LSU sequence data for selected genera within family Chaetosphaeriaceae. Bootstrap support values for maximum likelihood and maximum parsimony greater than 50% and Bayesian posterior probabilities (PP) greater than 0.8 are indicated above or below the nodes as ML/MP/PP. Ex-type strains are in bold, the new isolates are in red. The tree is rooted with *Gelasinospora tetrasperma* (AFTOL-ID 1287).

Saprobic on decaying wood. Asexual morph: *Colonies* on plant substrate effuse, gregarious, white to brown, shining. *Mycelium* mostly immersed, composed of branched, septate, smooth, thin-walled, pale brown hyphae. *Setae* absent. *Conidiophores* mononematous, macronematous, sometimes in groups, pale brown at the base becoming subhyaline or hyaline towards the apex, straight or slightly flexuous, septate, unbranched, smooth, cylindrical, swollen at the base, 13.5–51(–102) µm long, 2–4 µm wide just above the basal cell, sometimes reduced to conidiogenous cells. *Conidiogenous cells* monophialidic, with flared collarette, terminal, integrated, cylindrical, 12.7–33.6 × 2.5–3.9 µm. *Conidia* aggregated in large, slimy, white and glistening heads at the apex of conidiophores, acrogenous, aseptate, fusiform, most curved, with hair-like and 3.5–6.5 µm long appendages at both ends, 0–2 guttules, smooth, hyaline, 7.5–11.4 µm (av. = 9.0 µm, n = 45) long, 2.0–2.9 µm (av. = 2.5 µm, n = 45) wide. Sexual morph: Undetermined.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 2-39 (MFLU 19–0216, holotype; HKAS 105173, isotype), ex-type living culture GZCC 18–0096.

Notes – *Dictyochaeta brevis* resembles *D. renispora* Whitton, McKenzie & K.D. Hyde in having mononematous conidiophores, monophialidic, terminal conidiogenous cells, hyaline, reniform, aseptate conidia with a setula at each end, and both lacking setae. However, *D. brevis* differs from *D. renispora* by its shorter and determinate conidiophores, and longer and narrower conidia. Phylogenetically, *D. brevis* grouped in one of the *Chaetosphaeria* clades but in a separate clade with *Chaetosphaeria longiseta* F.A. Fernández & Huhndorf with high support value. *Dictyochaeta brevis* differs from the asexual morph of *C. longiseta* by its smaller conidia and lacking setae.

Dictyochaeta simplex (S. Hughes & W.B. Kendr.) Hol.-Jech., Folia geobot. phytotax. 19(4): 434 (1984) Fig. 5

Facesoffungi number: FoF06286

Saprobic on decaying leaves. Asexual morph: *Colonies* on plant substrate effuse, gregarious, brown, shining. *Mycelium* mostly immersed, composed of branched, septate, smooth, thin-walled, brown hyphae. *Setae* absent *Conidiophores* mononematous, macronematous, in groups, short, dark brown at the base becoming pale brown towards the apex, straight or slightly flexuous, septate, unbranched, sometimes reduced to conidiogenous cells, smooth, cylindrical, 20–125 µm long, 2.7–5.2 µm wide just above the base, which is swollen up to 7.5 µm. *Conidiogenous cells* monophialidic or polyphialidic, with flared collarette, terminal, integrated, sometimes sympodial, 8–51 µm long, 3–4 µm wide, slightly narrowing to 1.5–2.3 µm just below the collarette. *Conidia* aggregating in a globose mass at apex of conidiophores, acrogenous, aseptate, long fusiform, curved, with a hair-like, 4.4–7.8 µm long appendage at both ends, hyaline, smooth, 12.7–18.7 × 2.0–2.9 µm (av. = 15.6 × 2.5 µm, n = 30) wide. Sexual morph: Undetermined.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying leaves, 6 July 2018, Chuan-Gen Lin, DS 1-1 (MFLU 19–0202, HKAS 105104), living culture GZCC 18–0017.

Notes – Our specimen fits well with the description of *Dictyochaeta simplex* (≡ *Codinaea simplex*) in Hughes & Kendrick (1968), except they show sympodial proliferation in *D. simplex*. Our isolate grouped together with *D. simplex* (CBS 966.69) with high support value. Thus, we identify this new specimen as *D. simplex*.

Dictyochaeta terminalis C.G. Lin & K.D. Hyde, sp. nov. Fig. 6

Index Fungorum number: IF556706; Facesoffungi number: FoF06287

Etymology – Referring to the terminal conidiogenous cells.

Holotype – MFLU 19–0214

Saprobic on decaying leaves. Asexual morph: *Colonies* on plant substrate effuse, gregarious, brown, shining. *Mycelium* mostly immersed, composed of branched, septate, smooth, thin-walled, brown hyphae. *Setae* fertile, erect, dark brown at the base, paler towards the apex, septate, thick-walled, unbranched, smooth, cylindrical, 150–320 µm long, 3.7–9.4 µm wide at the base. *Conidiophores* mononematous, macronematous, in groups arising from the mycelial knots from the base of setae, short, sometimes percurrent, dark brown at the base becoming pale brown towards the apex, straight or slightly flexuous, septate, unbranched, smooth cylindrical, 31–171 µm long, 2.7–8.7 µm wide at the base. *Conidiogenous cells* monophialidic, with flared collarette, terminal, integrated, 13–70 × 3–6 µm. *Conidia* aggregating in a globose mass at apex of conidiophores and setae, acrogenous, aseptate, long fusiform, straight to curved, with a hair-like, 4–9.5 µm long appendage at both ends, hyaline, smooth, with 0–2 guttules, 14.7–20.7 × 2.9–4.2 µm (av. = 16.9 × 3.6 µm, n = 40). Sexual morph: Undetermined.

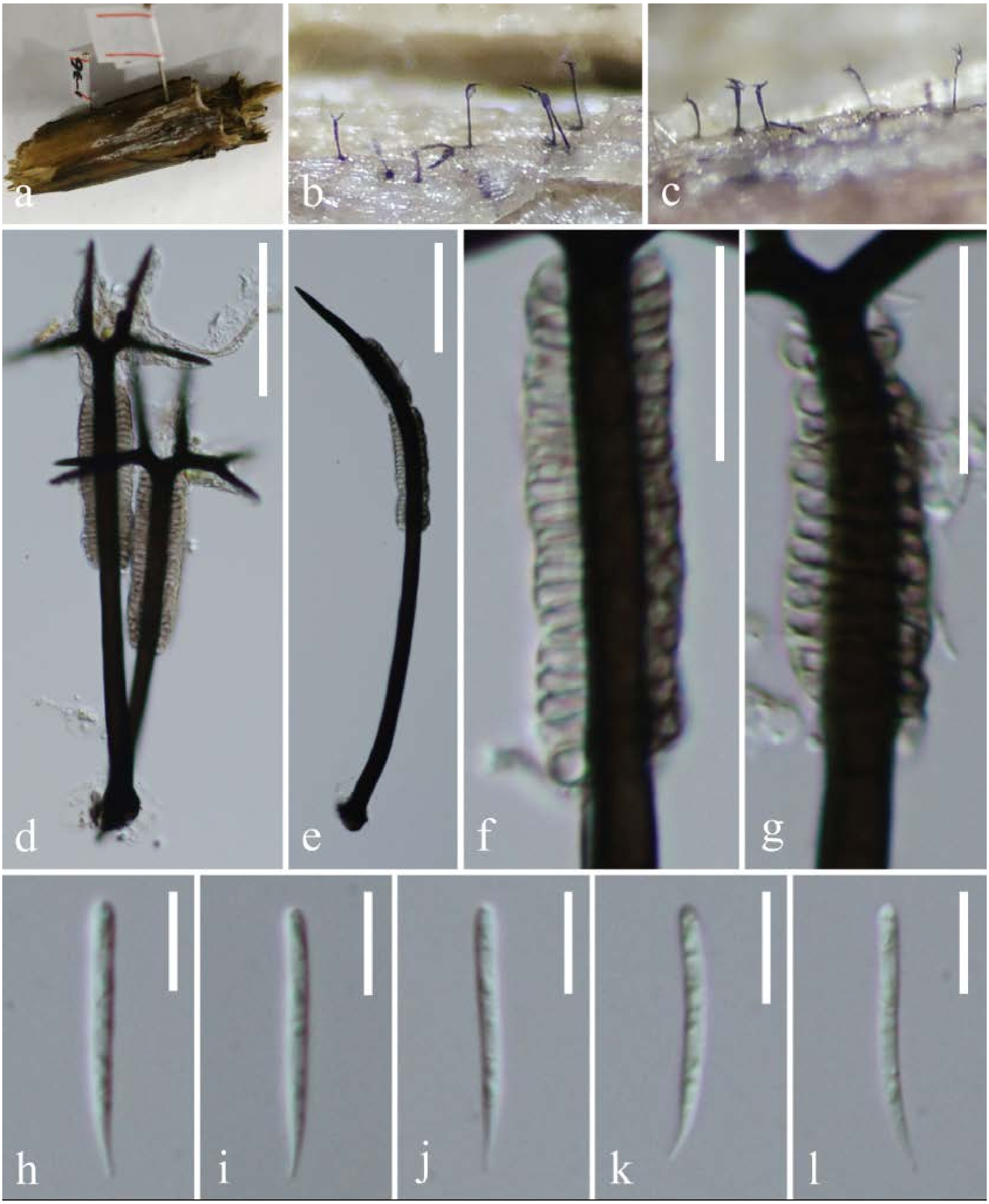

Figure 3 – *Cryptophiale udagawae* (MFLU 19–0209). a Host material. b, c Conidiophores on the host surface. d, e Conidiophores and conidiogenous cells. f, g Conidiogenous cells. h–l Conidia. Scale bars: d, e = 50 µm, f, g = 20 µm, h–l = 10 µm.

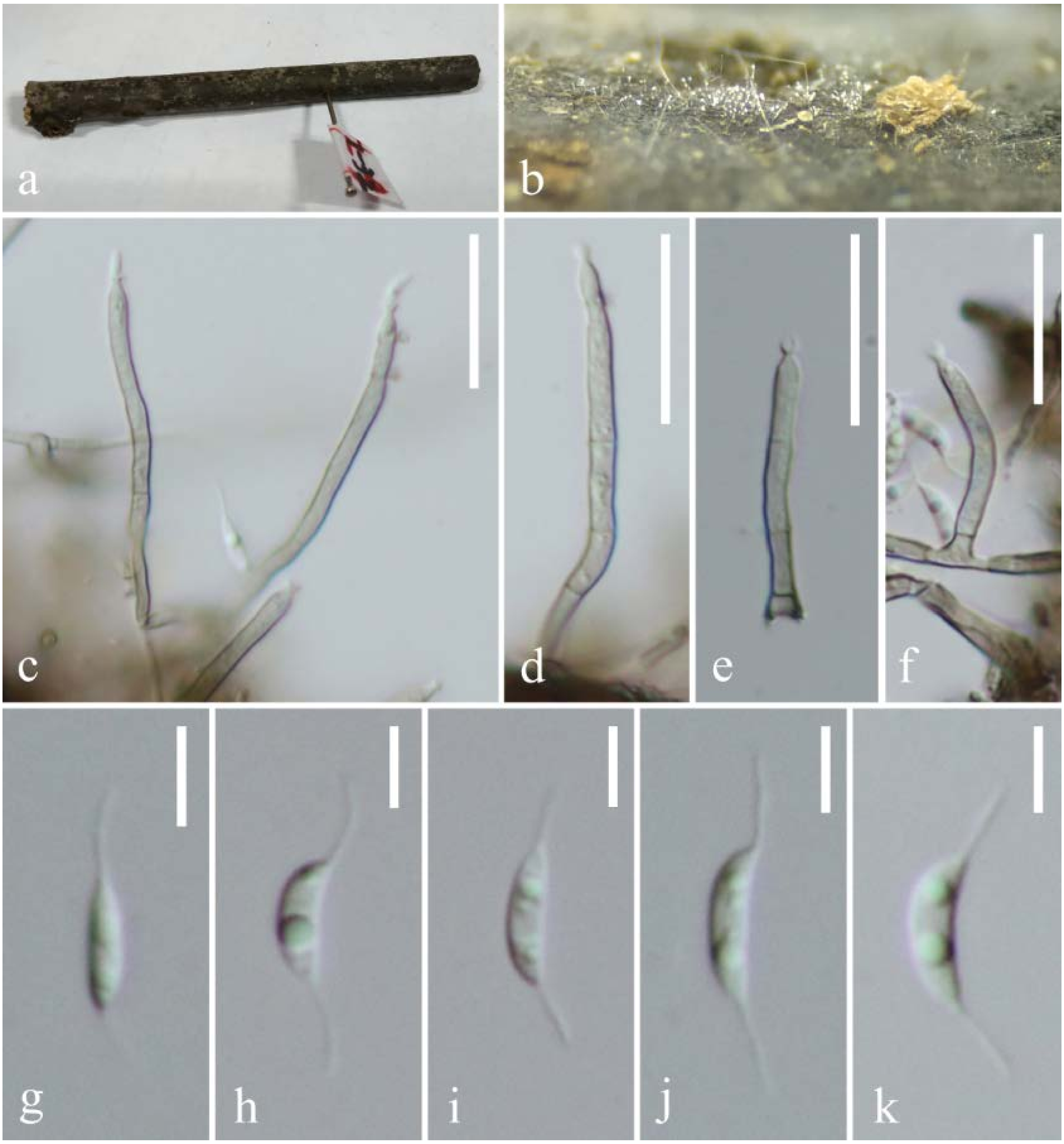

Figure 4 – *Dictyochaeta brevis* (MFLU 19–0216, holotype). a Host material. b Conidiophores on the host surface. c–f Conidiophores and conidiogenous cells. g–k Conidia. – Scale bars: c–f = 20 µm, g–k = 5 µm.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying leaves, 6 July 2018, Chuan-Gen Lin, DS 2-26 (MFLU 19–0214, holotype; HKAS 105163, isotype), ex-type living culture GZCC 18–0085.

Notes – *Dictyochaeta terminalis* is similar to *Codinaea pakhalensis* S.M. Reddy & S.S. Reddy, *D. assamica* (Agnihothr.) Aramb., Cabello & Mengasc., *D. fertilis* (S. Hughes & W.B. Kendr.) Hol.-Jech., *D. gamundiae* Aramb. & Cabello and *D. plovercovensis* Goh & K.D. Hyde in having fertile setae, mononematous conidiophores, and aseptate and hyaline conidia with setulae at each end (Agnihothrudu 1962, Hughes & Kendrick 1968, Reddy & Reddy 1977, Arambarri et al. 1987, Kuthubutheen & Nawawi 1991b, Goh & Hyde 1999, Whitton et al. 2000). However, *Dictyochaeta terminalis* differs from these species by its conidiogenous cells on setae, the conidiophores are monophialidic and without intercalary conidiogenous loci, and its conidia are bigger. In the phylogeny (Fig. 1), *D. terminalis* formed a separate clade, and grouped together with *Codinaeopsis gonytrichoides* (Shearer & J.L. Crane) Morgan-Jones (CBS 593.93). *Codinaeopsis gonytrichoides* differs from *D. terminalis* by conidiophores that are setiform, conidiogenous cells are polyphialidic and intercalary and conidia are allantoid, 14–17 × 2.5–3 µm, with a filiform, 6–10 µm long appendage at each end.

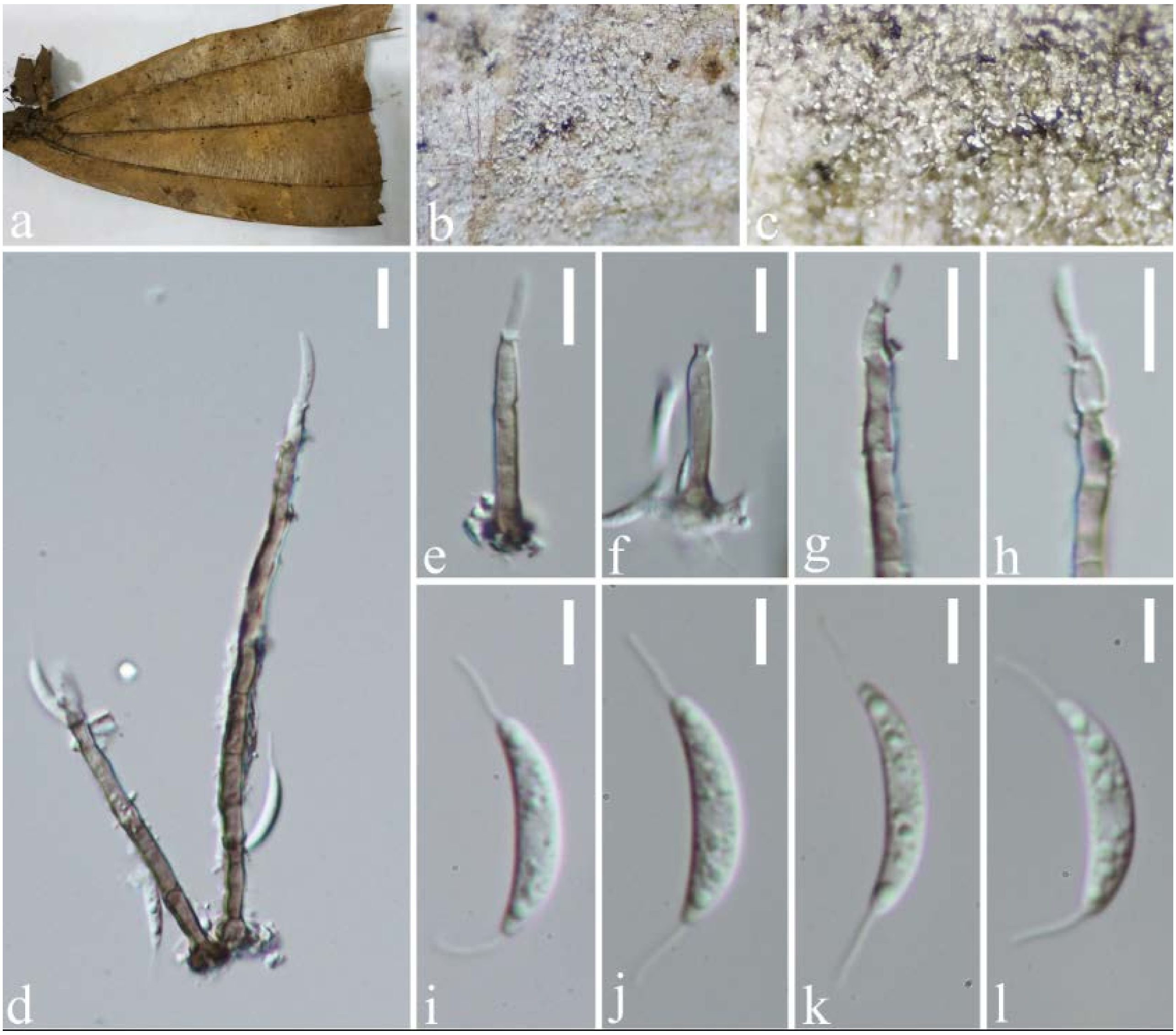

Figure 5 – *Dictyochaeta simplex* (MFLU 19–0202). a Host material. b, c Conidiophores on the host surface. d–f Conidiophores and conidiogenous cells. g, h Conidiogenous cells. i–l Conidia. Scale bars: d–h = 10 µm, i–l = 5 µm.

Kionochaeta castaneae C.G. Lin & J.K. Liu, sp. nov. Fig. 7

Index Fungorum number: IF556707; Facesoffungi number: FoF06288

Etymology – Referring to the host genus *Castanea* on which the type specimen was collected.

Holotype – MFLU 19–0204

Saprobic on decaying shell of *Castanea mollissima*. Asexual morph: *Colonies* on plant substrate effuse, caespitose, glistening, with white and slimy mass of conidia. *Mycelium* mostly immersed, partially superficial. *Conidiophores* macronematous, mononematous, setiform, caespitose, erect, straight or slightly curved, dark brown, smooth, thick-walled, sometimes branched above the fertile region, sometimes with secondly fertile region at the apex of the main axis, 265–320 µm long, 7–9.5 µm wide at the base; when branched, terminal branches dark brown, 45–105 µm long, 2.5–5.5 µm wide at the base, acutely pointed above. *Fertile region* immediately below the sterile branches at the middle part of the conidiophores, rarely with a secondly fertile region at the apex of the main axis, consisting of a mass of short branches on which conidiogenous cells are borne. *Conidiogenous cells* monophialidic, discrete, determinate, intercalary, rarely terminal, narrowly ellipsoid, pale brown, 5.2–7.9 × 2–2.8 µm. *Conidia* produced in slime and adhering to the fertile region, hyaline, smooth, lunate, cylindrical, aseptate, 5.1–6.5 µm long (av. = 5.9 µm, n = 35), 1.2–1.8 µm wide (av. = 1.5 µm, n = 35). Sexual morph: Undetermined.

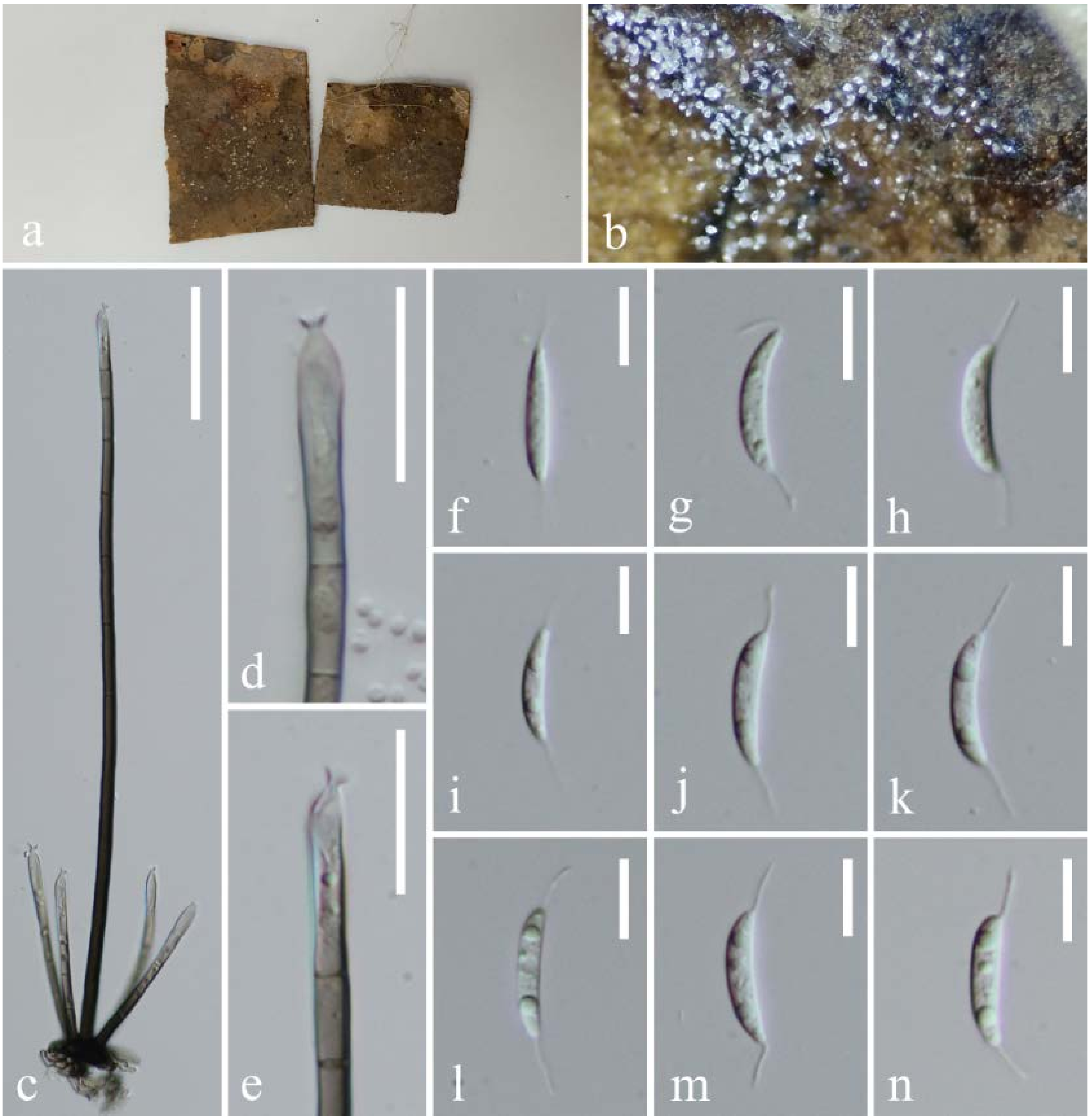

Figure 6 – *Dictyochaeta terminalis* (MFLU 19–0214, holotype). a Host material. b Conidiophores on the host surface. c Conidiophores and conidiogenous cells. d, e Conidiogenous cells. f–n Conidia. Scale bars: c = 50 µm, d, e = 20 µm, f–n = 10 µm.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying shell of *Castanea mollissima* Blume (Chinese chestnut), 6 July 2018, Chuan-Gen

Lin, DS 1-10 (MFLU 19–0204, holotype; HKAS 105111, isotype), ex-type living culture GZCC 18–0025.

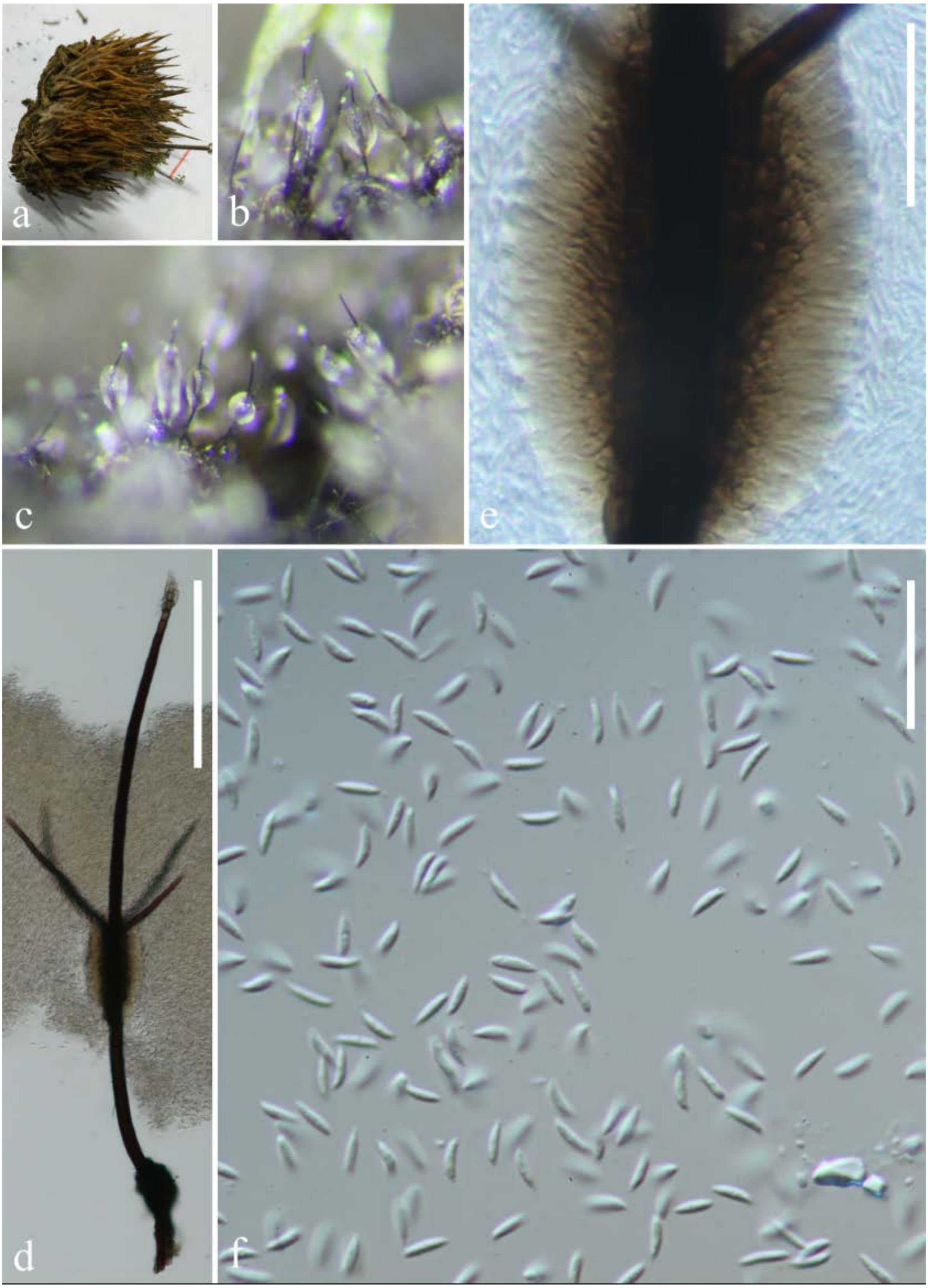

Figure 7 – *Kionochaeta castaneae* (MFLU 19–0204, holotype). a Host material. b, c Conidiophores on the host surface. d Conidiophore, conidiogenous cells and conidia. e Conidiogenous cells. f Conidia. Scale bars: d = 100 µm, e, f = 20 µm.

Notes – This is the fifth *Kionochaeta* species that has accessory lateral setiform branches. The other four are *K. australiensis* Goh & K.D. Hyde, *K. keniensis* (P.M. Kirk) P.M. Kirk & B. Sutton, *K. pughii* Kuthub. & Nawawi and *K. ramifera* (Kirk & Sutton 1985, Kuthubutheen & Nawawi 1988, Goh & Hyde 1997). *Kionochaeta castaneae* differs from *K. keniensis* by its asetulate conidia and from *K. australiensis* and *K. pughii* by its accessory lateral branches being sterile. The conidia of *K. castaneae* are smaller than *K. ramifera* (5.1–6.5 × 1.2–1.8 µm vs. (5–) 8–12 × 1–1.5(–1.8) µm). Phylogenetically, *K. castaneae* shows close relationship with *K. microspora* as they formed a monophyletic group (Fig. 1). However, *Kionochaeta castaneae* can be recognized as a phylogenetically distinct species. A comparison of ITS sequences data between *K. castaneae* and *K. microspora* showed that there are 20 bp (base pair) of 505 base pairs differences (including the gaps).

Kionochaeta microspora C.G. Lin & K.D. Hyde, sp. nov. Fig. 8

Index Fungorum number: IF556708; Facesoffungi number: FoF06289

Etymology – Referring to its small conidia.

Holotype – MFLU 19–0206

Saprobic on decaying wood. Asexual morph: *Colonies* on plant substrate effuse, caespitose, glistening, with olive-green to dark green and slimy mass of conidia. *Mycelium* mostly immersed, partially superficial. *Conidiophores* macronematous, mononematous, caespitose, erect, straight or slightly curved, setiform, smooth, thick-walled, unbranched, septate, dark brown at the base, paler towards the apex, cylindrical, swollen at the base, 40–305 µm long, 3.3–10.5 µm wide at the base. *Fertile region* at the apex of the conidiophores, rarely at the middle of the conidiophores with a secondary fertile region at the conidiophore apex, consisting of a mass of short branches on which conidiogenous cells are borne, 12–38 × 8–23 µm. *Conidiogenous cells* monophialidic, discrete, determinate, terminal, rarely intercalary, narrowly ellipsoid, ampulliform, subhyaline to pale brown, 4.5–8.1 × 2.5–3.9 µm. *Conidia* produced in slime and adhering to the fertile region, hyaline, smooth, lunate, cylindrical or clavate, aseptate, 4.2–6.4 × 1.5–2.3 µm (av. = 5.5 × 1.9 µm, n = 40). Sexual morph: Undetermined.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 1-22 (MFLU 19–0206, holotype; HKAS 105121, isotype), ex-type living culture GZCC 18–0036.

Notes – *Kionochaeta microspora* is similar to *K. filamentosa* Yanna & K.D. Hyde, *K. nanophora* Kuthub. & Nawawi and *K. pleomorpha* R.F. Castañeda, W.B. Kendr. & Guarro by having a fertile region at the apex of the setiform conidiophores without accessory lateral branches and aseptate conidia (Kuthubutheen & Nawawi 1988, Subramanian 1993, Castañeda Ruíz et al. 1998, Yanna & Hyde 2002). *Kionochaeta filamentosa* is a unique species in having hyaline filaments at the conidiophore apex (Yanna & Hyde 2002). *Kionochaeta nanophora* and *K. pleomorpha* have a setiform element devoid of a compactly branched conidiogenous apparatus throughout its height, which separates them from other *Kionochaeta* species (Kuthubutheen & Nawawi 1988, Subramanian 1993).

Menisporopsis breviseta C.G. Lin & K.D. Hyde, sp. nov. Fig. 9

Index Fungorum number: IF556709; Facesoffungi number: FoF06290

Etymology – Referring to the short setae.

Holotype – MFLU 19–0212

Saprobic on decaying leaves. Asexual morph: *Colonies* on plant substrate effuse, scattered, white to pale brown. *Mycelium* partly immersed, composed of brown hyphae. *Setae* central, solitary, erect, straight, unbranched, dark brown, septate, smooth, thick-walled, subulate, swollen at the apex, the lower part of each seta encased by tightly compacted conidiophores, 95–190 µm long, 2.7–5.4 µm thick at the base. *Synnemata* 52–113 µm long, 6.5–12 µm wide. *Conidiophores* macronematous, synnematous, encasing lower part of setae; separate filaments unbranched, straight or slightly flexuous, lower part narrow, upper part wider, pale brown, smooth, up to 182 µm long, upper part 2.5–4.6 µm thick. *Conidiogenous cells* monophialidic, integrated, terminal, cylindrical, with collarettes. *Conidia* aggregated in slimy heads, acrogenous, semi-endogenous, appendiculate with one or two setulae at each end, setulae 4–9 µm long, aseptate, curved, cylindrical or fusiform, hyaline, smooth, 14.2–24.3 µm (av. = 18.8 µm, n = 50) long, 2.4–3.6 µm (av. = 3.1 µm, n = 50) wide. Sexual morph: Undetermined.

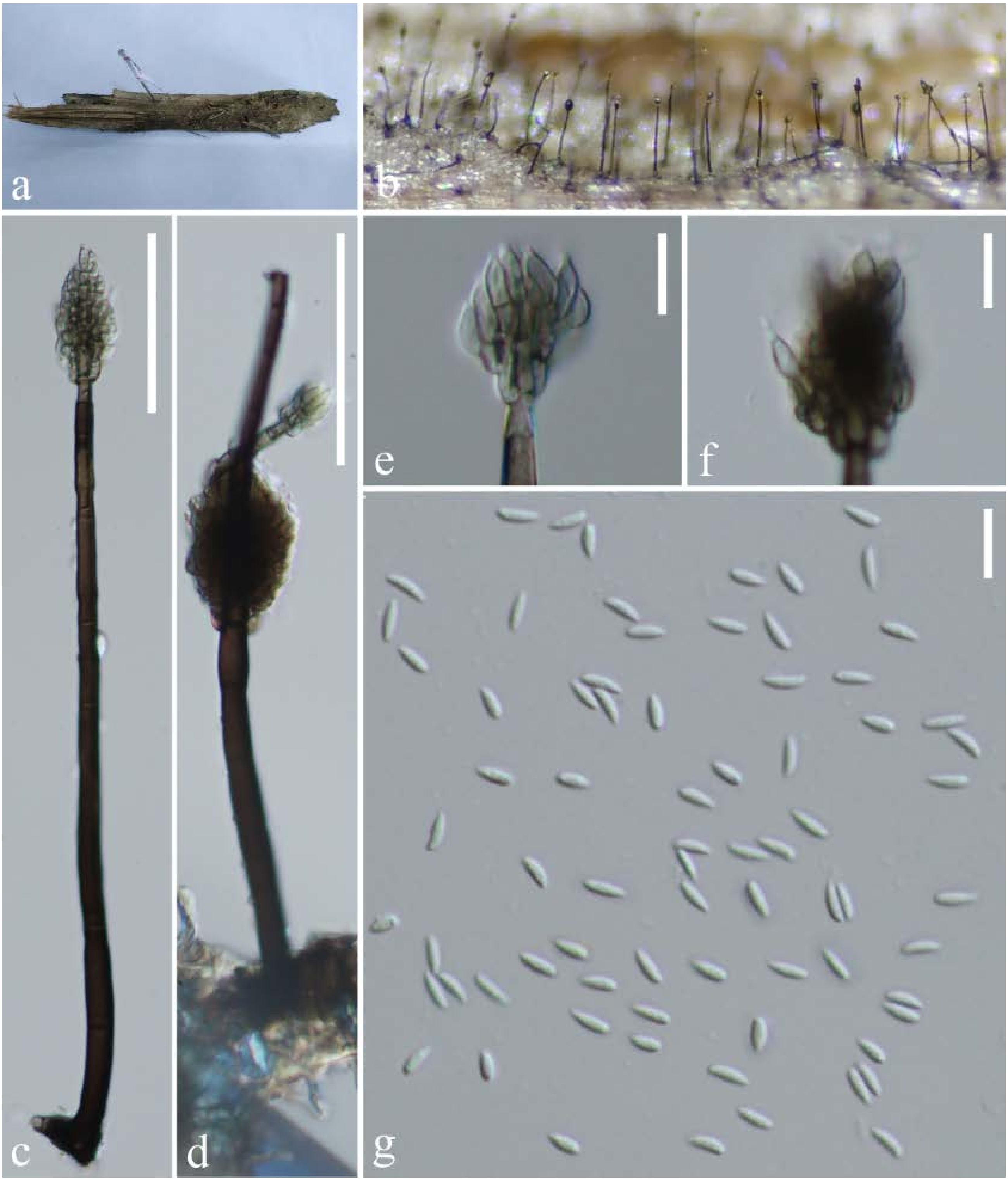

Figure 8 – *Kionochaeta microspora* (MFLU 19–0206, holotype) a Host material. b Conidiophores on the host surface. c, d Conidiophores and conidiogenous cells. e, f Conidiogenous cells. g Conidia. Scale bars: c, d = 50 µm, e–g = 10 µm.

Figure 9 – *Menisporopsis breviseta* (MFLU 19–0212, holotype) a Host material. b, c Conidiophores on the host surface. d Conidiophores, setae, conidiogenous cells and conidia. e Apex of seta. f Conidiogenous cells. g–k Conidia. Scale bars: d = 20 µm, e–k = 10 µm.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying leaves, 6 July 2018, Chuan-Gen Lin, DS 1-76 (MFLU 19–0212, holotype; HKAS 105151, isotype), ex-type living culture GZCC 18–0071.

Notes – The phylogenetic results showed that our isolate clustered with other *Menisporopsis* species and formed a sister group with *M. pandanicola* Tibpromma & K.D. Hyde (Fig. 1). *Menisporopsis breviseta* is similar to *M. pandanicola* by having lunate, hyaline conidia with 1–2 setula at each end. However, *M. breviseta* differs from *M. pandanicola* by its short setae and smaller synnemata. *Menisporopsis breviseta* can be distinguished from other *Menisporopsis* species by its short setae and conidia with 1–2 setula at each end. A comparison of ITS sequences data between *M. breviseta* and *M. pandanicola* showed that there are 23 bp (base pair) of 477 base pairs differences (including the gaps).

Menisporopsis dushanensis C.G. Lin & K.D. Hyde, sp. nov. Fig. 10

Index Fungorum number: IF556710; Facesoffungi number: FoF06291

Etymology – Referring to Dushan, the type locality of this species.

Holotype – MFLU 19–0213

Saprobic on decaying leaves. Asexual morph: *Colonies* on plant substrate effuse, scattered, white to pale brown. *Mycelium* partly immersed, composed of brown hyphae. *Setae* central, solitary, erect, straight, unbranched, dark brown, septate, smooth, thick-walled, subulate, the lower part of each seta encased by tightly compacted conidiophores, 207–455 µm long, 5–10.5 µm wide at the base. *Synemata* 75–150 µm long, 8.5–22.5 µm wide. *Conidiophores* macronematous, synnematous, encasing lower part of setae; separate filaments unbranched, straight or slightly flexuous, lower part narrow, upper part wider, pale brown, smooth, up to 147 µm long, upper part 2.5–6 µm thick. *Conidiogenous cells* monophialidic, integrated, terminal, cylindrical, with collarettes. *Conidia* aggregated in slimy heads, acrogenous, semi-endogenous, appendiculate with one or two setulae at each end, setulae 3–11 µm long, aseptate, curved, cylindrical or fusiform, hyaline, smooth, 14.0–21 µm (av. = 18 µm, n = 50) long, 3–4 µm (av. = 3.5 µm, n = 50) wide. Sexual morph: Undetermined.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying leaves, 6 July 2018, Chuan-Gen Lin, DS 2-25 (MFLU 19–0213, holotype; HKAS 105162, isotype), ex-type living culture GZCC 18–0084.

Notes – *Menisporopsis dushanensis* is closely related to other *Menisporopsis* species which constitute the strongly supported monophyletic *Menisporopsis* clade. In particular, *M. dushanensis* is nested in between *Menisporopsis* sp. (S417 AD 3-4-1) and *M. breviseta* but can be recognized as a distinct lineage (Fig. 1). The most similar species to *M. dushanensis* are *M. breviseta* and *M. pandanicola* in having lunate, hyaline conidia with 1–2 setula at each end. However, *M. dushanensis* differs from *M. breviseta* by its longer setae, bigger synnemata and wider conidia. *Menisporopsis dushanensis* differs from *M. pandanicola* by longer setae and wider conidia. A comparison of ITS sequences data between *M. dushanensis* and *M. pandanicola* showed that there are 23 bp (base pair) difference within the 478 base pairs (including the gaps). Therefore, we introduce it as a new species *M. dushanensis*.

Multiguttulispora C.G. Lin & J.K. Liu gen. nov.

Index Fungorum number: IF556712; Facesoffungi number: FoF06293

Etymology – Referring to the conidia with 0–4 guttules.

Type species – *Multiguttulispora sympodialis*

Saprobic on decaying plant. Asexual morph: *Colonies* on plant substrate effuse, scattered, white to pale brown. *Mycelium* partly immersed, composed of brown hyphae. *Conidiophores* mononematous, macronematous, erect, straight or flexuous, unbranched, septate, smooth, dark brown at the base becoming light brown towards the apex, cylindrical. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, pale brown, cylindrical. *Conidia* aggregated in slimy mass at the apex of the conidiophores, acrogenous, smooth, hyaline, septate, with guttules, cylindrical, oblong with an appendage at each end. Sexual morph: Undetermined.

Multiguttulispora sympodialis C.G. Lin & J.K. Liu, sp. nov. Fig. 11

Index Fungorum number: IF556711; Facesoffungi number: FoF06292

Etymology – Referring to the sympodial conidiophores.

Holotype – MFLU 19–0218

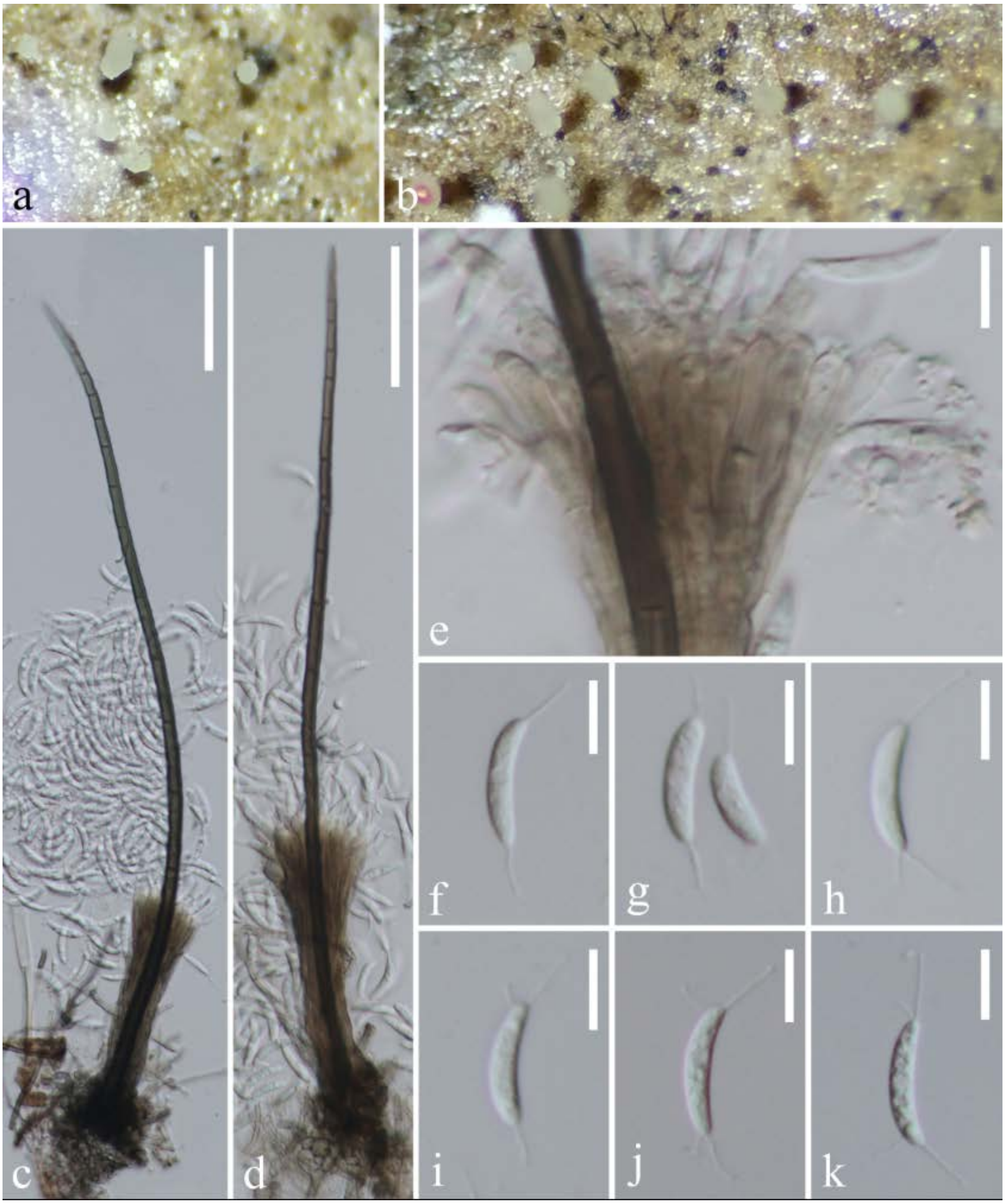

Figure 10 – *Menisporopsis dushanensis* (MFLU 19–0213, holotype) a, b Conidiophores on the host surface. c, d Conidiophores, setae, conidiogenous cells and conidia. e Conidiogenous cells. f–k Conidia. Scale bars: c, d = 50 µm, e–k = 10 µm.

Saprobic on decaying plant material. Asexual morph: *Colonies* on plant substrate effuse, scattered, white to pale brown. *Mycelium* partly immersed, composed of brown hyphae. *Conidiophores* mononematous, macronematous, erect, straight or flexuous, unbranched, septate, smooth, dark brown at the base becoming light brown towards the apex, cylindrical, 155–405 µm long, 5.6–10.6 µm wide. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, pale brown, cylindrical. *Conidia* aggregated in slimy mass at apex of the conidiophores, acrogenous, smooth, hyaline, 1–3-septate, with guttules, cylindrical, oblong, sometimes slightly curved, with a short and hyaline appendage at each end, 15.8–20.9 × 6–8.3 µm (av. =19.2 × 7.2 µm, n = 30). Sexual morph: Undetermined.

Material examined – THAILAND, Nan Province, Pua District, Phu Kha, on decaying plant, 4 August 2017, Chuan-Gen Lin, NAN 1-31 (MFLU 19–0218, holotype), ex-type living culture MFLUCC 18–0153.

Notes – *Multiguttulispora* is similar to *Anacacumisporium* Y.R. Ma & X.G. Zhang, which was introduced by Ma et al. (2016) and typified by *A. appendiculatum* Y.R. Ma & X.G. Zhang, by having mononematous, macronematous, unbranched, septate, dark brown to light brown and cylindrical conidiophores, integrated, terminal and cylindrical conidiogenous cells that produce septate conidia with an appendage at the tip and base and conidia aggregated in slimy masses at the conidiogenous loci. However, *Multiguttulispora* differs from *Anacacumisporium* by having sympodial conidiophores and hyaline and guttulate conidia, whereas the conidiophores are determinate and conidia are brown to dark brown or bicolorous in *Anacacumisporium*. *Multiguttulispora* is also similar to *Cacumisporium* Preuss by having cylindrical conidia with guttules, but *Multiguttulispora* has conidia with an appendage at both ends. A key to *Anacacumisporium* and similar genera was provided by Ma et al. (2016), which indicates that our fungus appears to be distinct from presently known genera. Phylogenetically, *Multiguttulispora* formed a separate clade within the family Chaetosphaeriaceae on the tree generated based on the combined LSU and ITS sequence data (Fig. 1). Therefore, we introduce a new genus, *Multiguttulispora*, to accommodate this distinct fungus *M. sympodialis*.

Tainosphaeria aseptata C.G. Lin & J.K. Liu, sp. nov. Fig. 12

Index Fungorum number: IF556713; Facesoffungi number: FoF06294

Etymology – Referring to the aseptate conidia.

Holotype – MFLU 19–0208

Saprobic on decaying wood. Asexual morph: *Colonies* on plant substrate effuse, aggregate, brown, with a hyaline, glistening conidial mass, hairy, short. *Conidiophores* mononematous, macronematous, erect, straight or flexuous, unbranched, septate, smooth, dark brown at the base, paler towards the apex, often with percurrent proliferations, cylindrical, 65–135 μm long, 3.5–5.5 μm wide at the base. *Conidiogenous cells* monophialidic, integrated, terminal, with conspicuous collarettes, pale brown to subhyaline, cylindrical, 28–49 μm long, 3.3–4.8 μm wide, narrowing to 1.2–2.8 μm just below the collarette. *Conidia* aggregated in slimy mass at the apex of the conidiophore, acrogenous, smooth, hyaline, aseptate, straight to curved, long fusiform, 15.7–23.3 × 3.8–4.5 μm (av. = 20.6 × 4.1 μm, n = 20). Sexual morph: Undetermined.

Material examined – CHINA, Guizhou Province, Qiannan Buyi Miao Autonomous Prefecture, Dushan County, Guizhou Zilinshan National Forest Park (Shengou District), unnamed road, on decaying wood, 6 July 2018, Chuan-Gen Lin, DS 1-31 (MFLU 19–0208, holotype; HKAS 105130, isotype), ex-type living culture GZCC 18–0044.

Notes – *Tainosphaeria aseptata* is similar to *Dictyochaeta heteroderae* (Morgan-Jones) Carris & Glawe and *D. lunulospora* (Hewings & J.L. Crane) Hol.-Jech. by having mononematous conidiophores without fertile lateral branches, lacking setae, and aseptate, curved conidia without setulae. However, the conidia of *D. heteroderae* (9–13 × 3–4 μm) and *D. lunulospora* (8.8–12.0 × 0.8–1.0 μm) are smaller than those of *T. aseptata* (15.7–23.3 × 3.8–4.5 μm) and they are also guttulate. The phylogenetic results (Fig. 1) showed that our isolate clustered together with species of *Tainosphaeria* and *Anacacumisporium*. *Tainosphaeria aseptata* (GZCC 18–0044) formed a separate clade and sister to *Anacacumisporium*. However, this clade is not stable. *Anacacumisporium* is characterized by pigmented, transversely septate, appendaged conidia and conidiophores that are brown, macronematous, mononematous and that bear one (or more) integrated phialides at the tip (Ma et al. 2016). Our fresh specimen does not fit with the generic concept of *Anacacumisporium*. In addition, *Tainosphaeria aseptata* is distinguishable from all known asexual morph *Tainosphaeria* species. Therefore, *T. aseptata* is introduced as a new species based on both morphology and phylogeny.

Figure 11 – *Multiguttulispora sympodialis* (MFLU 19–0218, holotype) a Host material. b Conidiophores on the host surface. c, d Conidiophores and conidiogenous cells. e, f Conidiogenous cells. g–m Conidia. Scale bars: c, d = 100 µm, e, f = 20 µm, g–m = 10 µm.

Figure 12 – *Tainosphaeria aseptata* (MFLU 19–0208, holotype) a Host material. b Conidiophores on the host surface. c Conidiophore and conidiogenous cell with conidium. d, e Conidiogenous cells. f–n Conidia. Scale bars: c = 20 µm, d–n = 10 µm.

Tainosphaeria monophialidica C.G. Lin & J.K. Liu, sp. nov. Fig. 13

Index Fungorum number: IF556714; Facesoffungi number: FoF06295

Etymology – Referring to the monophialidic conidiogenous cells.

Holotype – MFLU 19–0217

Saprobic on decaying wood. Asexual morph: *Colonies* on plant substrate effuse, aggregated, brown, as a hyaline, glistening conidial mass, hairy, short. *Conidiophores* mononematous, macronematous, erect, straight or slightly flexuous, unbranched, septate, smooth, pale brown at the base becoming subhyaline towards the apex, often with percurrent proliferations, sometimes reduced to conidiogenous cells, cylindrical, 33–120 µm long, 2.7–4.8 µm wide. *Conidiogenous cells* monophialidic, integrated, terminal, percurrent, with conspicuous collarettes, subhyaline, cylindrical, 20–46 µm long, 2.7–4.3 µm wide, narrowing to 1–2 µm just below the collarette.

Conidia aggregated in slimy mass at the apex of the conidiophores, acrogenous, smooth, hyaline, aseptate, straight to slightly curved, ellipsoidal, long fusiform, 14.0–19 × 2.3–3.5 µm (av. = 16.6 × 3.0 µm, n = 40), with 7–10 µm long hair-like appendage at both ends. **Sexual morph**: Undetermined.

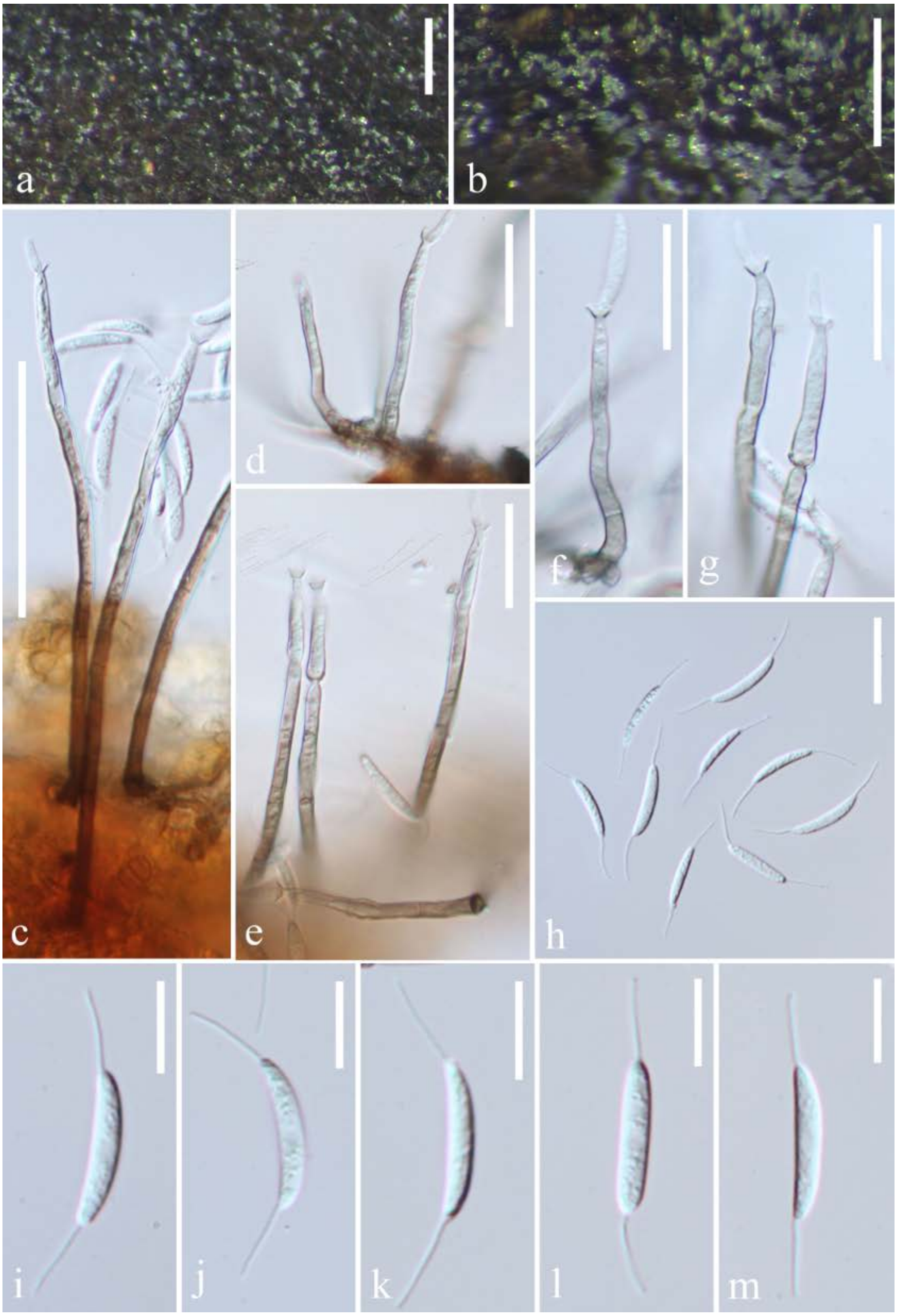

Figure 13 – *Tainosphaeria monophialidica* (MFLU 19–0217, holotype) a, b Conidiophores on the host surface. c–e Conidiophores and conidiogenous cells. f–g Conidiogenous cells. h–m Conidia. Scale bars: a, b = 200 µm, c = 10 µm, d–h = 20 µm, i–m = 10 µm.

Material examined – THAILAND, Nan, Pua District, Phu Kha, on decaying wood, 4 August 2017, Chuan-Gen Lin, NAN 1-3 (MFLU 19–0217, holotype), ex-type living culture MFLUCC 18–0146.

Notes – *Tainosphaeria monophialidica* is similar to *Dictyochaeta tumidospora* Kuthub. & Nawawi by lacking setae, having mononematous conidiophores, well-developed and funnel-shaped collarettes, and aseptate, ellipsoidal, not typically curved conidia with long setulae at both ends. However, *T. monophialidica* has smaller conidia and shorter conidiophores than *D. tumidiospora*, and its conidiogenous cells are monophialidic rather than polyphialidic as in *D. tumidiospora*. The phylogenetic results (Fig. 1) showed that our isolate clustered together with other *Tainosphaeria* species but can be recognized as a distinct lineage. *Tainosphaeria monophialidica* is sister to *T. jonesii* (GZCC 16–0053 and GZCC 16–0065), but differs from *T. jonesii* by its conidiophores sometimes reduced to conidiogenous cells. In addition, the conidia are guttulate in *T. jonesii*. Based on the morphology and phylogeny, *T. monophialidica* is introduced as a new species.

Discussion

Taxa in the Chaetosphaeriaceae family are common on wood in terrestrial habitats and some are fungicolous while others are frequently recorded on submerged wood in freshwater (Goh & Hyde 1996, Hyde & Goh 1998, Ho et al. 2002, Maharachchikumbura et al. 2016, Sun et al. 2019). Réblová et al. (1999) accepted seven sexual genera and 13 asexual genera. Molecular data has allowed a better taxonomic understanding of the asexual morph genera (Shenoy et al. 2007) and various genera have been placed in this family (Table 2). In the most recent treatment, 38 genera were accepted (Wijayawardene et al. 2017, 2018). However, this family needs a detailed study of both asexual and sexual morphs of the various genera and a comparison with similar genera in other families. Several new Chaetosphaeriaceae species have been introduced in recent studies and updated phylogenetic trees have been provided (e.g. Li et al. 2016, Liu et al. 2016, Tibpromma et al. 2018, Yang et al. 2018, Hyde et al. 2019). Here we discuss some of the genera assigned to the Chaetosphaeriaceae.

Chaetosphaeria was introduced by Tulasne & Tulasne (1863) for *C. innumera* Berk. & Broome ex Tul. & C. Tul. The asexual morphs of this genus are diverse. Seifert et al. (2011) listed 19 genera that are linked to *Chaetosphaeria*, viz., *Cacumisporium*, *Catenularia* Grove, *Chalara* (Corda) Rabenh., *Chloridium*, *Codinaea* Maire, *Cryptophiale*, *Craspedodidymum* Hol.-Jech., *Custingophora* Stolk, Hennebert & Klopotek, *Dictyochaeta*, *Exserohilum* K.J. Leonard & Suggs, *Fusichalara* S. Hughes & Nag Raj, *Gonytrichum* Nees & T. Nees, *Kylindria* DiCosmo, S.M. Berch & W.B. Kendr., *Menispora* Pers., *Menisporopsis* S. Hughes, *Phaeostalagmus* W. Gams, *Phialophora* Medlar, *Sporoschisma* Berk. & Broome and *Zanclospora* S. Hughes & W.B. Kendr. In this study, the phylogenetic results (Fig. 1) also confirmed some of these connections, e.g. *Chloridium*, *Codinaea*, *Dictyochaeta*, *Exserohilum*, *Gonytrichum* and *Menispora*.

The genera *Codinaea*, *Codinaeopsis*, *Dictyochaeta* and *Dictyochaetopsis* are problematic. A brief historical review of these four genera was provided by Li et al. (2012) and Réblová (2000). In this study, we treat *Codinaea*, *Dictyochaeta* and *Dictyochaetopsis* as distinct genera and accept the treatment of Whitton et al. (2000) to synonymize *Codinaeopsis* under *Dictyochaetopsis* to prevent ongoing confusion until a monographic study on these genera is performed in the future.

This study involves a phylogenetic analysis based on combined SSU, ITS and LSU sequence data to assess taxonomy of *Kionochaeta* (Fig. 2). Phylogenys showed that *Kionochaeta* is polyphyletic and species are phylogenetically located in two groups (*Kionochaeta 1* and *Kionochaeta 2*) (Fig. 2). A synopsis of *Kionochaeta* species is provided here (Table 3).

The status of *Menisporopsis* within Chaetosphaeriaceae was confirmed by Liu et al. (2016). Tibpromma et al. (2018) introduced the new species *M. pandanicola* and we introduce two new species. Twelve species are accepted within *Menisporopsis*. A synopsis of *Menisporopsis* species is provided here (Table 4).

Ellisembia Subram. was synonymized under *Sporidesmium* Link by Su et al. (2016). The main difference between these two genera is that the conidia of *Ellisembia* are distoseptate, while those of *Sporidesmium* are euseptate. However, Su et al. (2016) suggested that this difference was not significant. We included *E. brachypus* (HKUCC 10555) in our phylogenetic analysis, and it clustered within Chaetosphaeriaceae (Fig. 1). Hyde et al. (2019) introduced a new species *Ellisembia aurea* Réblová & J. Fourn. and placed it within Chaetosphaeriaceae. Luo et al. (pers. comm.) suggested to use *Sporidesmium brachypus* rather than *Ellisembia brachypus*. Shenoy et al. (2006) confirmed that *Sporidesmium* is polyphyletic based on combined LSU and RPB2 sequence data.

The placements of some genera within Chaetosphaeriaceae are discussed here and some of them are re-assigned. Samuels et al. (1997) introduced the genus *Ascocodinaea* with a *Codinaea* asexual morph and placed this genus within family Lasiosphaeriaceae. Réblová et al. (1999) placed *Ascocodinaea* within Chaetosphaeriaceae based on the asci, ascospores and perithecial morphology and the *Dictyochaeta* asexual morph. However, this treatment has not been universally accepted (Huhndorf et al. 2004, Lumbsch & Huhndorf 2007b, 2010, Wijayawardene et al. 2012, 2017, 2018, Maharachchikumbura et al. 2015, 2016). In our phylogenetic analysis (Fig. 1), the strain (GJS 95-184) of *A. stereicola* clustered outside of the Chaetosphaeriaceae (data not shown), and we exclude *Ascocodinaea* from the family.

Bahusutrabeeja was introduced by Subramanian & Bhat (1977), and typified by *B. dwaya* Subram. & Bhat, but its taxonomic placement was uncertain. Shenoy et al. (2010) placed it within family Botryosphaeriaceae (Botryosphaeriales, Dothideomycetes) based on phylogenetic analysis of LSU sequence data of a fresh specimen of *B. dwaya* from India. This treatment was accepted by many authors (Hyde et al. 2011, Seifert et al. 2011, Wijayawardene et al. 2012, Slippers et al. 2017, Burgess et al. 2019). However, in the present study, LSU and ITS sequence data analysis of *B. dwaya* ex-type strain (CBS 261.77) shows that it is phylogenetically related to *Dictyochaeta* spp. in Chaetosphaeriaceae (Fig. 1). *Bahusutrabeeja* is similar to some genera (*Codinaea*, *Dictyochaeta*, *Dinemasporium*, *Menispora*, *Thozetella*) in Chaetosphaeriaceae by having phialidic conidiogenous cells and aseptate conidia with slender appendages (Subramanian & Bhat 1977, Réblová et al. 1999, Seifert et al. 2011, Li et al. 2014, Gao et al. 2015). We suggest to assign the genus *Bahusutrabeeja* to the family Chaetosphaeriaceae based on morphology and phylogenetic analysis.

Calvolachnella Marinc., T.A. Duong & M.J. Wingf. was introduced by Hernández-Restrepo et al. (2016) to accommodate *C. guaviyunis* (Marinc., T.A. Duong, M.J. Wingf. & C.A. Perez) Marinc., T.A. Duong, M.J. Wingf., which was previously known as *Pseudolachnella guaviyunis*. This genus is characterized by having acervular conidiomata, absence of setae in conidiomata, pale brown, septate and branched conidiophores, phialidic conidiogenous cells that produce fusiform, hyaline to pale brown conidia (Hernández-Restrepo et al. 2016). Hernández-Restrepo et al. (2016) placed this genus in Chaetosphaeriales genera *incertae sedis*. Our phylogenetic results show that the ex-type strain of *C. guaviyunis* forms a separate clade and sister to *Dictyochaeta* group within the Chaetosphaeriaceae (Fig. 1). Therefore, we assign *Calvolachnella* within the family Chaetosphaeriaceae.

The genus *Conicomyces* was established by Sinclair et al. (1983) to accommodate a distinctive synnematous hyphomycete. Hashimoto et al. (2015) suggested to place this genus within Chaetosphaeriaceae based on its morphological similarity with *Pseudolachnea* and its relatives. The first phylogenetic analysis of the genus *Conicomyces* was performed by Liu et al. (2015) and confirmed its placement within Chaetosphaeriaceae.

The genus *Exserticlava* was established by Hughes (1978) and has a *Chaetosphaeria* sexual morph (Matsushima 1985, Réblová & Seifert 2003, Fernández & Huhndorf 2005, Seifert et al. 2011). Unpublished sequence data of *E. vasiformis* (Matsush.) S. Hughes (TAMA 450) was included in our analysis, and it showed close phylogenetic relationship with *Chaetosphaeria capitata* Sivan. & H.S. Chang (SMH 3239) with high support value (99% MLBS /0.95 PP) (Fig. 1). *Exserticlava vasiformis* was found on the holotype specimen of *C. capitata* but without a common mycelial link between them (Sivanesan & Chang 1995). Fernández & Huhndorf (2005) confirmed the sexual-asexual connection between *C. capitata* and *E. vasiformis* by culturing ascospores *in vitro* We confirm this connection by phylogenetic analysis (Fig. 1).

Table 2 Genera accepted within family Chaetosphaeriaceae by various authors.

Réblová et al. (1999)[a]	Lumbsch & Huhndorf (2010)[a]	Seifert et al. (2011)[b]	Maharachchikumbura et al. (2015)	Maharachchikumbura et al. (2016)	Wijayawardene et al. (2018)
Ascocodinaea	*Ascochalara*	*Cacumisporium*	*Ascochalara*	*Ascochalara*	*Adautomilanezia*
Chaetosphaeria	*Australiasca*	*Catenularia*	*Brunneodinemasporium*	*Brunneodinemasporium*	*Anacacumisporium*
Melanochaeta	*Chaetosphaeria*	*Chloridium*	*Catenularia*	*Catenularia*	*Ascochalara*
Melanopsammella	*=Paragaeumannomyces*	*Codinaea*	*Chaetosphaeria*	*Chaetosphaeria*	*Brunneodinemasporium*
Porosphaerella	*Lecythothecium*	*Craspedodidymum*	*Chloridium*	*Chloridium*	*Catenularia*
Porosphaerellopsis	*Melanochaet*	*Cryptophiale*	*Codinaea*	*Codinaea*	*Chaetosphaeria*
Striatosphaeria	*Melanopsammella*	*Custingophora*	*Codinaeopsis*	*Codinaeopsis*	*Chloridium*
	Porosphaerella	*Dictyochaeta*	*Craspedodidymum*	*Craspedodidymum*	*Codinaea*
	Striatosphaeria	*Exserticlava*	*Cryptophiale*	*Cryptophiale*	*Conicomyces*
	Tainosphaeri	*Fusichalara*	*Dendrophoma*	*Dendrophoma*	*Craspedodidymum*
	Zignoëlla	*Gonytrichum*	*Dictyochaeta*	*Dictyochaeta*	*Cryptophiale*
		Hyphopolynema	*Dictyochaetopsis*	*Dictyochaetopsis*	*Dendrophoma*
		Janetia	*Dinemasporium*	*Dinemasporium*	*Dictyochaeta*
		Kylindria	*Exserticlava*	*Exserticlava*	*Dinemasporium*
		Menispora	*Gonytrichum*	*Gonytrichum*	*Eucalyptostroma*
		Menisporopsis	*Hemicorynespora*	*Hemicorynespora*	*Exserticlava*
		Paliphora	*Infundibulomyces*	*Infundibulomyces*	*Gonytrichum*
		Phaeostalagmus	*Kionochaeta*	*Kionochaeta*	*Hemicorynespora*
		Pleurothecium	*Lecythothecium*	*Lecythothecium*	*Infundibulomyces*
		Rattania	*Melanopsammella*	*Melanopsammella*	*Kionochaeta*
		Sporoschisma	*Menispora*	*Menispora*	*Lecythothecium*
		Sporoschismopsis	*Miyoshiella*	*Miyoshiella*	*Melanopsammella*
		Thozetella	*Phaeostalagmus*	*Neopseudolachnella*	*Menispora*
		Zanclospora	*Phialogeniculata*	*Phaeostalagmus*	*Menisporopsis*
			Pseudobotrytis	*Phialogeniculata*	*Miyoshiella*
			Pseudolachnea	*Pseudobotrytis*	*Neopseudolachnella*
			Pyrigemmula	*Pseudodinemasporium*	*Pseudobotrytis*
			Rattania	*Pseudolachnea*	*Pseudodinemasporium*
			Sporoschisma	*Pyrigemmula*	*Pseudolachnea*
			= Melanochaeta	*Rattania*	*Pseudolachnella*
			Striatosphaeria	*Sporoschisma*	*Pyrigemmula*
			Tainosphaeria	*= Melanochaeta*	*Rattania*
			Thozetella	*Striatosphaeria*	*Sporoschisma*
			Umbrinosphaeria	*Tainosphaeria*	*= Melanochaeta*
			Zanclospora	*Thozetella*	*Striatosphaeria*
			Zignoëlla	*Umbrinosphaeria*	*Tainosphaeria*
				Zanclospora	*Thozetella*
				Zignoëlla	*Umbrinosphaeria*
					Zanclospora

[a] Only included the sexual genera, [b] Only included the hyphomycetous genera.

Table 3 Synopsis of *Kionochaeta* species.

	Conidiophores	**Fertile branches**	**Conidiogenous cells**	**Conidia**
K. aristata	Simple, subulate, smooth, 240–320µm high	Borne sub-medianly on the conidiophore	Lageniform, with a conspicuous, cup-shaped collarette at the apex.	Cylindrical to broadly fusiform, slightly curved, with a setula 6.0–8.5µm long at each end, hyaline, smooth, non-septate, 2–4 guttulate, 10–12(–14) µm long, 1.5–2.0µm wide.
K. australiensis	Setiform, smooth, up to 9-septate, subulate, 200–300 µm long, unbranched or occasionally with a single lateral setiform branch arising from the middle of the central element; apex of central setiform element and lateral setiform branches fertile;	Median to submedian on the conidiophore	Ampulliform or lageniform, subhyaline to hyaline, monoblastic	Ellipsoidal to fusiform, hyaline, smooth, 4–5 × 1–1.5µm
K. castaneae	Setiform, dark brown, smooth, sometimes branched above the fertile region, sometimes with secondly fertile region at the apex of the main axis, 265–320 µm long, 7–9.5 µm wide at the base; when branched, terminal branches dark brown, 45–105 µm long, 2.5–5.5 µm wide at the base, acutely pointed above	Middle part of the conidiophores, rarely with the secondarily fertile region at the apex of the main axis	Narrowly ellipsoid, pale brown	Hyaline, smooth, lunate, cylindrical, aseptate, 5.1–6.5 × 1.2–1.8 µm
K. filamentosa	Unbranched, smooth, multiseptate, cylindrical, 800–1200 µm long	Terminal	Monoblastic, ampulliform or lageniform, hyaline to pale brown	Hyaline, narrowly ellipsoidal to fusiform, 0- or 1-septate, smooth, 10–16 × 1.5–3 µm (av. = 14 × 2 µm, n = 25)
K. ivoriensis	Setiform, subulate, smooth, 70–150µm high, 4.5–5.5µm wide, 12.5–14.0µm wide at the base, up to 11-septate, unbranched	Terminal and/or situated just below the middle of the main axis	Ampulliform to short lageniform, with an indistinct collarette.	Aseptate, cylindrical, 3.4–5.0 × 1.5–2.5 µm
K. keniensis	Setiform, subulate, smooth, 200–260µm high, up to 8-septate, branched	Just below the middle of the conidiophores	Cylindrical, with an indistinct collarette	Aseptate, setulate, cylindrical to broadly fusiform, slightly curved, (11–)12–16 µm long (excluding the setulae), 1.5–2.5 µm wide
K. malaysiana	Simple, subulate, smooth, 3–4-septate, 200–250 µm high	Borne sub-medianly on the conidiophore at two loci	Obpyriform, with an indistinct collarette at the apex	Narrowly clavate to fusiform, slightly curved, hyaline, smooth, non-septate, (11–)14–16(–17) µm long, 1.0(–1.5) µm wide
K. microspora	Setiform, smooth, unbranched, septate, dark brown at the base, paler towards the apex, cylindrical, swollen at the base, 40–305 µm long, 3.3–10.5 µm wide at the base	At the apex of the conidiophores, rarely at the middle of the conidiophores with a secondary fertile region at the conidiophore apex	Narrowly ellipsoid, ampulliform, subhyaline to pale brown	Hyaline, smooth, lunate, cylindrical or clavate, aseptate, 4.2–6.4 × 1.5–2.3 µm

Table 3 Continued.

	Conidiophores	**Fertile branches**	**Conidiogenous cells**	**Conidia**
K. nanophora	Setiform element up to 10-septate, subulate, up to 320 µm tall, occasionally fertile at the apex; conidiophores smooth, up to 2–4 septate, up to 160 µm tall	At the apex of the shorter conidiophore	Ampulliform to lageniform with an indistinct collarette at the apex.	Fusiform, hyaline, smooth, non-septate, 5–7 × 0.8–1.2 µm
K. pini	Simple, verrucose, up to 10-septate, subulate, 120–180µm tall	Situated in middle of conidiophore	Ampulliform to lageniform or cylindrical; apical collarettes inconspicuous.	Fusiform to cylindrical, hyaline, smooth, aseptate, 10–12 × 1.5–2 µm.
K. pleomorpha	Simple, up to 7-septate, 50–100 µm long, cylindrical to subcylindrical	At the apex of conidiophores	Lageniform or globose with short narrow neck, hyaline to subhyaline	Small, hyaline, bacillar, one-celled, smooth, slimy, 4–5 × 1.5 µm
K. pughii	Smooth, up to 16-septate, subulate, central element up to 360 µm high, branched; tips of central element and lateral branches fertile	Just below the middle of conidiophores	Ampulliform to lageniform, with an indistinct collarette at the apex.	Fusiform, hyaline, smooth, non-septate, 5.5–7.0 × 1–1.2 µm
K. ramifera	Setiform, subulate, smooth or verruculose, up to 300 µm high, up to 16-septate	Just below the middle of conidiophores	Ampulliform to lageniform or cylindrical, with an indistinct collarette.	Aseptate, narrowly clavate, slightly curved, (5–)6–10(–12) × 1.0–1.5(–2.0) µm
K. spissa	Simple, subulate, smooth, 170–260 µm high	Borne sub-medianly on the conidiophore at a single locus	Lageniform, with an indistinct collarette at the apex	Narrowly clavate to fusiform, slightly curved, hyaline, smooth, non-septate, 4.5–6.5(–8.0) × 1.0–1.5 µm
K. virtuosa	Setiform, subulate, smooth, 225–300 µm high, up to 17-septate, unbranched	Situated just below the middle of the main axis	Lageniform to cylindrical, with a prominent collarette.	1-septate, falcate, 20.5–34.5 × 2.0–2.5 µm

Table 4 Synopsis of *Menisporopsis* species.

	Setae	**Synnema width**	**Conidiophores**	**Conidia**
M. anisospora	200–425 × 10–12 µm, 7–15-septate	60–80 µm	Brown to dark brown, 300–500 × 2–3 µm, single phialides 2.5–4 µm wide	Allantoid, fusiform, subsigmoid, sublunate, vermiform to irregular, aseptate, hyaline, 17–30 × 2–6 µm, 1 apical setula, 4–11 µm; 1 basal setula, 3–10 µm; 1–2(3) lateral setula, 7–10 µm
M. breviseta	97–189 µm long, 2.7–5.4 µm thick	6.5–12 µm wide	Up to 182 µm long	Curved, cylindrical or fusiform, aseptate, hyaline,14.2–24.3 × 2.4–3.6 µm, with one or two setulae at each end, setulae 4–9 µm long

Table 4 Continued.

	Setae	**Synnema width**	**Conidiophores**	**Conidia**
M. dushanensis	207–455 µm long	8.5–22.5 µm wide	Up to 147 µm long	Curved, cylindrical or fusiform, aseptate, hyaline, 14.0–20.6 × 2.7–4.2 µm; with one or two setulae at each end, setulae 3–11 µm long
M. kobensis	250–275 µm long, 7.5–8.8 µm, septate	-	Reduced to conidiogenous cells, 75–90 µm long, below 2.5–3µm wide, up slightly to 3–3.5µm inflated, beneath the light brown, upper colorless, single phialides	0(–1)-septate, (19–)22.5–30(–32) × 4.5 µm, 1 setula at each end, 6–10 µm long
M. multisetulata	300–500 × 6–10 µm, 10–15-septate	22–40 µm	Brown, 180–220 × 1–2 µm wide, with 3–4 µm wide single phialides	Allantoid, 0-septate, 12–18 × 2.5–4 µm, 2(3) and 3(4) setulae on each end, long one 7–10 µm, short one 2–4 µm
M. novae-zelandiae	220–820 × 7–10 µm, 17-septate	14–21 µm	Pale brown, single phialides 2.8–4.3 µm wide	Curved, 1-septate, 15–18 × 2.4–3.1 µm, 1 setula at distal end and to one side of the basal scar, 4.3–5.7 µm long
*M. pandanicola**	344–375 × 7–10.5 µm, multi-septate	14.5–23 µm	Pale brown	Lunate, conical at both ends, aseptate, guttulate, hyaline,17–22 × 2–3 µm, (1–)2 setula at each end, 4–12 µm long.
M. pirozynskii	300–500 × 5.5–6 µm, 10–15-septate	15–27 µm	Brown, 75–80 × 1.5–2 µm wide, with 2–2.5 µm wide single phialides	Allantoid, 0-septate, 16–20.5 × 2–3.5 µm, 2 setulae at each end, terminal one 7–10 µm, subterminal one 2.5–8 µm
M. pleiosetosa	100–300 × 2–4 µm, 10–15-septate	30–40 µm	Brown, 250 × 3–4 µm wide, with 1–2 µm wide single phialide	Ellipsoidal, 0-septate, 12–18 × 4–5 µm, 2–4 setulae around the conidial base and 1 at the apex, up to 6 µm long
M. profusa	150–250 × 4.5–6 µm, 10-15-septate	10 µm	Gold brown, polyphialidic, phialides 3.5–5µm wide	Curved, 0-septate, 12–15 × 2–2.5 µm, 1 setula at each end, 4.5–6 µm long
M. theobromae	200–420 × 5–7 µm, 21-septate	ca. 10 µm	Brown, monophialidic, phialides 2.5–3 µm wide	0-septate, 14–18 × 2–3 µm, 1 setula at each end, up to 10 µm long
M. trisetulosa	250–460 × 5.5–7 µm, about 20-septate	-	120–175 × 2–4µm, with 3–3.5 µm wide single phialides	Allantoid, aseptate, 12–20 × 2 µm, hyaline, 1 setula at the apex and 2 at the base, about 10 µm long

* Tibpromma et al. (2018) gave a measurement for conidiophores within the original description, however, based on their photo plate, this measurement is wrong, they may have muddled up conidiophores with synnema.

Melanopsammella Höhn. was introduced by Höhnel (1919) to accommodate *M. inaequalis* (Grove) Höhn. (now known as *Chaetosphaeria inaequalis* (Grove) W. Gams & Hol.-Jech.). All *Melanopsammella* species have been synonymized under the genera *Chaetosphaeria* and *Chloridium* (Réblová et al. 2016).

Sivanesan & Chang (1997) reported a new species *Chaetosphaeria ampulliformis*, and linked it to *Hemicorynespora multiseptata* Sivan. & H.S. Chang since the latter species was collected on the perithecial neck of *C. ampulliformis*. However, this *Chaetosphaeria* species and the asexual connection was uncertain and rejected by Réblová (1999) who excluded it from Chaetosphaeriaceae (Seifert et al. 2011). *Hemicorynespora* has been placed within Chaetosphaeriaceae in some studies (Hyde et al. 2011, Maharachchikumbura et al. 2015, 2016, Wijayawardene et al. 2017, 2018). However, no sequence data is available for *Hemicorynespora*. We follow the treatment by Réblová (1999) and Seifert et al. (2011) and exclude *Hemicorynespora* from Chaetosphaeriaceae.

Shenoy et al. (2010) performed the first phylogenetic analysis for the genus *Paliphora* based on LSU sequence data, and confirmed its placement within Chaetosphaeriaceae. This treatment was accepted by Seifert et al. (2011). However, Maharachchikumbura et al. (2015) and Wijayawardene et al. (2017, 2018) excluded it from Chaetosphaeriaceae, and placed *Paliphora* as Ascomycota genera *incertae sedis*. In this study, *Paliphora intermedia* strains (CBS 199.95 and CBS 896.97) formed a separate clade and sister to the *Eucalyptostroma* clade (Fig. 1), confirming the results of Crous et al. (2016, 2018). *Eucalyptostroma* was introduced by Crous et al. (2016) and is characterized by sporodochial, cupulate, orange-yellow conidiomata, branched and pale orange-brown conidiophores with penicillate and orange-brown conidiogenous apparatus, and producing aseptate, hyaline, smooth and ellipsoid conidia. We follow the treatment of Shenoy et al. (2010) as *Paliphora* has a close phylogenetic relationship with *Eucalyptostroma* within Chaetosphaeriaceae.

The monotypic genus *Paragaeumannomyces* Matsush. was established by Matsushima (2001) to accommodate *P. sphaerocellularis* Matsush. It was treated as a synonym of *Chaetosphaeria* since *P. sphaerocellularis* is identical to *Chaetosphaeria raciborskii* (Penz. & Sacc.) F.A. Fernández & Huhndorf (Lumbsch & Huhndorf 2007a, b).

Phialogeniculata Matsush., introduced by Kobayasi (1971), was treated as a synonym of *Dictyochaeta* by Kuthubutheen & Nawawi (1991a). However, this treatment was not accepted in some later studies (Matsushima 1993, Hyde et al. 1998, Seifert et al. 2011, Maharachchikumbura et al. 2015, 2016). Hyde et al. (1998) differentiated *Phialogeniculata* from *Dictyochaeta* as it lacked setae, proliferating sympodially, and possessing geniculate conidiophores, and obclavate, septate, non-setulate conidia. We maintain both genera and place *Phialogeniculata* within the family Chaetosphaeriaceae.

Réblová et al. (1999) accepted the sexual genus *Porosphaerellopsis* (with *Porosphaerellopsis* asexual morph) within family Chaetosphaeriaceae, and treated *Porosphaeria* as a synonymy of *Porosphaerellopsis*. Réblová (2014) synonymized *Porosphaeria* and *Porosphaerellopsis* under *Sporoschismopsis*, and positioned it in the Reticulascaceae (Glomerellales, Sordariomycetes) based on multi-gene phylogenetic analysis.

Réblová (1999) introduced *Umbrinosphaeria* Réblová to accommodate *U. caesariata* (Clinton & Peck) Réblová with a *Sporidesmium hormiscioides* asexual morph. However, Subramanian (1992) had established the genus *Stanjehughesia* and transferred *Sporidesmium hormiscioides* to *Stanjehughesia*. Réblová et al. (2016) suggested to use *Stanjehughesia* rather than *Umbrinosphaeria*. Meanwhile, several other suggestions were provided: (1) using *Chloridium* rather than *Gonytrichum* or *Melanopsammella*; (2) using *Menispora* rather than *Zignoëlla*; (3) using *Menisporopsis* rather than *Menisporopascus*; (4) using *Sporoschisma* rather than *Melanochaeta* (Réblová et al. 2016).

Yang et al. (2018) studied five genera of Sordariomycetes, viz., *Cryptophiale*, *Cryptophialoidea*, *Nawawia*, *Neonawawia* and *Phialosporostilbe*. They confirmed the placement of *Cryptophiale*, *Cryptophialoidea*, *Nawawia* and *Phialosporostilbe* within Chaetosphaeriaceae based on morphological characters and phylogenetic analyses of combined LSU and ITS sequence data. However, the placements of *Neonawawia* in family- and order-level are uncertain.

In conclusion, we accept 49 genera (including three uncertain genera) within family Chaetosphaeriaceae and these are listed below, together with generic synonyms (^{H}=hyphomycetes, ^{C}=coelomycetes, ^{S}=sexual genus, ?= uncertain classification):

Chaetosphaeriaceae Réblová, M.E. Barr & Samuels 1999

- *Adautomilanezia* Gusmão, S.S. Silva, Fiuza, L.A. Costa & T.A.B. Santos 2016^{H}
- *Anacacumisporium* Y.R. Ma & X.G. Zhang 2016^{H}
- *Ascochalara* Réblová 1999^{S}
- *Bahusutrabeeja* Subram. & Bhat 1977^{H}
- *Brunneodinemasporium* Crous & R.F. Castañeda 2012^{C}
- *Cacumisporium* Preuss 1851^{H}
- *Calvolachnella* Marinc., T.A. Duong & M.J. Wingf. 2016^{C}
- *Catenularia* Grove 1886^{H}
  - = *Haplochalara* Linder 1933
  - = *Psiloniella* Costantin 1888
- *Chaetosphaeria* Tul. & C. Tul. 1863^{S}
  - = *Aposphaeriella* Died. 1912
  - = *Chaetolentomita* Maubl. 1915
  - = *Didymopsamma* Petr. 1925
  - = *Lentomita* Niessl 1876
  - = *Melanopsammina* Höhn. 1919
  - = *Miyoshia* Kawam. 1907
  - = *Miyoshiella* Kawam. 1929
  - = *Montemartinia* Curzi 1927
  - = *Paragaeumannomyces* Matsush. 2003
  - = *Trichocollonema* Höhn. 1902
  - = *Urnularia* P. Karst. 1866
- ?*Chalarodes* McKenzie 1991^{H}
- *Chloridium* Link 1809^{H}
  - = *Bisporomyces* J.F.H. Beyma 1940
  - = *Cirrhomyces* Höhn. 1903
  - = *Gonatotrichum* Corda 1842
  - = *Gongromeriza* Preuss 1851
  - = *Gonytrichum* Nees & T. Nees 1818
  - = *Melanopsammella* Höhn. 1920
  - = *Mesobotrys* Sacc. 1880
  - = *Monostachys* G. Arnaud 1954
  - = *Piminella* G. Arnaud 1954
  - = *Psilobotrys* Sacc. 1879
  - = *Sphaeromycetella* G. Arnaud 1954
- *Codinaea* Maire 1937^{H}
- *Conicomyces* R.C. Sinclair, Eicker & Morgan-Jones 1983^{H}
- *Craspedodidymum* Hol.-Jech. 1972^{H}
- *Cryptophiale* Piroz. 1968^{H}
- *Cryptophialoidea* Kuthub. & Nawawi 1987^{H}
- *Dendrophoma* Sacc. 1880^{C}
- *Dictyochaeta* Speg. 1923^{H}
  - = *Menisporella* Agnihothr. 1962
- *Dictyochaetopsis* Aramb. & Cabello 1990^{H}
  - = *Codinaeopsis* Morgan-Jones 1976

Dinemasporium Lév. 1846[C]
Eucalyptostroma Crous & M.J. Wingf. 2016[H]
Exserticlava S. Hughes 1978[H]
?*Hyphopolynema* Nag Raj 1977[H]
Infundibulomyces Plaingam, Somrith. & E.B.G. Jones 2003[C]
Kionochaeta P.M. Kirk & B. Sutton 1986[H]
Lecythothecium Réblová & Winka 2001[S]
Menispora Pers. 1822[H]
  = *Camptosporium* Link 1818
  = *Ciliofusa* Clem. & Shear 1931
  = *Ciliofusarium* Rostr. 1892
  = *Eriomene* (Sacc.) Clem. & Shear 1931
  = *Eriomenella* Peyronel 1918
  = *Erionema* Maire 1906
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  = *Menisporopascus* Matsush. 2003
Morrisiella Saikia & A.K. Sarbhoy 1985[H]
Multiguttulispora C.G. Lin & J.K. Liu[H]
Nawawia Marvanová 1980[H]
?Neonawawia J. Yang, K.D. Hyde & J.K. Liu 2018[H]
Neopseudolachnella A. Hashim. & Kaz. Tanaka 2015[C]
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Phialogeniculata Matsush. 1971[H]
Phialosporostilbe Mercado & J. Mena 1985[H]
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Pseudolachnea Ranoj. 1910[C]
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Pseudolachnella Teng 1936[C]
Pyrigemmula D. Magyar & Shoemaker 2011[H]
Rattania Prabhug. & Bhat 2009[H]
Sporoschisma Berk. & Broome 1847[H]
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Stanjehughesia Subram. 1992[H]
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Striatosphaeria Samuels & E. Müll. 1979[S]
Tainosphaeria F.A. Fernández & Huhndorf 2005[S]
Thozetella Kuntze 1891[H]
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Verhulstia Hern.-Restr. 2017[H]
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