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ARTICLE

New taxa of Xylariales from Karst Ecosystems in Southwestern China

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Abstract

The order Xylariales consists of fungi that are widely distributed and commonly found on decaying wood, fallen branches, and trunks. Despite the taxonomic and morphological challenges in accurately identifying species within this group, interest in *Xylariales* has increased in recent years, largely due to their ecological significance and and species diversity. Over the course of this study, dead branches of several plant hosts with fungal fruiting bodies were collected from Guizhou, Yunnan and Guangxi China. The collected specimens were described morphologically, and a multigene phylogeny was constructed based on internal transcribed spacer (ITS), 28S large subunit rDNA (LSU), RNA polymerase II second largest subunit (*rpb2*), and *β-tubulin* (*TUB2*), including a significant number of representative species of the main lineages in the Xylariales. These analyses led to the introduction of 24 new species: *Amphibambusa cerosissimae*, *Am. subbambusicola*, *Anthostomella guangxiensis*, *Arecophila guizhouensis*, *Ar. subguizhouensis*, *Biscogniauxia betulae*, *Cainia daweishanensis*, *Ca. shilihetanensis*, *Daldinia guizhouensis*, *Digitodochium damingshanense*, *D. xishuangbannense*, *D. zhangjiajiense*, *Fasciatispora guizhouensis*, *Helicogermslita nulliclypeata*, *Magnostiolata shiwandashanensis*, *Minuticlypeus yunnanensis*, *Nemania huangjingensis*, *Spirodecospora anshunensis*, *S. daweishanensis*, *S. jichuanenii*, *S. jinghongensis*, *Vamsapriya clypeata*, *V. damingshanensis*, and

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V. shiwandashanensis. Additionally, we report the occurrence of three new records in China, which includes *Amphibambusa bambusicola*, *Biscogniauxia petrensis*, and *Fasciatispora cocoes*. A new combination *Magnostiolata guizhouensis* (= *Anthostomella guizhouensis*) is proposed based on comparative morphological analysis and phylogenetic evidence. Morphologically similar species and phylogenetically close taxa are compared and discussed. Comprehensive morphological descriptions, illustrations, and a phylogenetic tree to show the placement of new taxa are provided.

Keywords – *Anthostomella*-like fungi – Ascomycetes – bambusicolous fungi – fungal systematics – new species

INTRODUCTION

The order Xylariales was originally established by Nannfeldt (1932) to accommodate Xylariaceae (type family), Diatrypaceae, Hypocreaceae, Hyponectriaceae, Lasiosphaeriaceae and Polystigmataceae. Over time, advancements in molecular technology have led to an expansion and refinement of the classification system for *Xylariales*. Eriksson & Winka (1997) introduced Xylariomycetidae, consisting of a single order, Xylariales, based on both morphology and SSU phylogeny. Smith et al. (2003) conducted the first comprehensive multigene analysis to elucidate familial relationships within Xylariales, accepting in total seven families. Kirk et al. (2008), confirmed Xylariales as the sole order within Xylariomycetidae, with nine families: Amphisphaeriaceae, Cainiaceae, Clypeosphaeriaceae, Diatrypaceae, Graphostromataceae, Hyponectriaceae, Iodosphaeriaceae, Myelospermataceae, and Xylariaceae. Later Senanayake et al. (2015) revised the Xylariales to include twelve families: Apiosporaceae, Cainiaceae, Coniocessiaceae, Diatrypaceae, Graphostromataceae, Hyponectriaceae, Iodosphaeriaceae, Lopadostomataceae, Melogrammataceae, Pseudomassariaceae, Vialaeaceae, and Xylariaceae.

Maharachchikumbura et al. (2016) provided a description of Xylariales based on morphology and phylogeny (based on a combined dataset of LSU-SSU-*TEF-1α*-*rpb2* loci). Furthermore, Maharachchikumbura et al. (2016) treated Amphisphaeriales D. Hawksw. & O.E. Erikss. as a synonym of Xylariales and recognized 22 families within the order. However, Samarakoon et al. (2016) and Hongsanan et al. (2017) resurrected Amphisphaeriales and kept both as separate orders within Xylariomycetidae. In a comprehensive overview of Sordariomycetes, Hyde et al. (2020b) provided a detailed outline of Xylariales, recognizing 160 genera distributed among 15 families; Barrmaeliaceae, Cainiaceae, Clypeosphaeriaceae, Coniocessiaceae, Diatrypaceae, Graphostromataceae, Hansfordiaceae, Hypoxylaceae, Induratiaceae, Lopadostomataceae, Microdochiaceae, Polystigmataceae, Requienellaceae, Xylariaceae, and Zygosporiaceae. In a more recent investigation, Samarakoon et al. (2022) revisited the Xylariomycetidae, employing morphology, ITS, LSU, *rpb2*, *TUB2*, and *TEF-1α* phylogenies, divergence time estimation, and ancestral character state reconstruction. As a result of their comprehensive analysis, they accepted 16 families within Xylariales.

Sugita et al. (2022, 2024) introduced two novel families: Spirodecosporaceae and Pallidoperidiaceae. Their work, based on a comprehensive analysis incorporating combined ITS (excluding ITS1), LSU, *rpb2*, and *TEF-1α* phylogeny, revealed the presence of a total of 39 families within the Xylariales. However, their research primarily focused on the description and characterization of the newly introduced families, rather than on elucidating familial relationships within the order Xylariales.

Hyde et al. (2020b, 2023) and Wijayawardene et al. (2022) listed 52 genera under Xylariales as incertae sedis due to the absence of molecular data and uncertainty regarding both teleomorph and anamorph morphologies, with many of these genera represented by only single collections. Samarakoon et al. (2022), however, recognized 57 genera in Xylariales incertae sedis due to a lack of molecular data, uncertainty in teleomorph and anamorph morphologies, and most genera having only single collections.

The stromatic characters play a major role in the generic and family-level classifications of xylarialean taxa (Eriksson & Winka 1997, Samarakoon et al. 2022). Recent investigations using

molecular data have revealed the polyphyletic nature of poorly developed stromata across Xylariales complicating the understanding of their taxonomy. Samarakoon et al. (2022) emphasized that the clypeus or immersed ascomata, lacking a well-developed stroma, is a primitive character and cannot be used to delimit genera without employing a polyphasic approach. Furthermore, stromatic variations were shown to lack discriminatory power for taxonomic resolution, in contrast to the importance of asci ring type, ascospore color, and the presence, absence, and position of the germ slit for distinguishing higher-rank xylarialean taxa (Samarakoon et al. 2022). These features, when combined with molecular data in a polyphasic approach, provide a more comprehensive framework for taxonomic resolution within the order.

Since 2018, our research has focused on the diversity and systematics study of xylarialean taxa in Mainland China. Mainland China is home to some of the world's most extensive and spectacular karst ecosystems. The southern and southwestern regions, particularly Guizhou, Yunnan, Guangxi, and Hunan provinces, are particularly renowned for their karst landscapes (Wang et al. 2019). Our findings unveil a rich collection of discoveries. In 2024, we have introduced approximately 90 new species (Dissanayake et al. 2024, Li et al. 2024a, b). In this study, we introduce 24 new xylarialean species collected from mainland China. We herein describe them based on morphology and multigene phylogeny using ITS, LSU, *rpb2*, and *TUB2* sequences. The findings contribute significantly to the understanding of xylarialean diversity and taxonomy.

MATERIALS AND METHODS

Sample Collection and Morphological Study

The specimens were collected during surveys conducted in the Guizhou, Yunnan provinces and Guangxi Zhuang Autonomous Region, China. All related habitat information, including details about elevation, climatic conditions, and geographical features, were recorded. The photos of the collected materials were taken using a Canon G15 camera (Canon Corporation, Tokyo, Japan). Materials were placed in paper bags and were taken to the laboratory for examination. To preserve the freshness of the specimens, they were dried at room temperature. The dried specimens were carefully labelled and stored in an ultra-low freezer at –80 °C for one week to eliminate any insects and their eggs. After this preparation, the specimens were ready for both morphological and molecular studies.

Herbarium materials were deposited at the herbarium of Guizhou Medical University (GMB) and the Herbarium of Cryptogams, Herbarium of Kunming Institute of Botany, Chinese Academy of Sciences (KUN-HKAS), and living cultures were deposited at the Guizhou Medical University Culture Collection (GMBC).

Isolation and morphological characterization

Macroscopic characteristics were observed under an Olympus SZ61 stereomicroscope and photographed with a Canon 700D digital camera fitted to a light microscope (Nikon Ni, Tokyo, Japan). Morphological characteristics of specimens were examined, and photomicrographs were taken as described in Senanayake et al. (2020). Materials were mounted in water for anatomical examination and Melzer's reagent was added where necessary. More than 30 ascospores and 30 asci were measured using the Tarosoft ® image framework (v. 0.9.0.7). Images were arranged using Adobe Photoshop CS6 (Adobe Systems, USA).

Axenic cultures were obtained from single spores or tissues by the method described in Senanayake et al. (2020). Germinating spores were observed with a Stereo Zoom microscope and transferred to potato dextrose agar (PDA; 39 g/l distilled water, Difco potato dextrose of Becton, Dickinson and Company, USA). The cultures were incubated at 25–30 °C for 4–6 weeks, with frequent observations. New taxa were linked with the Facesofungi and the Mycobank databases.

DNA extraction, PCR amplification and sequencing

Mycelium was scraped from pure culture plates using a sterilized scalpel and used for DNA

extraction using the commercially available BIOMIGA fungus genomic DNA extraction kit (Biomiga, San Diego, USA). For specimens for which their ascospores did not germinate, we extracted the DNA directly from the contents of the perithecium. The DNA samples were kept at –20 °C. Internal transcribed spacers (ITS), 28s large subunit (LSU), β-tubulin (*TUB2*), and RNA polymerase II second largest subunit (*rpb2*) were amplified by PCR with primers ITS1/ITS4 (White et al. 1990, Gardes & Bruns 1993), LR0R/LR5 (Vilgalys & Hester 1990), Bt2a/Bt2b or T1/T22 (Glass & Donaldson 1995, O'Donnell & Cigelnik 1997), and rpb2-5F/rpb2-7cR (Liu et al. 1999), respectively. The components of a 25 μL volume PCR mixture was: 9.5 μL of double distilled water, 12.5 μL of PCR Master Mix (Sangon Biotech Shanghai Co., Ltd), 1 μL of each primer and 1 μL of template DNA. The amplification followed the protocol of Samarakoon et al. (2022). Amplified PCR products were examined through 1.5% agarose gel electrophoresis stained with GoldenView, and sent to Sangon Co., China, for sequencing (Xie et al. 2020).

Sequence alignments and phylogenetic analyses

All the sequences obtained were deposited in GenBank (Table 1). These sequences were compared by using the BLASTn algorithm for identification. The molecular phylogeny was inferred from a combined dataset of ITS, LSU, *rpb2*, and *TUB2* sequences. All taxa were selected from previous work (Samarakoon et al. 2022, Sugita et al. 2024) and BLASTn results of close matches as indicated in Table 1, which also contains all references from which sequence data were derived. Sequences were aligned using MAFFT v.7.110 (Katoh et al. 2019) with default settings, respective alignments were adjusted manually using BioEdit v.7.0.5.3 (Hall 1999) where necessary. The ML analysis was conducted using RAxML v.8.2.12, employing the GTRGAMMA substitution model with 1,000 bootstrap replicates (Stamatakis 2014).

Bayesian inference phylogenetic analyses were performed using MrBayes v. 3.2.1 (Ronquist et al. 2012, online version). The model of evolution was estimated by MrModeltest 2.2 (Nylander 2004). The Markov chain Monte Carlo (MCMC) sampling in MrBayes v.3.2.2 (Ronquist et al. 2012) was used to determine the posterior probabilities (PP). Six simultaneous Markov chains were run for 1,000,000 generations, and trees were sampled every 1000th generation. The phylogenetic tree was visualized in FIGTREE v.1.4.3 (Rambaut 2012). All analyses were run on the CIPRES Science Gateway v 3.3 web portal (Miller et al. 2010).

RESULTS

Phylogenetic analyses

After the exclusion of ambiguously aligned regions and gaps, the final combined data matrix contained 2710 characters. *Caudospora taleola* (WU 39955), *Juglanconis juglandina* (CBS133343), *Lasiosphaeria ovina* (SMH4605) and *Thyridium punctulatum* (MAFF 247510) were added as the outgroup (Samarakoon et al. 2022, Sugita et al. 2024). The RAxML analysis of the combined ITS-LSU-*rpb2-TUB2* dataset yielded the best-scoring tree (Fig. 1). The tree topology derived from Maximum Likelihood (ML) analysis closely resembled that of Bayesian Inference (BI) analysis. The best scoring maximum-likelihood (ML; lLn = -86423.766457) following RAxML analysis of the combined ITS-LSU-*rpb2-TUB2* dataset is shown in Fig. 1.

The sequences of our collected specimens nested within the clades corresponding to their respective genera, confirming their morphological affinities. Certain nodes within the clades lacked robust support (they consistently appeared stable in repeated phylogenetic analyses)

Five newly generated sequences belonged to Xylariaceae, identified as *Nemania huangjingensis* sp. nov. (GMB0746, GMB0747, GMB0748), *Helicogermslita nulliclypeata* sp. nov. (GMB5625, GMB5636). The branch representing them shows the values of (74BS/0.99PP) and (94BS/1.00PP), respectively.

The Clypeosphaeriaceae clade includes newly generated sequences of four species identified as *Digitodochium damingshanense* sp. nov. (GMB5605, GMB5620), *D. xishuangbannense* sp. nov.

Table 1 Taxa with corresponding GenBank accession numbers of sequences used in the phylogenetic analysis. Notes: T: Type material; HT: holotype; Aut: Authoritative strain; ET: ex-type; Newly generated sequences are indicated in bold.

Species	**Strain/voucher**	**Type**	**ITS**	**LSU**	***rpb2***	***TUB2***
Acrocordiella occulta	CBS 140500	ET	KT949893	KT949893	–	–
Acrocordiella omanensis	SQUCC 15091	HT	MG584568	MG584570	–	–
Acrocordiella photiniicola	MFLU 17-1552	HT	MW240627	MW240556	MW658617	MW775583
Acrocordiella yunnanensis	HKAS 111922	HT	MW424507	MW424505	–	–
Albicollum berberidicola	WUMYC 0043994	HT	ON869278	ON869278	ON808457	ON808501
Albicollum longisporum	WUMYC 0044004	HT	ON869286	ON869286	ON808465	ON808509
Albicollum vincensii	WUMYC 0044014	ET	ON869297	ON869297	ON808475	ON808519
Alishanika miscanthii	FU31025	HT	MK503821	MK503827	–	–
Allocryptovalsa polyspora	MFLU 17-1218	HT	MF959500	MF959503	–	–
Allodiatrype arengae	MFLUCC 15-0713	HT	MN308411	MN308402	MN542886	MN340297
Amphibambusa bambusicola	**GMB5602**	**HT**	**PQ884689**	**PQ885401**	**PQ893617**	–
Amphibambusa bambusicola	**GMB5608**		**PQ884690**	**PQ885402**	**PQ893618**	–
Amphibambusa bambusicola	MFLUCC 11-0617	HT	KP744433	KP744474	–	–
Amphibambusa cerosissimae	**GMB5603**	**HT**	**PQ884693**	**PQ885405**	–	–
Amphibambusa cerosissimae	**GMB5613**		**PQ884694**	**PQ885406**	–	–
Amphibambusa hongheensis	HONGHE014	HT	MW892971	MW892969	–	–
Amphibambusa sp.	GMB45650		PQ066508	PQ066514	–	–
Amphibambusa subbambusicola	**GMB5606**	**HT**	**PQ884691**	**PQ885403**		**PQ893596**
Amphibambusa subbambusicola	**GMB5618**		**PQ884692**	**PQ885404**		**PQ893597**
Amphigermslita deformis	HHUF 30660	HT	LC760553	LC760572	LC760592	–
Amphigermslita fusiformis	HHUF 30663	HT	LC760555	LC760574	LC760594	–
Amphigermslita pseudofusiformis	HHUF 30662	HT	LC760556	LC760576	LC760596	–
Amphirosellinia fushanensis	HAST 91111209	HT	GU339496	–	GQ848339	GQ495950
Amphirosellinia nigrospora	HAST 91092308	HT	GU322457	–	GQ848340	GQ495951
Annulohypoxylon truncatum	CBS 140778	ET	KY610419	KY610419	KY624277	KX376352
Anthostomella guangxiensis	**GMB5609**	**HT**	**PQ884707**	**PQ885419**	–	**PQ893603**
Anthostomella guangxiensis	**GMB5616**		**PQ884708**	**PQ885420**	–	**PQ893604**
Anthostomella eucalyptorum	CBS 120036		DQ890026	DQ890026	–	–
Anthostomella helicofissa	MFLUCC 14-0173	T	KP297406	KP297406	KP340534	KP406617
Anthostomella lamiacearum	MFLU 18-0101	T	MW240669	MW240599	MW658648	–
Anthostomella leucobasis	GMB1143		PP153382	–	PP198092	PP203030
Anthostomella obesa	MFLUCC 14-0171	HT	KP297405	KP340546	KP340533	KP406616

Table 1 Continued.

Species	**Strain/voucher**	**Type**	**ITS**	**LSU**	rpb2	**TUB2**
Anthostomella rhaphidophylli	GMB1150		PP153386	–	–	PP203034
Anthostomella rubicola	MFLUCC 14-0175		KP297407	KP340548	KP340535	KP406618
Anthostomella tomicoides	1013		PP336516	PP336516	–	–
Anthostomella torosa	AFTOL-ID 732	HT	–	DQ836902	DQ836885	–
Anthostomella yunnanensis	GMB1153		PP133235	–	–	PP209124
Anthostomelloides krabiensis	MFLUCC 15-0678	HT	KX305927	KX305928	KX305929	–
Anthostomelloides leucospermi	CBS 110126	HT	EU552100	EU552100	−	–
Anthostomelloides proteae	CBS 110127	HT	EU552101	EU552101	−	–
Anungitea eucalyptorum	CBS 137967	HT	KJ869118	KJ869176	−	–
Anungitiomyces stellenboschiensis	CPC34726	HT	MK876376	MK876415	−	–
Apiospora arundinis	CBS 301.49		AB220258	AB220352	−	AB220305
Apiospora aurea	CBS 244.83	HT	MH861576	KF144935	−	KF144981
Apiospora hydei	CBS 114990	HT	KF144890	KF144936	−	KF144982
Apiospora montagnei	AP301120	ET	ON692408	ON692424	ON677177	ON677188
Arecophila australis	GZUCC0112	HT	MT742126	MT742133	–	MT741734
Arecophila bambusae	HKUCC 4794		–	AF452038	–	–
Arecophila clypeata	GZUCC0110	HT	MT742129	MT742136	MT741732	MT741733
Arecophila guizhouensis	**GMB1138**	**HT**	**PQ884695**	**PQ885407**	–	–
Arecophila guizhouensis	**GMB5614**		**PQ884696**	**PQ885408**	–	–
Arecophila sp.	GMB4541		PQ066512	PQ066516	–	–
Arecophila sp.	HKUCC 6487		–	AF452039	–	–
Arecophila subguizhouensis	**GMB5617**	**HT**	**PQ884697**	**PQ885409**		
Arecophila subguizhouensis	**GMB5610**		**PQ884698**	**PQ885410**		
Arecophila xishuangbannaensis	GMB-W1283		OR995736	OR995743	–	–
Arecophila zhaotongensis	ZHKU 23-0260	HT	OR995738	OR995745	–	–
Arecophila zhaotongensis	ZHKU 23-0261		OR995735	OR995742	–	–
Arthrinium caricicola	CBS:145903	T	NR_175149	NG_078683	–	MN313861
Arthrinium curvatum	AP25418		MK014872	MK014839	–	MK017978
Ascotricha chartarum	CBS 902.69		MH859477	MH871257	–	−
Ascotricha erinacea	CBS 535.73		KF893285	MH872482	–	KF893272
Ascotricha longipila	OUCMBI110118	T	KC503896	–	–	KF893265
Astrocystis mirabilis	HAST 94070803		GU322448	–	GQ844835	GQ495941
Barrmaelia oxyacanthae	CBS 142770		MF488988	MF488988	MF488997	MF489016

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Barrmaelia rhamnicola	CBS 142772	ET	MF488990	MF488990	MF488999	MF489018
Beltrania rhombica	CBS 123.58	HT	MH857718	MH869260	MH554899	MH704631
Bicellulospora elaeidis	CGMCC 3.24962	HT	OR253161	OR253319	–	OR266104
Bicellulospora elaeidis	UESTCC 23.0127		OR253162	OR253320	–	OR266105
Biscogniauxia anceps	YMJ 123		EF026132	–	JX507777	AY951671
Biscogniauxia arima	WSP 122	HT	EF026150	–	GQ304736	AY951672
Biscogniauxia atropunctata	YMJ 128		JX507799	–	JX507778	AY951673
Biscogniauxia betulae	**GMB0711**	**HT**	**PQ884683**	**PQ885395**	**PQ893615**	–
Biscogniauxia betulae	**GMB5615**		**PQ884684**	**PQ885396**	**PQ893616**	–
Biscogniauxia capnodes	YMJ 138		EF026131	–	JX507779	AY951675
Biscogniauxia citriformis	YMJ 88113012		JX507801	–	JX507781	AY951678
Biscogniauxia cylindrispora	YMJ 89092701		EF026133	–	JX507782	AY951679
Biscogniauxia dendrobii	MFLUCC 17-2607	HT	NR172733	MK951679	–	MK975826
Biscogniauxia formosana	YMJ 89032201		JX507802	–	JX507783	AY951680
Biscogniauxia glaucae	GMBC 0007		MT624046	–	MT622652	MT622654
Biscogniauxia granmo	YMJ 135		JX507803	–	JX507784	AY951681
Biscogniauxia latirima	YMJ 89101101		JX507804	–	JX507785	AY951682
Biscogniauxia magna	MFLU 18-0850	HT	MW240616	MW240545	MW342620	MW775577
Biscogniauxia mangiferae	MFLU 18-0827	HT	MN337232	MN336236	MN366247	MN509782
Biscogniauxia marginata	MFLUCC 12-0740		KJ958407	KJ958408	KJ958409	KJ958406
Biscogniauxia mediterranea	YMJ 147		EF026134	–	GQ844765	AY951684
Biscogniauxia nummularia	MUCL 51395	ET	KY610382	KY610427	KY624236	KX271241
Biscogniauxia petrensis	CGMCC 37912	HT	KU746669	KU746715	KY883231	KU746761
Biscogniauxia petrensis	LC5698		KU746670	KU746716	KY883232	KU746762
Biscogniauxia petrensis	**GMB0714**		**PQ884682**	**PQ885394**	–	**PQ893591**
Biscogniauxia petrensis	MFLUCC 14-0151		MK944283	MK951680	MK975825	MK975827
Biscogniauxia philippinensis	YMJ 89041101		EF026136	–	JX507787	AY951685
Biscogniauxia repanda	ATCC 62606		KY610383	KY610428	KY624237	KX271242
Biscogniauxia simplicior	BCRC340		EF026130	–	JX507788	AY951686
Biscogniauxia sinensis	CFCC 59648		OR803753	–	OR832187	OR832177
Biscogniauxia uniapiculata	YMJ 90080608		JX507805	–	JX507789	AY951685
Biscogniauxia whalleyi	SWUF 13-85	HT	MW403821	–	MZ466387	MZ466386
Brunneiperidium gracilentum	MFLUCC 14-0011	HT	KP297400	KP340542	KP340528	KP406611

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Cainia anthoxanthis	MFLUCC 15-0539	T	KR092787	KR092777	–	–
Cainia daweishanensis	**GMB5619**	**HT**	**PQ884699**	**PQ885411**	**PQ893619**	–
Cainia daweishanensis	**GMB5624**		**PQ884700**	**PQ885412**	**PQ893620**	–
Cainia desmazieri	CBS137.62		MH858124	MH869702	–	–
Cainia globosa	MFLUCC 13-0663	HT	NR171724	KX822123	–	–
Cainia graminis	MFLUCC 15-0540	Ref	KR092793	KR092781	–	–
Cainia shilihetanensis	**GMB5612**		**PQ884701**	**PQ885413**	**PQ893621**	**PQ893598**
Cainia shilihetanensis	**GMB5622**		**PQ884702**	**PQ885414**	**PQ893622**	**PQ893599**
Calceomyces lacunosus	CBS 633.88	HT	KY610397	KY610476	KY624293	KX271265
Camillea obularia	ATCC 28093		KY610384	KY610429	KY624238	KX271243
Camillea tinctor	YMJ 363		JX507806	–	JX507790	JX507795
Castanediella acaciae	CBS 139869	HT	KR476728	KR476763	–	–
Castanediella malaysiana	CPC 24918	HT	KX306752	KX306781	–	–
Castellaniomyces rosae	MFLUCC 15-0536	HT	MF614127	MF614130	–	–
Caudospora taleola	WU 39955		MG495965	MG495965	MG495993	MG496009
Ciferriascosea rectimura	MFLUCC 15-0542	HT	KR092786	KR092776	–	–
Circinotrichum cycadis	CBS 137969	HT	KJ869121	KJ869178	−	–
Circinotrichum maculiforme	CBS 122758		KR611875	KR611896	−	–
Circinotrichum papakurae	CBS 101373		KR611876	KR611897	–	–
Circinotrichum sinense	UAMH 11913	HT	KY994106	KY994107	–	–
Clypeosphaeria mamillana	CBS140735	ET	KT949897	KT949897	MF489001	MH704637
Collodiscula japonica	CBS 124266		JF440974	JF440974	KY624273	KY624316
Coniocessia anandra	CBS 125766	HT	MH863747	MH875215	–	–
Coniocessia maxima	CBS 593.74	HT	GU553332	MH878275	–	–
Coniolariella limonispora	MUCL 29409		MN984615	MN984624	MN987235	MN987240
Crassipseudostroma phyllostachydis	HHUF 30678	HT	LC760557	LC760577	LC760597	–
Creosphaeria sassafras	STMA 14087		KY610411	KY610468	KY624265	KX271258
Cryptosphaeria eunomia	CBS216.87	HT	KT425230	KT425296	–	–
Cryptosphaeria subcutanea	CBS 240.87	HT	KT425232	KT425297	–	–
Cryptostroma corticale	CBS 216.52		HG934110	MH868529	HG934116	HG934102
Daldinia andina	CBS 114736	T	AM749918	KY610430	KY624239	KC977259
Daldinia bambusicola	CBS 122872	T	KY610385	KY610431	KY624241	AY951688
Daldinia brachysperma	BCC33676		MN153854	MN153871	–	MN172205

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Daldinia caldariorum	MUCL 49211		AM749934	AM749934	AM749934	AM749934
Daldinia chiangdaoensis	BCC88220		MN153850	MN153867	MN172208	MN172197
Daldinia childiae	CBS 122881	HT	NR172249	MH874773	KU684290	KU684129
Daldinia concentrica	CBS 113277		AY616683	KY610434	KY624243	KC977274
Daldinia dennisii	CBS 114741	T	JX658477	KY610435	KY624244	KC977262
Daldinia eschscholtzii	MUCL 45435B		JX658484	JX658484	JX658484	JX658484
Daldinia flavogranulata	BCC89363		MN153856	MN153873	MN17221	MN172200
Daldinia guizhouensis	**GMB0719**	**HT**	**PQ884703**	**PQ885415**	**PQ893623**	**PQ893600**
Daldinia guizhouensis	**GMB5611**		**PQ884704**	**PQ885416**	**PQ893624**	**PQ893601**
Daldinia kretzschmarioides	TBRC 8875		MH938531	MH938540	MK165425	MK165416
Daldinia loculatoides	CBS 113279	ET	AF176982	KY610438	KY624247	KX271246
Daldinia loculatoides	CBS 113279	ET	AF176982	KY610438	KY624247	KX271246
Daldinia macaronesica	CBS 113040	PT	KY610398	KY610477	KY624294	KX271266
Daldinia petriniae	MUCL 49214	ET	AM749937	KY610439	KY624248	KC977261
Daldinia phadaengensis	BCC89349		MN153852	MN153869	MN172206	MN172195
Daldinia placentiformis	MUCL 47603		AM749921	AM749921	AM749921	AM749921
Daldinia placentiformis	MUCL 47603		AM749921	KY610440	KY624249	KC977278
Daldinia pyrenaica	MUCL 53969		KY610413	KY610413	KY624274	KY624312
Daldinia pyrenaica	CC.LYC43		PP407891	PP407706	PP474174	–
Daldinia menghaiensis	SAUCC242405		–	PP198895	PP263618	PP277058
Daldinia menghaiensis	SAUCC242404	HT	–	PP198894	PP263617	PP277057
Daldinia steglichii	MUCL 43512	PT	KY610399	KY610479	KY624250	KX271269
Daldinia subvernicosa	TBRC 8877		MH938533	MH938542	MK165430	MK165421
Daldinia theissenii	CBS 113044	PT	KY610388	KY610441	KY624251	KX271247
Daldinia vernicosa	CBS 157.32		MH855256	MH866709	KU684293	KU684133
Daldinia vernicosa	CBS 119316	ET	KY610395	KY610442	KY624252	KC977260
Delonicicola siamense	MFLUCC 15-0670	HT	MF167586	MF158345	MF158346	–
Dematophora bunodes	CBS 124028		MN984619	MN984625	–	MN987245
Dematophora necatrix	CBS 349.36		AY909001	KF719204	KY624275	KY624310
Diabolocovidia claustri	CPC37593	HT	MT373367	MT373350	–	–
Diatrype palmicola	MFLUCC 11-0020		KP744438	KP744482	–	–
Diatrypella heveae	MFLUCC 15-0274	HT	MN308418	MN308409	MN542892	MN340301
Digitodochium ailaoshanense	HKAS 130308		PP584761	PP584834	–	–

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Digitodochium amoenum	WUMYC 0044020	ET	ON869303	–	ON808481	ON808525
Digitodochium damingshanense	**GMB5620**	**HT**	**PQ884669**	**PQ885381**	**PQ893611**	**PQ893581**
Digitodochium damingshanense	**GMB5605**		**PQ884670**	**PQ885382**	**–**	**PQ893582**
Digitodochium rhodoleucum	NBRC 32296		LC146732	LC146732	–	–
Digitodochium xishuangbannense	**GMB5604**	**HT**	**PQ884667**	**PQ885379**	**PQ893609**	**PQ893579**
Digitodochium xishuangbannense	**GMB5621**		**PQ884668**	**PQ885380**	**PQ893610**	**PQ893580**
Digitodochium yunnanense	HKAS 130310	HT	PP584763	PP584836	–	–
Digitodochium zhangjiajiense	**GMB5607**	**HT**	**PQ884671**	**PQ885383**	–	**PQ893583**
Digitodochium zhangjiajiense	**GMB5623**		**PQ884672**	**PQ885384**	–	**PQ893584**
Digitodochium zhangjiajiense	**2023JWS91**		**PQ884673**	**PQ885385**	–	**–**
Emarcea castanopsidicola	CBS 117105	HT	AY603496	MK762717	MK791285	MK776962
Emarcea eucalyptigena	CBS 139908	HT	KR476733	MK762718	MK791286	MK776963
Endocalyx cinctus	JCM 7946		LC228648	LC228704	–	–
Endocalyx indumentum	JCM 5171	T	MZ313153	MZ313161	–	–
Endocalyx melanoxanthus	CBS 147393		MW718204	MW718204	–	–
Endocalyx metroxyli	MFLUCC 15-0723A	HT	MT929162	MT929313	–	–
Endocalyx ptychospermatis	ZHKUCC 21-0008	T	MZ493352	NG088303	–	–
Entalbostroma erumpens	ICMP 21152	HT	KX258206	–	KX258204	KX258205
Entoleuca mammata	JDR 100	Aut	GU300072	–	GQ844782	GQ470230
Entonaema liquescens	ATCC 46302		KY610389	KY610443	KY624253	KX271248
Entosordaria perfidiosa	CBS 142773	ET	MF488993	MF488993	MF489003	MF489021
Entosordaria quercina	CBS 142774	HT	MF488994	MF488994	MF489004	MF489022
Euepixylon sphaeriostomum	JDR 261	Aut	GU292821	–	GQ844774	GQ470224
Eutypa cerasi	GMBC0049	T	MW797105	MW797049	MW814895	MW814877
Eutypa lata	AFTOL-ID 929	HT	DQ836903	DQ836903	DQ836889	
Eutypa linearis	MFLUCC 11-0503		KU940150	KU863138	–	–
Fasciatispora arengae	MFLUCC 15-0326a	HT	MK120275	MK120300	MK890794	MK890793
Fasciatispora cocoes	**GMB1154**		**PQ884685**	**PQ885397**	–	**PQ893592**
Fasciatispora cocoes	**GMB1155**		**PQ884686**	**PQ885398**	–	**PQ893593**
Fasciatispora cocoes	MFLUCC 18-1445	HT	MN482680	MN482675	MN481517	MN505154
Fasciatispora cocoes	HKAS 107000		MW240619	MW240548	MW658612	MW775579
Fasciatispora guizhouensis	**GMB1147**	**HT**	**PQ884687**	**PQ885399**	–	**PQ893594**
Fasciatispora guizhouensis	**GMB1148**		**PQ884688**	**PQ885400**	–	**PQ893595**

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Fasciatispora nypae	MFLUCC 11-0382	HT	NR185352	KP744484	–	–
Fasciatispora sichuanensis	HKAS 130296	HT	PP584750	PP584823	–	–
Furfurella luteostiolata	CBS 143620	HT	MK527842	MK527842	MK523273	MK523330
Furfurella nigrescens	CBS 143622	HT	MK527844	MK527844	MK523275	MK523332
Furfurella stromatica	CBS 144409	HT	MK527846	MK527846	MK523277	MK523334
Graphostroma guizhouensis	GMBC0219	HT	MW854659	MW854664	MW855487	MW855490
Graphostroma platystomum	CBS 270.87		JX658535	DQ836906	KY624296	HG934108
Guayaquilia cubensis	MUCL39017		KC775733	KC775708	–	–
Gyrothrix eucalypti	CPC 36066	HT	MN562109	MN567617	–	–
Gyrothrix inops	BE108		KC775746	KC775721	–	–
Gyrothrix ramosa	MUCL54061		KC775747	KC775722	–	–
Halodiatrype avicenniae	MFLUCC 15-0948		MH304414	MH305308	–	MH370278
Halorosellinia krabiensis	MFLU 17-2596	HT	MN047119	MN017883	–	MN431493
Hansfordia pruni	CBS 194.56	HT	MK442585	MH869122	KU684307	–
Hansfordia pulvinata	CBS 144422		MK442587	MK442527	–	–
Haploanthostomella elaeidis	MFLU 20-0522	HT	MT929161	MT929312	–	–
Helicogermslita clypeata	MFLU 18-0852	HT	MW240666	MW240596	MW658647	MW775614
Helicogermslita nulliclypeata	**GMB5636**	**HT**	**PQ884665**	**PQ885377**	**PQ893607**	**PQ893577**
Helicogermslita nulliclypeata	**GMB5625**		**PQ884666**	**PQ885378**	**PQ893608**	**PQ893578**
Hypocopra anomala	TTI-000339		–	MT903245	MT901033	MT901030
Hypomontagnella barbarensis	STMA 14081	HT	MK131720	MK131718	MK135891	MK135893
Hyponectria buxi	UME 31430		–	AY083834	–	–
Hypoxylon fragiforme	MUCL 51264	ET	KC477229	KM186295	KM186296	KX271282
Idriella lunata	CBS 204.56	HT	MH857584	MH869129	–	–
Induratia apiospora	ATCC 60639	HT	NR189403	OP86288	OP879469	OP879468
Iodosphaeria honghense	MFLU 19-0719	HT	MK737501	MK722172	MK791287	–
Iodosphaeria tongrenensis	MFLU 15-0393	HT	KR095282	KR095283	–	–
Jackrogersella multiformis	CBS 119016	ET	KC477234	KY610473	KY624290	KX271262
Juglanconis juglandina	CBS 133343		KY427149	KY427149	KY427199	KY427234
Kretzschmaria deusta	CBS 163.93		KC477237	KY610458	KY624227	KX271251
Kretzschmariella culmorum	JDR 88		KX430043	–	KX430045	KX430046
Lanceispora amphibia	NBRC 32918	HT	LC146743	LC146743	–	–
Lasiosphaeria ovina	SMH4605		AY587923	AY436413	AY600284	AY600263

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Leptomassaria simplex	WUMYC 0044025		ON869305	–	ON808483	ON808527
Leptosillia macrospora	CBS 143627	HT	MK527853	MK527853	MK523286	MK523343
Leptosillia muelleri	CBS 143628	HT	MK527857	MK527857	MK523290	MK523347
Leptosillia slaptonensis	CBS 145296	HT	MK527862	MK527862	MK523294	MK523351
Leptosillia wienkampii	CBS 143630	HT	MK527865	MK527865	MK523297	MK523353
Linosporopsis ochracea	CBS 145999	ET	MN818958	MN818958	MN820714	MN820721
Longiappendispora chromolaenae	MFLU 20-0320	HT	MT214370	MT214464	–	–
Lopadostoma dryophilum	CBS 133213	ET	KC774570	KC774570	KC774526	MF489023
Lopadostoma fagi	CBS 133206	HT	KC774575	KC774575	KC774531	–
Lopadostoma insulare	CBS 133214	HT	KC774589	KC774589	KC774542	–
Lopadostoma lechatii	CBS 133694	HT	KC774590	KC774590	KC774543	–
Lopadostoma quercicola	CBS 133212	HT	KC774610	KC774610	KC774558	–
Lopadostoma turgidum	CBS 133207	ET	KC774618	KC774618	KC774563	MF489024
Lunatiannulus irregularis	MFLUCC 14–0014	HT	KP297398	KP340540	KP340526	KP406609
Magnostiolata guizhouensis	GMB1140	HT	PP133233	–	–	PP209122
Magnostiolata guizhouensis	GMB1141		PP133234	–	–	PP209123
Magnostiolata mucida	MFLU 19-2133	HT	MW240673	MW240603	MW658652	MW775618
Magnostiolata shiwandashanensis	**GMB5626**	**HT**	**PQ884674**	**PQ885386**	**PQ893612**	–
Magnostiolata shiwandashanensis	**GMB5639**		**PQ884675**	**PQ885387**	–	–
Melanographium phoenicis	MFLUCC 18-1481	HT	MN482677	MN482678	–	–
Melogramma campylosporum	MBU		JF440978	JF440978	–	–
Microdochium lycopodinum	CBS 125585	HT	JF440979	JF440979	KP859125	KP859080
Microdochium phragmitis	CBS 285.71	ET	KP859013	KP858949	KP859122	KP859077
Minuticlypeus discosporus	HHUF 30673	HT	LC760559	LC760579	–	–
Minuticlypeus discosporus	HHUF 30672		LC760558	LC760578	LC760598	–
Minuticlypeus yunnanensis	**GMB5631**	**HT**	**PQ884705**	**PQ885417**	–	**PQ893602**
Minuticlypeus yunnanensis	**GMB5638**		**PQ884706**	**PQ885418**	–	–
Muscodor thailandica	MFLUCC 17-2669	HT	MK762707	MK762714	MK791283	MK776960
Muscodor ziziphi	MFLUCC 17-2662	HT	MK762705	MK762712	MK791281	MK776958
Nemania abortiva	BISH 467	ET	GU292816	–	GQ844768	GQ470219
Nemania aquilariae	HKAS 111935	HT	MW729422	MW729420	MW717891	MW881142
Nemania bannaensis	GMB0731	HT	PP153355	–	PP198079	PP197666
Nemania beaumontii	HAST 405		GU292819	–	GQ844772	GQ470222

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Nemania bipapillata	HAST 90080610		GU292818	–	GQ844771	GQ470221
Nemania buxi	GMB0735	HT	PP153356		PP198081	PP197664
Nemania caries	GMB0069	HT	MW851873	MW851856	MW836069	MW836035
Nemania diffusa	HAST 91020401		GU292817	–	GQ844769	GQ470220
Nemania feicuiensis	GMBC0058		MW851879	MW851862	MW836064	MW836024
Nemania huangjingensis	**GMB0746**	**HT**	**PQ884662**	**PQ885374**	–	**PQ893574**
Nemania huangjingensis	**GMB0747**		**PQ884663**	**PQ885375**	–	**PQ893575**
Nemania huangjingensis	**GMB0748**		**PQ884664**	**PQ885376**	**–**	**PQ893576**
Nemania illita	YMJ 236		EF026122	–	GQ844770	EF025608
Nemania landingshanensis	GMB0791	HT	PP153358	–	PP198083	PP197685
Nemania lasiocarpae	PP153360	HT	**PP153360**	–	**PP198085**	**PP197687**
Nemania leigongshanensis	GMB0743	HT	PP153362	–	PP198087	PP197689
Nemania leishanensis	GMB0768		PP584764	PP584837	–	PP951421
Nemania longipedicellata	MFLU 18-0819	HT	MW240612	MW240541	MW342616	MW775573
Nemania macrocarpa	WSP 265	HT	GU292823	MH874423	GQ844776	GQ470226
Nemania maritima	HAST 89120401	HT	GU292822	–	GQ844775	GQ470225
Nemania maritima	J.F. 03075		KY610414	KY610414	–	–
Nemania mengmanensis	GMB0793	HT	PP153365	–	–	PP197692
Nemania paraphysata	MFLU 19-2121	HT	MW240609	NG081491	MW342613	
Nemania primolutea	YMJ 91102001	HT	EF026121	–	GQ844767	EF025607
Nemania sp.	HAST 235		GU292820	–	GQ844773	GQ470223
Nemania subchangningensis	GMB0749	HT	PP153366	–	–	PP197693
Nemania thailandensis	MFLU 19-2117	HT	MW240611	NG081492	MW342615	MW775572
Nemania thailandensis	MFLU 19-2122		MW240610	MW240539	MW342614	MW775571
Nemania viridis	MFLU 17-2600	HT	MN047123	MN017887	–	–
Neoanthostomella bambusicola	MFLU 18-0796	HT	NR_175681	MW240587	MW658641	MW775610
Neoanthostomella fici	MFLU 19-2765	HT	MW114390	MW114445	MW177711	–
Neoanthostomella pseudostromatica	MFLUCC 11-0610	HT	NR_154240	NG059678	–	–
Neoanthostomella viticola	MFLUCC 16-0243	HT	KX505957	KX505958	KX789496	KX789495
Neoeutypella baoshanensis	MFLUCC 16-1002	HT	MT310662	MT214618	–	–
Neogyrothrix oleae	CBS 146069	HT	MN562136	NG_068333		
Neoidriella desertorum	CBS 985.72	HT	KP859048	KP858985	–	–

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Neoxylaria juruensis	HAST 92042501		GU322439	–	GQ844825	GQ495932
Nigropunctata bambusicola	MFLU 19-2134	P	MW240662	MW240592	MW658644	
Nigropunctata bambusicola	MFLU 19-2145	HT	MW240664	MW240594	MW658646	
Nigropunctata complanate	MAFF 247800	HT	LC760561	LC760581	LC760600	
Nigropunctata khalidii	GMB1156	HT	PP153389	–	–	PP209114
Nigropunctata nigrocircularis	MFLU 19-2130	HT	MW240661	MW240591	–	–
Nigropunctata thailandica	MFLU 19-2118	HT	MW240659	MW240589	MW658643	–
Nigrospora gorlenkoana	CBS 480.73	HT	KX986048	KX986109	–	KY019456
Nigrospora musae	CBS 319.34	HT	KX986076	KX986110	–	KY019455
Nothodactylaria nephrolepidis	CPC37028	HT	MN562132	MN567639	MN556809	–
Nothoramichloridium perseae	CPC36383	HT	MN562121	MN567629	–	–
Obolarina dryophila	MUCL 49882		GQ428316	GQ428316	KY624284	GQ428322
Obolarina persica	YMJ 1461		JX507807	–	JX507792	JX507796
Occultitheca rosae	HKAS 102393	HT	MW240672	MW240602	MW658651	MW775617
Oligostoma insidiosum	WUMYC 0044032		ON869314		ON808491	ON808535
Oxydothis metroxylonis	MFLUCC 15-0283	HT	KY206775	KY206764	–	–
Oxydothis phoenicis	MFLUCC 18-0270	HT	MK088066	MK088062	–	–
Pallidoperidium paraexasperatum	HHUF 30671		LC760571	LC760591	LC760604	–
Paraeutypella guizhouensis	KUMCC 20-0016	T	MW036142	–	–	MW239660
Paravamsapriya ostiolata	MFLU 18-0761	HT	NR175669	NG081497	–	MW775581
Paraxylaria rosacearum	TASM 6132	HT	MG828941	MG829050	–	–
Paraxylaria xylostei	MFLU 17-1645		MW240641	MW240571	–	MW820915
Pedumispora rhizophorae	BCC44877		KJ888853	KJ888850	–	–
Phlogicylindrium eucalyptorum	CBS 111680		KF251204	KF251707	KF252209	–
Podosordaria mexicana	WSP 176		GU324762	–	GQ853039	GQ844840
Podosordaria muli	WSP 167	HT	GU324761	–	GQ853038	GQ844839
Polyancora globosa	WU 26489	HT	DQ396469	DQ396466	–	–
Polyscytalum fecundissimum	CBS 100506		EU035441	EU035441	–	–
Polystigma rubrum	MFLU 18-0263		MK429740	MK429729	–	–
Polystigma rubrum	MFLU 180265		MK429742	MK429731	–	–
Poroisariopsis inornata	CLM-RV87	HT	MF380436	MF380436	MH745149	MH745148
Poronia punctata	CBS 656.78	HT	KT281904	KY610496	KY624278	KX271281

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Pseudapiospora corni	WU 36852	NT	KT949907	KT949907	–	–
Pseudoanthostomella conorum	CBS 119333		EU552099	EU552099	–	–
Pseudoanthostomella delitescens	MFLUCC 16-0477		KX533451	KX533452	KX789491	KX789490
Pseudoanthostomella pini-nigrae	MFLUCC 16-0478	ET	KX533453	KX533454	KX789492	–
Pseudoceratocladium polysetosum	FMR 10750	HT	NR_154849	NG_059024	ON399348	
Pseudocircinotrichum papakurae	CBS 140221		ON400768	ON400820	ON399349	
Pseudomassaria chondrospora	CBS 125600		JF440981	JF440981	–	–
Pseudomassaria sepincoliformis	CBS 129022		JF440984	JF440984	–	–
Pseudomassariella vexata	CBS 129021	HT	JF440977	JF440977	–	–
Pseudosporidesmium knawiae	CBS 123529	HT	FJ349609	FJ349610	–	–
Pseudosporidesmium lambertiae	CBS 143169	HT	NR 156656	NG 058506	–	–
Pyrenomyxa morganii	CBS 118186	HT	MH863028	MH874581	–	–
Pyrenopolyporus hunteri	MUCL 52673	ET	KY610421	KY610421	KY610421	KY610421
Pyrenopolyporus laminosum	MUCL 53305		KC968934	KY610485	KY624303	KC977292
Pyrenopolyporus nicaraguensis	CBS 117739		AM749922	AM749922	AM749922	AM749922
Pyriformiascoma trilobatum	MFLUCC 14-0012	HT	KP297402	KP340543	KP340530	KP406613
Requienella fraxini	CBS 140475	HT	NR 138415	KT949910	–	–
Requienella seminuda	CBS 140502	HT	NR 154630	KT949912	MK523300	–
Rhizomaticola guizhouensis	GZUH0101	HT	ON815473	0N815474	ON897692	ON924997
Rhopalostroma angolense	CBS 126414		FN821965	KM186298	KM186297	KM186299
Rosellinia aquila	MUCL 51703		KY610392	KY610460	KY624285	KX271253
Rosellinia chiangmaiensis	MFLUCC 15-0015	HT	KU246226	KU246227	–	–
Rosellinia corticium	MUCL 51693		KY610393	KY610461	KY624229	KX271254
Rostrohypoxylon terebratum	CBS 119137	HT	DQ631943	DQ840069	DQ631954	DQ840097
Ruwenzoria pseudoannulata	MUCL 51394	ET	KY610406	KY610494	KY624286	KX271278
Sarcoxylon compunctum	CBS 359.61		KT281903	KT281898	KY624230	KX271255
Selenodriella cubensis	CBS 683.96	HT	KP859053	KP858990	–	–
Seynesia erumpens	SMH 1291		–	AF279410	AY641073	–
Sphaeria pileiformis	WSP 88113001	ET	GU324760	–	GQ853037	GQ502720
Spirodecospora anshunensis	**GMB5629**	**HT**	**PQ884709**	**PQ885421**	**PQ893625**	–
Spirodecospora anshunensis	**GMB5640**		**PQ884710**	**PQ885422**	**PQ893626**	–
Spirodecospora daweishanensis	**GMB5633**	**HT**	**PQ884713**	**PQ885425**	**PQ893627**	–
Spirodecospora daweishanensis	**GMB5637**		**PQ884714**	**PQ885426**	**PQ893628**	–

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Spirodecospora jichuanenii	**GMB5644**	**HT**	**PQ884715**	**PQ885427**	**PQ893629**	**PQ893605**
Spirodecospora jichuanenii	**GMB5628**		**PQ884716**	**PQ885428**	**PQ893630**	**PQ893606**
Spirodecospora jinghongensis	**GMB5635**	**HT**	**PQ884711**	**PQ885423**	–	–
Spirodecospora jinghongensis	**GMB1159**		**PQ884712**	**PQ885424**	–	–
Spirodecospora melnikii	KT4092		LC731937	LC731946	LC731955	–
Spirodecospora paramelnikii	MAFF 247748	HT	NR184351	NG228775	LC731956	–
Spirodecospora paulospiralis	MAFF 247749	HT	NR_184352	NG_228776	LC731957	–
Stilbohypoxylon elaeicola	HAST 94082615	Aut	GU322440	–	GQ844827	GQ495933
Stilbohypoxylon elaeidis	MFLUCC 15-0295b		MT496746	MT496756	–	–
Stilbohypoxylon quisquiliarum	YMJ 172		EF026119	–	GQ853020	EF025605
Strelitziomyces knysnanus	CBS 146056	HT	MN562135	MN567642	MN556810	–
Stromatoneurospora phoenix	BCC82040		MT703666	MT735133	MT742605	MT700438
Subramaniomyces fusisaprophyticus	CBS 418.95		EU040241	EU040241	–	–
Surculiseries rugispora	NBRC 33167	HT	LC146763	LC146763	−	−
Synnemadiella eucalypti	CPC 27637	HT	KY173467	KY173556	−	−
Thamnomyces dendroideus	CBS 123578	HT	FN428831	KY610467	KY624232	KY624313
Thuemenella cubispora	CBS 119807		JX658531	EF562508	–	–
Thyridium punctulatum	MAFF 247510	HT	NR 75612	NG 081299	LC655970	LC655978
Vamsapriya bambusicola	MFLUCC 11-0477	HT	KM462835	KM462836	KM462834	KM462833
Vamsapriya breviconidiophora	MFLUCC 14-0436	T	MF621584	MF621588	–	–
Vamsapriya chiangmaiensis	MFLUCC 21-0065	T	MZ613171	MZ613168	–	–
Vamsapriya clypeata	**GMB5630**	**HT**	**PQ884676**	**PQ885388**	–	**PQ893585**
Vamsapriya clypeata	**GMB5642**		**PQ884677**	**PQ885389**	–	**PQ893586**
Vamsapriya damingshanensis	**GMB5627**	**HT**	**PQ884680**	**PQ885392**	–	**PQ893589**
Vamsapriya damingshanensis	**GMB5643**		**PQ884681**	**PQ885393**	–	**PQ893590**
Vamsapriya indica	MFLUCC 12-0544	T	KM462839	KM462840	KM462841	KM462838
Vamsapriya indica	MFLUCC 21-0066		MZ613172	MZ613169	OK560921	–
Vamsapriya khunkonensis	MFLUCC 13-0497	T	KM462830	KM462831	KM462829	KM462828
Vamsapriya khunkonensis	MFLUCC 11-0475		MW240620	MW240549	KM462829	KM462828
Vamsapriya mucosa	MFLU 18-0103	HT	MW240622	MW240551	MW658614	MW775580
Vamsapriya shiwandashanensis	**GMB5632**	**HT**	**PQ884678**	**PQ885390**	**PQ893613**	**PQ893587**
Vamsapriya shiwandashanensis	**GMB5641**		**PQ884679**	**PQ885391**	**PQ893614**	**PQ893588**
Vamsapriya sichuanensis	HKAS 130304	HT	PP584757	PP584830	PP993507	–

Table 1 Continued.

Species	Strain/voucher	Type	ITS	LSU	rpb2	TUB2
Vamsapriya uniseptata	GZCC 21-0892	T	MZ613173	MZ613170	–	–
Vamsapriya uniseptata	MFLU23-0261		OR259106	OR259087	–	OR269618
Vamsapriya yunnana	KUMCC 18-0008	HT	MG833874	MG833873	MG833875	–
Vesiculozygosporium echinosporum	CPC 35607	HT	MT223869	MT223940	–	–
Vialaea insculpta	DAOM 240257		JX139726	JX139726	–	–
Vialaea mangiferae	MFLUCC 12-0808	HT	KF724974	KF724975	–	–
Vialaea minutella	BRIP 56959		KC181926	KC181924	–	–
Wawelia regia	CBS110.10		MH854595	MH866123	–	–
Xenoanthostomella chromolaenae	MFLUCC 17-1484	HT	MN638863	MN638848	MN648729	
Xyladictyochaeta lusitanica	FMR-12177	HT	KY853479	KY853543	–	–
Xylaria adscendens	JDR 865		GU322432	–	GQ844818	GQ487709
Xylaria arbuscula	CBS 126415		KY610394	KY610463	KY624287	KX271257
Xylaria bambusicola	WSP 205	HT	EF026123	–	GQ844802	AY951762
Xylaria botuliformis	HAST 89091627		MN089652	–	MN095399	MN095400
Xylaria cf. *heliscus*	HAST 88113010		GU324742	−	GQ848355	GQ502691
Xylaria cubensis	BCC20646		MT703672	MT735142	MT742611	−
Xylaria digitata	HAST 919		GU322456	−	GQ848338	GQ495949
Xylaria hypoxylon	CBS122620	ET	AM993141	KM186301	KM186302	KM186300
Xylaria intracolorata	HAST 90080402		GU324741		GQ848354	GQ502690
Xylaria multiplex	HAST 580		GU300098	−	GQ844814	GQ487705
Xylaria phyllocharis	HAST 528		GU322445	−	GQ844832	GQ495938
Xylaria plebeja	HAST 91122401		GU324740		GQ848353	GQ502689
Xylaria polymorpha	MUCL 49884		KY610408	KY610464	KY624288	KX271280
Xylaria schweinitzii	RLC 1495 iNat 7004843		OQ872036	OQ913074	−	−
Zygosporium minus	HKAS 99625	T	MF621586	MF621590	−	−
Zygosporium oscheoides	MFLUCC 14-0402	HT	MF621585	MF621589	−	−
Zygosporium pseudogibbum	CBS 143503	HT	MH107928	MH107974	−	MH108055
Zygosporium pseudomasonii	CBS 146059	HT	MN562147	MN567654	MN556815	−

(GMB5604, GMB5621), *D. zhangjiajiense* sp. nov. (GMB5607, GMB5623), and *Magnostiolata shiwandashanensis* sp. nov. (GMB5626, GMB5639). *Digitochium* and *Magnostiolata* are close relatives of *Occultitheca* and *Clypeosphaeria*.

Three species clustered in Vamsapriyaceae described as *Vamsapriya clypeata* sp. nov. (GMB5630, GMB5642), *V. damingshanensis* sp. nov. (GMB5627, GMB5643), and *V. shiwandashanensis* sp. nov. (GMB5632, GMB5641). Four species in Graphostromataceae and Fasciatisporaceae, identified as *Biscogniauxia petrensis* (GMB0714), *B. betulae* sp. nov. (GMB0711, GMB5615) in Graphostromataceae, and *Fasciatispora cocoes* (GMB1154, GMB1155), *F. guizhouensis* sp. nov. (GMB1147, GMB1148) in Fasciatisporaceae. The sequences of *Daldinia guizhouensis* sp. nov. (GMB0719, GMB5611) formed a strongly supported clade in Hypoxylaceae in a sister relationship to an unknown *D. menghaiensis* (SAUCC 242405; SAUCC 242404).

The Cainiaceae clade includes newly generated sequences of seven species identified as *Arecophila guizhouensis* sp. nov. (GMB1138, GMB5614), *A. subguizhouensis* sp. nov. (GMB5617, GMB5610), *Amphibambusa cerosissimae* sp. nov. (GMB5603, GMB5613), *A. bambusicola* (GMB5602, GMB5608), *A. subbambusicola* sp. nov. (GMB5606, GMB5618), *Cainia shilihetanensis* sp. nov. (GMB5612, GMB5622), and *C. daweishanensis* sp. nov. (GMB5619, GMB5624). Two *Anthostomella*-like taxa were collected in this study, one recovered in Pallidoperidiaceae as *Minuticlypeus yunnanensis* sp. nov. (GMB5631, GMB5638), and one identified as *Anthostomella guangxiensis* sp. nov. (GMB5609, GMB5616). The Spirodecosporaceae clade included newly generated sequences of four species identified as *Spirodecospora anshunensis* sp. nov. (GMB5629, GMB5640), *S. daweishanensis* sp. nov. (GMB5633, GMB5637), *S. jichuanenii* sp. nov. (GMB5628, GMB5644), and *S. jinghongensis* sp. nov. (GMB1159, GMB5635).

Taxonomy

Amphibambusa D.Q. Dai & K.D. Hyde, in Liu et al. Fungal Diversity [7] (2015).

Type species – *Amphibambusa bambusicola* D.Q. Dai & K.D. Hyde 2015.

Notes – *Amphibambusa*, was introduced by Liu et al. (2015) to accommodate taxa characterized by immersed ascomata surrounded by a small blackened clypeus, an ostiolar opening surrounded by a white margin, and cylindrical asci with fusiform ascospores enclosed in a wide gelatinous sheath. The genus currently includes two species: *A. bambusicola* D.Q. Dai & K.D. Hyde and *A. hongheensis* H.B. Jiang & Phookamsak (Liu et al. 2015, Jiang et al. 2021). In this study, we introduce two new species and one new record of *Amphibambusa* from China.

Amphibambusa bambusicola D.Q. Dai & K.D. Hyde, Fungal Diversity [7] (2015). Fig. 2

MycoBank number: MB550941

Description – *Saprobic* on the surface of decaying bamboo culms, forming black round spots. Teleomorph: *Ascomata* 483–498 µm high, 405–622 µm diam., solitary, scattered, immersed under the host epidermis, black, coriaceous, ostiole at the center, ostiolar opening surrounded by white margin. *Peridium* 25–45 µm ($\overline{x}$ = 31 µm, n = 20) wide, composed of thick walled, hyaline to brown cells of *textura angularis*. *Paraphyses* 1.3–6.4 µm ($\overline{x}$ = 3.8 µm, n = 20) diam., intermingled among asci, septate, thin-walk, with hyaline, guttulate cells. *Asci* 179–196 × 14.0–16.7 µm ($\overline{x}$ = 186 × 15.1 µm, n = 20), 8-spored, unitunicate, long-cylindrical, short-pedicellate, J+, subapical ring, bluing in Melzer's reagent, 1.5–1.9 µm high, 2.3–2.9 µm diam. *Ascospores* 29.7–36.9 × 6.7–7.8 µm ($\overline{x}$ = 32.1 × 7.2 µm, n = 30), biseriate or uniseriate, hyaline, fusiform, 1-septate at the centre, not constricted at the septum, pointed at both ends, with hyaline round spots when mature, with longitudinal striation along the entire length of the ascospore, surrounded by gelatinous sheath, up to 10 µm thick. Anamorph: Undetermined.

Culture characters – Ascospores germinating on PDA within 36h, colonies growing slowly on PDA, reaching 5 mm in 2 weeks, effuse, velvety to hairy at the center, few short plush at the

margin, nearly round to oval, white from above, Pale yellowish white from below. Mycelium immersed in the media, composed of branched, septate, smooth-walled, hyaline, hyphae.

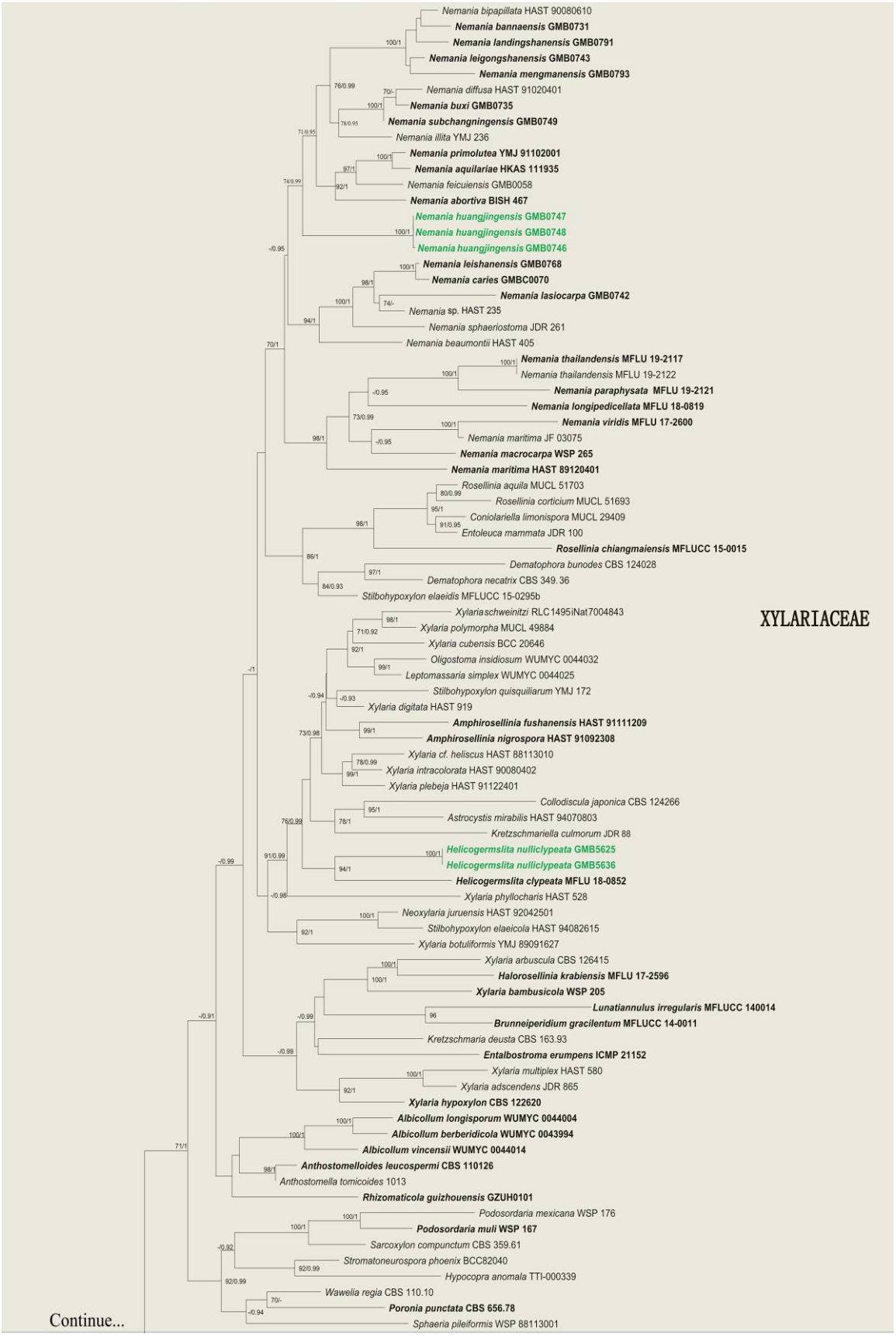

Figure 1 – RAxML tree based on a combined ITS, LSU, *rpb2* and *TUB2* sequences dataset. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior

probabilities (BPP) greater than 0.90 are displayed above the respective branches (ML/BI). The newly described species are marked green, and new records are marked in red. Type collections are in bold.

Figure 1 – Continued.

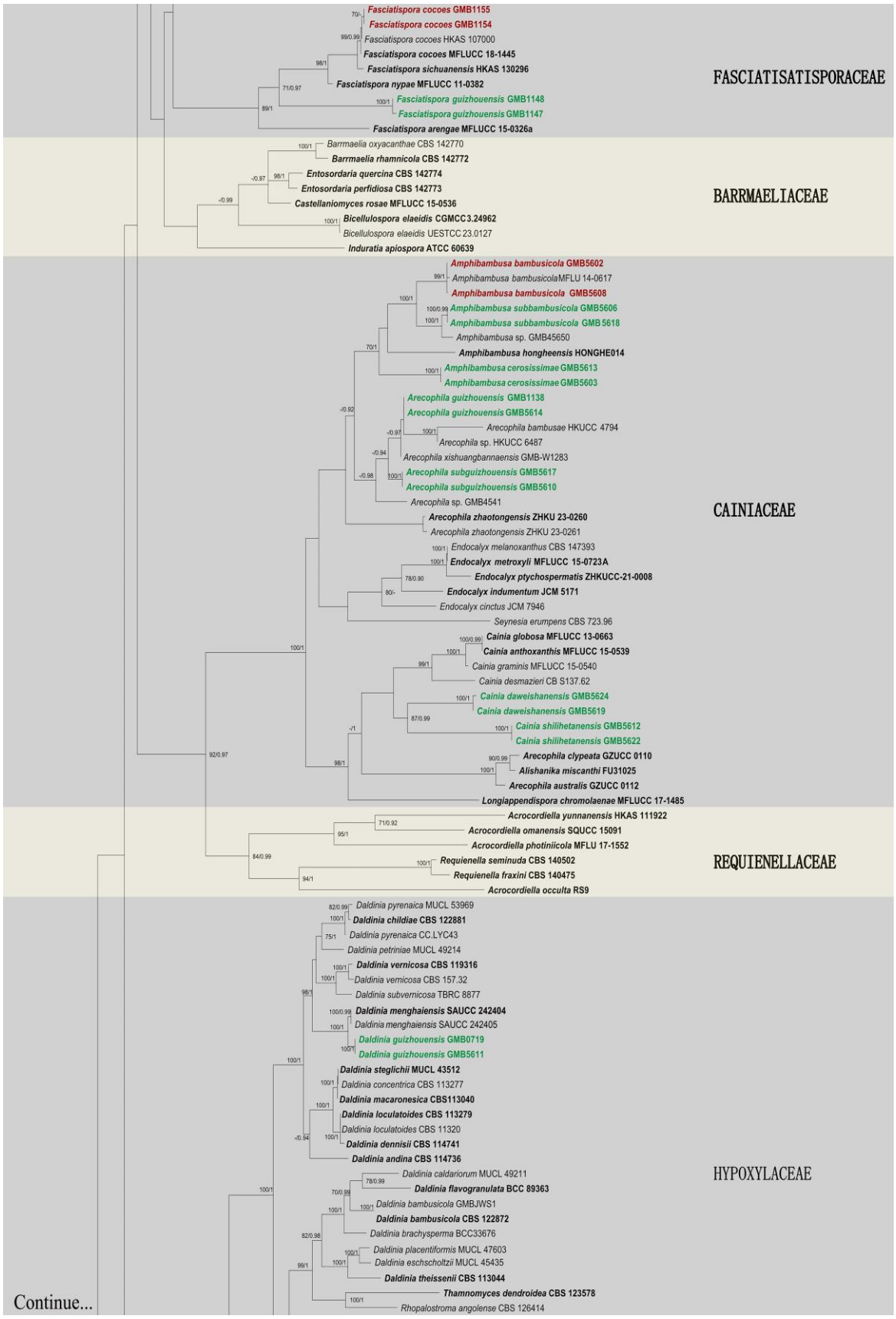

Figure 1 – Continued.

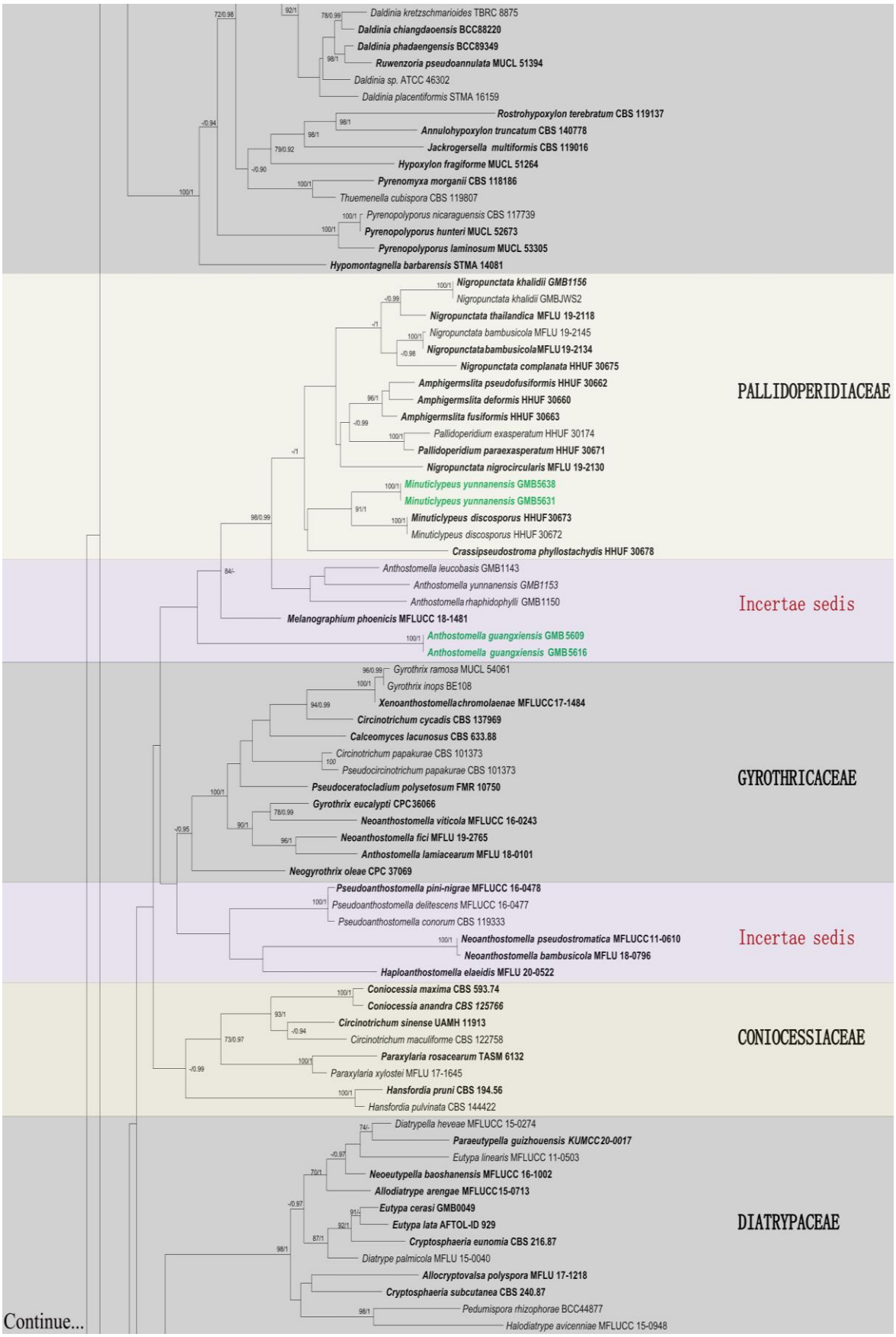

Figure 1 – Continued.

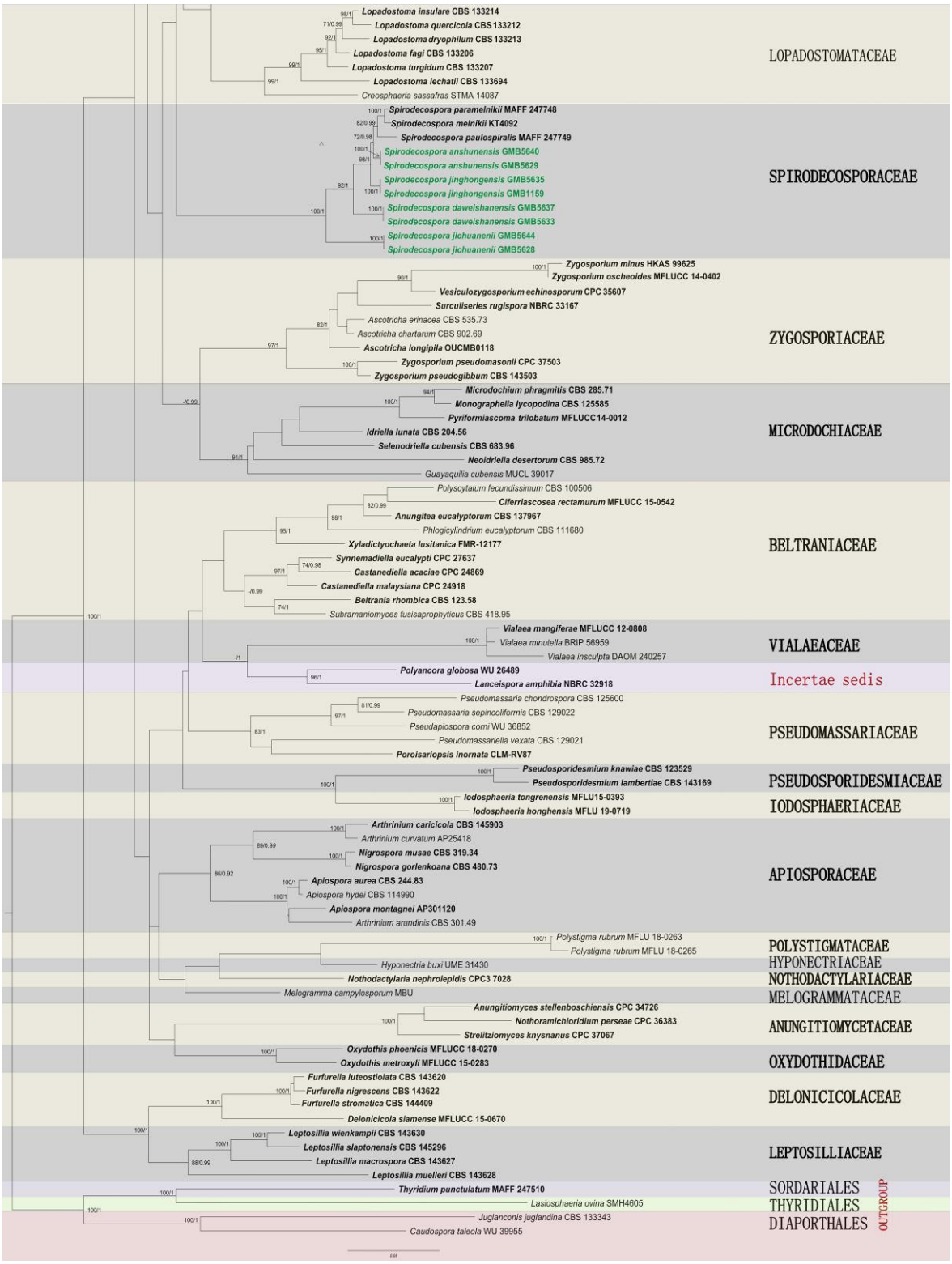

Figure 1 – Continued.

Material examined – CHINA, Yunnan Province, Xishuangbanna Scenic Spot, 100º54'20.37"E, 22º16'04.21"N, altitude: 969 m, on dead culm of bamboo, 18 August 2023, Yulin Ren, XSBNZ46 (GMB5602, GMBC5602). CHINA, Yunnan Province, Xishuangbanna Scenic Spot, 100º54'20.45"E, 22º16'04.58"N, altitude: 1053 m, on dead culm of bamboo, 18 August 2023, Yulin Ren, 2023XSBNZ73 (GMB5608).

Notes – Morphologically, the description of our collection aligns closely with the holotype description of *A. bambusicola* (Liu et al. 2015), except for the ascomata and ascospores sizes. The

ascospores in our collection are significantly larger (29.7–36.9 × 6.7–7.8 µm) and the ascomata smaller (483–498 µm high, 405–622 µm in diameter) compared to those described in the original Thai specimens (ascospores: 25–27 × 5.5–6 µm; ascomata: 500–800 µm in diam., 450–700 µm high). Despite this size variation, the sequence data supports its identification as *A. bambusicola* (Fig. 1). *Amphibambusa bambusicola* was originally described from Thailand (Liu et al. 2015). This is the first report of this taxon from China.

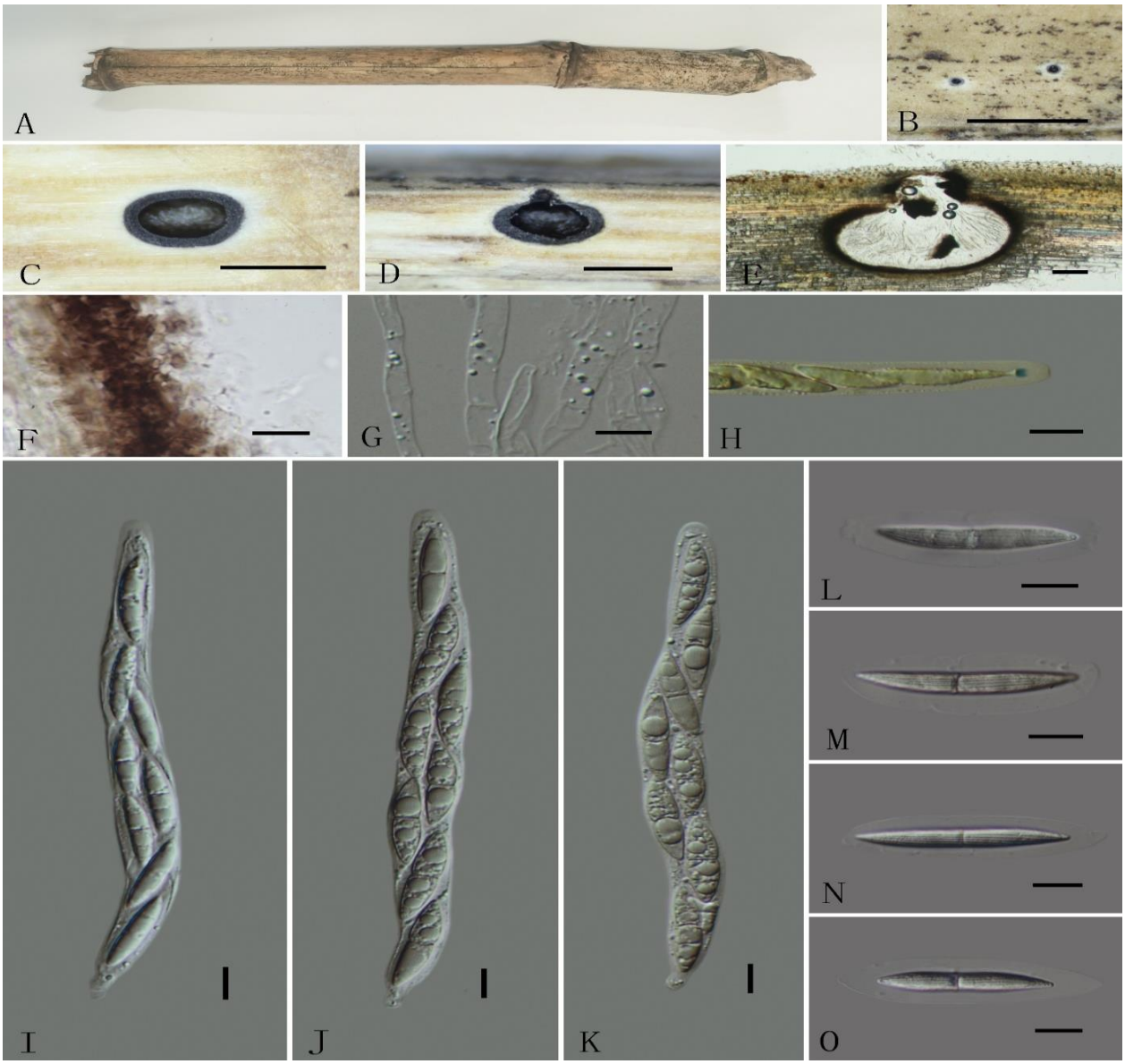

Figure 2 – *Amphibambusa bambusicola* (GMB5602, new country record). A, B Bamboo host. C Cross section of ascoma. D, E Longitudinal sections of ascoma. F Peridium. G Paraphyses. H Apical ring (staining by Melzer's reagent). I–K Asci in distilled water. L–O Ascospores surrounded by a gelatinous sheath. Scale bars: B–D = 0.5 mm, E = 100 µm, F–O = 10 µm.

Amphibambusa cerosissimae Y. L. Ren, K. Habib & Q. R. Li, sp. nov. Fig. 3

MycoBank number: MB854842; Facesoffungi number: FoF17249

Etymology – The epithet refers to the species epithet of the host plant, *Bambusa cerosissima* McClure.

Description – *Saprobic* on the surface of decaying culms of *Bambusa cerosissima* McClure, forming black round spots. Teleomorph: *Ascomata* 298–381 µm wide × 271–328 µm high ($\bar{x}$ = 340.5 × 297.5 µm), solitary, scattered, immersed under the host epidermis, black, coriaceous, in

cross section globose to subglobose, ostiole at the center, clypeus lacking or undeveloped. *Peridium* 28–42 µm ($\overline{x}$ = 34.4 µm, n = 20) wide, composed of thick-walled, hyaline to brown cells of *textura angularis*. *Paraphyses* 3.8–8.9 µm ($\overline{x}$ = 5.1 µm, n = 20) diam., intermingled among asci, septate, thin-walk, with hyaline, guttulate cells. *Asci* 132–154 × 13.2–16.5 µm ($\overline{x}$ = 143 × 14.9 µm, n = 20), 8-spored, unitunicate, long-cylindrical, short-pedicellate, with a J+, disc-shaped, subapical ring, bluing in Melzer's reagent, 2.0–2.6 µm wide, 1.0–1.3 µm high ($\overline{x}$ = 2.3 × 1.1 µm). *Ascospores* 18.7–22.4 × 4.5–6.6 µm ($\overline{x}$ = 20.6 × 5.7 µm, n = 30), biseriate or uniseriate, hyaline, fusiform, 1-septate at the centre, not constricted at the septum, tapering towards both ends, with longitudinal striation along the entire length of the ascospore, lacking a germ slit, surrounded by a gelatinous sheath, 7–12 µm thick. Anamorph: Undetermined.

Material examined – CHINA, Yunnan Province, Xishuangbanna Scenic Spot, 100º54'20.15"E, 22º16'04.49"N, altitude: 969 m, on dead culm of *Bambusa cerosissima* McClure, 18 August 2023, Yulin Ren, 2023XSBNZ47 (GMB5603 holotype; GMBC5603 ex-type); *ibid*., KUN-HKAS 136277 isotype.

Additional specimen – CHINA, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28º18'56.20"N, 107º06'49.02"E, altitude: 1,538 m, on dead culm of bamboo, 2 November 2022, Youpeng Wu, XSBNZ 2022-06 (GMB5613).

Notes – Morphologically, *Amphibambusa bambusicola* differs from *A. cerosissimae* by having larger ascomata (500–800 µm in diameter), ostioles surrounded by a small blackened clypeus and ostiolar opening surrounded by the white margin. Additionally, *A. bambusicola* has larger asci (150–200 µm) and ascospores (25–27 × 5.5–6 µm) surrounded by a 10 µm thick gelatinous sheath (Liu et al. 2015).

The other species of the genus, *Amphibambusa hongheensis* differs from *A. cerosissimae* in having larger ascomata (350–600 µm diam.) with protruding carbonaceous papillae surrounded by a white margin, and larger ascospores 25.5–33 × 5.5–7 µm surrounded by a thick mucilaginous sheath (4–25 µm) (Jiang et al. 2021).

Amphibambusa subbambusicola Y.L. Ren, K. Habib & Q. R. Li, sp. nov. Fig. 4

MycoBank number: MB854843; Facesoffungi number: FoF17250

Etymology – The epithet refers to the morphologically and phylogenetically closely related species *A. bambusicola*.

Description – *Saprobic* on the surface of decaying bamboo culms, forming black round to oval spots. Teleomorph: *Ascomata* 638–876 µm high, 849–1091 µm diam., solitary, scattered, immersed under the host epidermis, black to black brown, ostiole at the center, ostiolar opening surrounded by grey margin; clypeus lacking or undeveloped. *Peridium* 32–56 µm wide, composed of thick walled, hyaline to brown cells of *textura angularis*. *Paraphyses* 3.2–6.4 µm ($\overline{x}$ = 4.5 µm, n = 20) diam., intermingled among asci, with hyaline guttulate cells. *Asci* 117–162 × 11.8–15.3 µm ($\overline{x}$ = 134.6 × 13.8 µm, n = 20), 8-spored, unitunicate, long-cylindrical, short-pedicellate, J+, subapical ring, bluing in Melzer's reagent, 1.4–2.4 µm high, 2.4–2.9 µm diam. *Ascospores* 25.7–29.9 × 6.3–7.9 µm ($\overline{x}$ = 27.2 × 7.1 µm, n = 30), biseriate or uniseriate, hyaline, fusiform, 1-septate at the centre, slightly to non-constricted at septum, tapering towards both ends, with rounded or slightly sharp ends, without striation, lacking a germ slit, surrounded by gelatinous sheath, 6–10 µm thick. Anamorph: Undetermined.

Material examined – CHINA, Yunnan Province, Xishuangbanna Scenic Spot, 100º54'20.57"E, 22º16'04.45" N, altitude: 969 m, on dead culm of bamboo, 18 August 2023, Yulin Ren, 2023XSBNZ63 (GMB5606 holotype; no culture was obtained); *ibid*., KUN-HKAS 136278 isotype.

Additional specimen – CHINA, Guizhou Province, Guiyang City, Huaxi District, Shilihetan Wetland Park, 106º41'08"E, 26º26'50"N, altitude: 1135 m, on dead culm of bamboo, 10 July 2023, Yulin Ren, HX 2023_24 (GMB5618).

Notes – Morphologically, this species is closely related to *Amphibambusa bambusicola* (Liu et al. 2015). Both species exhibit similar ascospores of almost the same size. Phylogenetically also

form a well-supported relationship. However, *A. bambusicola* differ in having larger asci (150–200 μm) and slightly thinner ascospores (25–27 × 5.5–6 μm) with longitudinal striation along the entire length of the ascospore. Additionally, ascospores of *A. bambusicola* have pointed end cells and are deeply constricted at the septum (Liu et al. 2015).

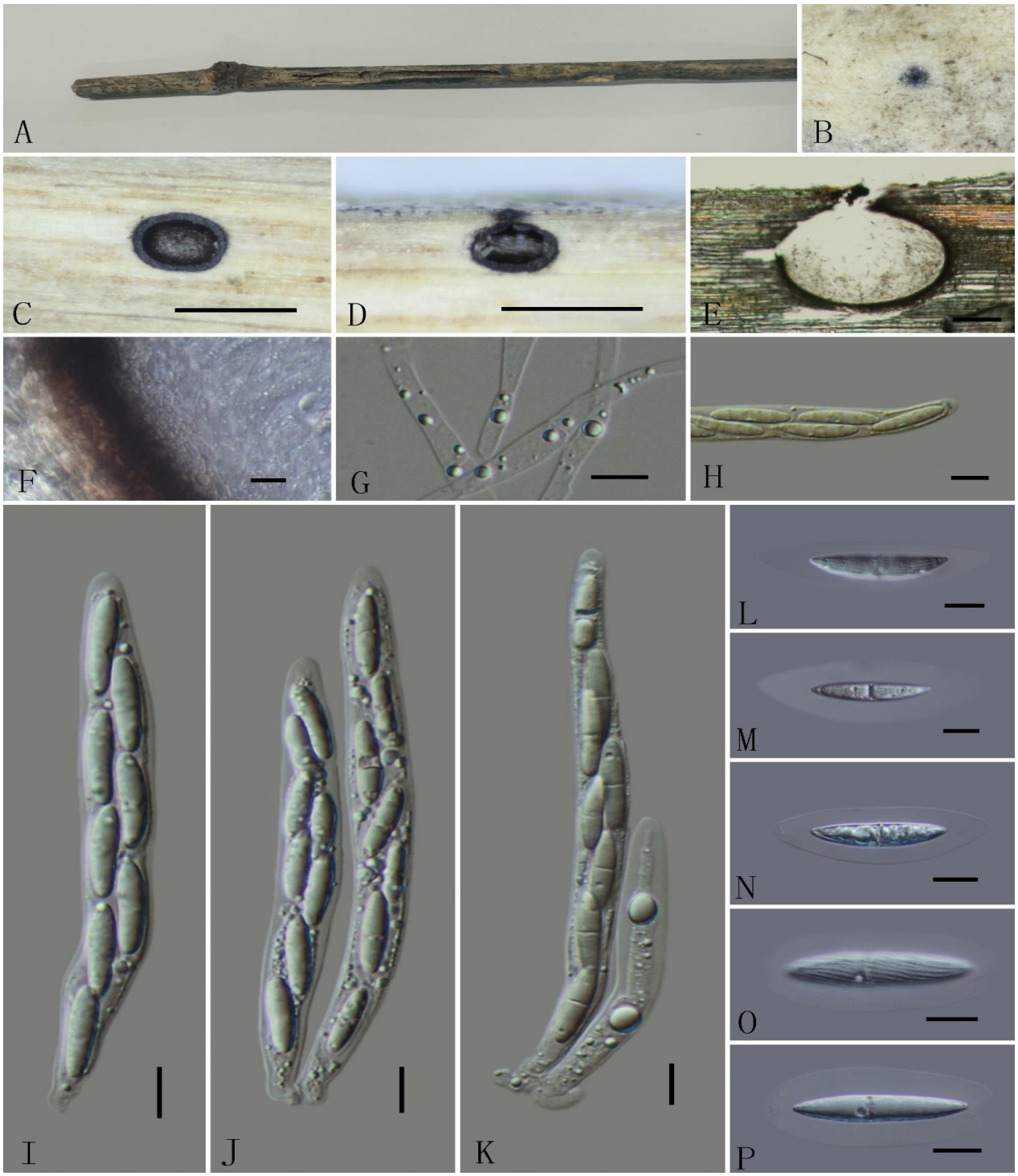

Figure 3 – *Amphibambusa cerosissimae* (GMB5603 holotype). A, B Bamboo host. C Cross section of ascoma. D, E Longitudinal sections of ascoma. F Peridium. G Paraphyses. H Apical ring (stained in Melzer's reagent). I–K Asci in distilled water. L–P Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μm, F–P = 10 μm.

The other species of the genus, *Amphibambusa hongheensis*, differs from *A. subbambusicola* in having ascomata with protruding carbonaceous papillae and larger ascospores (25.5–33 × 5.5–7

μm) with longitudinal striation, surrounded by a thick mucilaginous sheath (4–25 μm) (Jiang et al. 2021). *Amphibambusa cerosissimae* differs from *A. subbambusicola* in having smaller ascomata, 298–381 μm wide by 271–328 μm high (vs. 638–876 μm high, 849–1091 μm in diam.), and smaller ascospores, 18.7–22.4 × 4.5–6.6 μm, $\bar{x}$ = 20.6 × 5.7 μm (vs. 25.7–29.9 × 6.3–7.9 μm, $\bar{x}$ = 27.2 × 7.1 μm in *A. subbambusicola*).

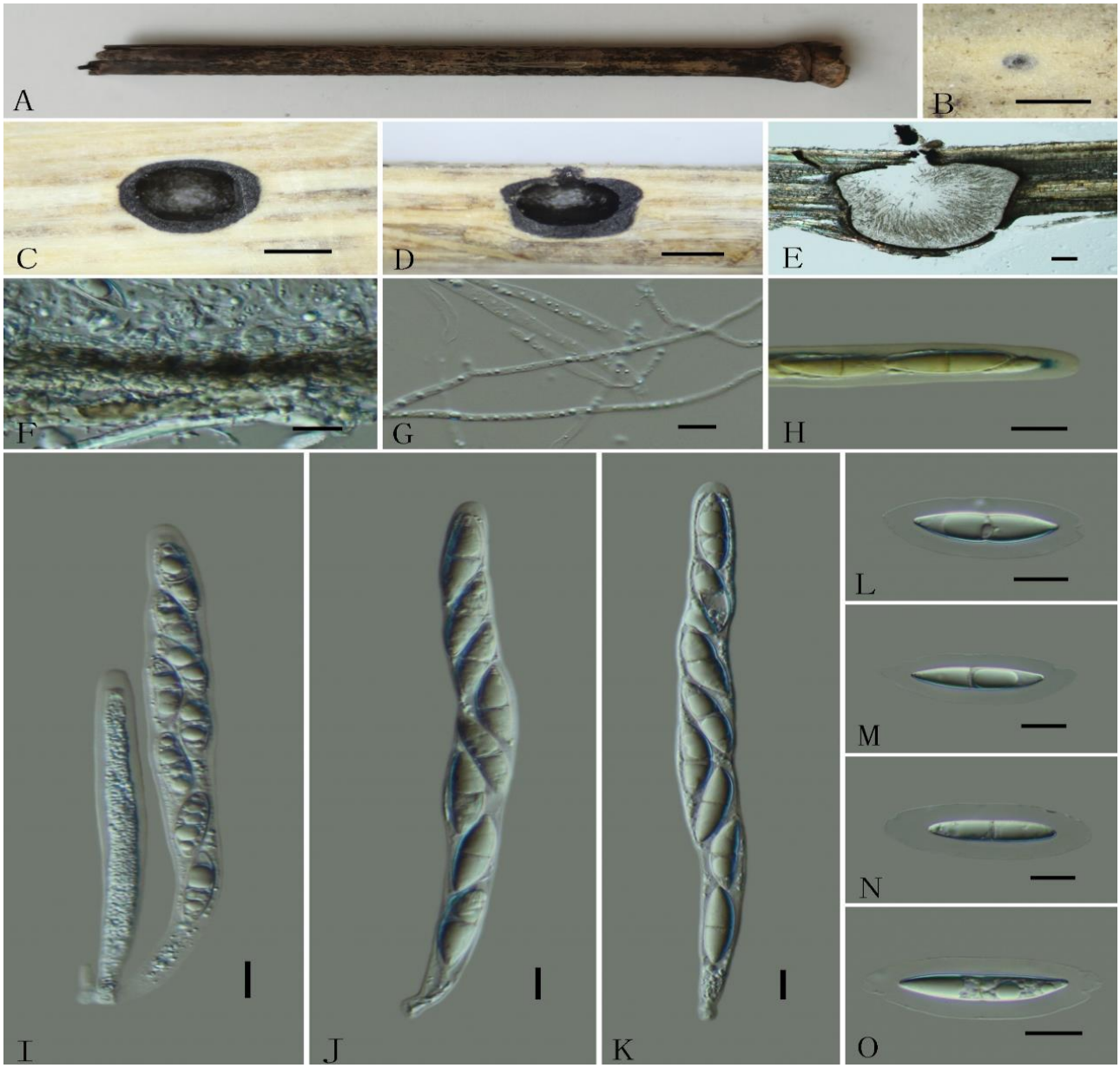

Figure 4 – *Amphibambusa subbambusicola* (GMB5606 holotype). A, B Bamboo host. C Cross section of ascoma. D, E Longitudinal sections of ascomata. F Peridium. G Paraphyses. H Apical ring (stained in Melzer's reagent). I–K Asci in distilled water. L–O Ascospores surrounded by a gelatinous sheath. Scale bars: B–D = 0.5 mm, E = 100 μm, F–O = 10 μm.

Anthostomella Sacc., Atti Soc. Veneto-Trent. Sci. Nat., Padova, Sér. 4 4: 84 (1875).

Type species – *Anthostomella tomicoides* Sacc., Atti Soc. Veneto-Trent. Sci. Nat., Padova, Sér. 4 4: [101] (1875).

Notes – *Anthostomella* is a polyphyletic genus with species characterized by immersed to semi-immersed ascomata with or without clypeus; periphysate ostiolar canals, uniseriate to biseriate, cylindrical asci, and mostly brown, ellipsoid to inequilaterally ellipsoid, aseptate ascospores with variable features (Lu & Hyde 2000, Daranagama et al. 2015).

Saccardo (1875) introduced the genus with three species, *Anthostomella limitata* Sacc., *A. tomicoides* Sacc., and *A. perfidiosa* (De Not.) Sacc., but did not designate a type. Different studies have debated the generic type, with Eriksson (1966) and Francis (1975) supporting *A. limitata* and *A. tomicoides*, respectively. Eriksson (1966) prioritized non-appendiculate ascospores, accepting *A. limitata* as the type. Francis (1975) argued *A. limitata* is not a typical species of *Anthostomella* because it has ascomata without a clypeus and proposed *A. tomicoides* as the generic type. However, Francis (1975) was unable to locate the material for *A. tomicoides*. Later, Lu & Hyde (2000) located the material and lectotypified *A. tomicoides*, and also confirmed the presence of a clypeus in *A. limitata*. Following the work of Lu & Hyde (2000) and using the lectotype of *A. tomicoides*, Daranagama et al. (2015) accepted *A. tomicoides* as the generic type. The genus comprises more than 400 species (Index Fungorum; http://indexfungorum.org/names/names.asp, accessed on June 4, 2024). In this study a new species of this genus has been described from China.

Anthostomella guangxiensis Y. L. Ren, K. Habib & Q. R. Li sp. nov. Fig. 5

MycoBank number: MB854844; Facesoffungi number: FoF17251

Etymology – The specific epithet is derived from Guangxi Autonomous Region, where the holotype was collected.

Description – *Saprobic* on dead culms of bamboo. Teleomorph: *Ascomata* 358–485 × 378–520 µm ($\bar{x}$ = 451.4 × 443.7 µm, n = 15), perithecial, deeply immersed in host tissue, solitary, subglobose, visible as black dots on the surface, with a clypeus, black or central black, with the outermost layer being black. *Ostioles* papillate, central, black, with a conical neck. *Peridium* 30–45 µm ($\bar{x}$ = 41.7 µm, n = 10), composed of many layers of polygonal, dark brown cells. *Paraphyses* 2.5–4.3 µm ($\bar{x}$ = 3.5 µm, n = 20) wide, hyaline, numerous, long-cylindrical, unbranched, septate. *Asci* 156–191 × 6.8–9.6 µm ($\bar{x}$ = 173.2 × 8.3 µm, n = 30), 8-spored, unitunicate, cylindrical, pedicellate, straight or slightly curved, apically rounded, with a wedge-shaped, J+, apical ring, 2.5–3.5 × 3–3.8 µm ($\bar{x}$ = 2.9 × 3.4 µm, n = 30), bluing in Melzer's reagent. *Ascospores* 17.1–20.4 × 5.9–7.0 µm ($\bar{x}$ = 18.4 × 6.3 µm, n = 30), uniseriate, unicellular, inequilaterally ellipsoidal, with rounded ends, smooth, with a straight to slight curved germ slit, lack mucilaginous sheath. Anamorph: Undetermined.

Materials examined – CHINA, Guangxi Zhuang Autonomous Region, Shiwandashan National Forest Park, 107º33'55.28"E, 21º41'51.40"N, altitude: 1,560 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, 2023SWDS8 (GMB5609 holotype; no culture was obtained); *ibid*., KUN-HKAS 136279 isotype.

Additional specimen – CHINA, Guangxi Zhuang Autonomous Region, Shiwandashan National Forest Park, 107º33'55.18"E, 21º41'51.58"N, altitude: 1,540 m, on dead culm of bamboo, 28 July 2023, Lili Liu, SWDS 2023-25 (GMB5616).

Notes – In the phylogram, our new collection formed a distinct lineage separate from *Anthostomella leucobasis*, *A. rhaphidophylli*, *A. yunnanensis* and *Melanographium phoenicis*, with low statistical support. However, this placement remained consistent across repeated phylogenetic analyses. Morphologically these three can be easily distinguished. *Melanographium* is a dematiaceous hyphomycete genus lacking known teleomorph (Goh & Hyde 1997, Hyde et al. 2020a). *Anthostomella leucobasis*, *A. rhaphidophylli*, and *A. yunnanensis* are differentiated by the size of their asci and ascospores, which are surrounded by a thick mucilaginous sheath (Li et al. 2024a). *Anthostomella rhaphidophylli* has smaller asci (137.5–155 × 12.5–15 µm) and larger ascospores (16.5–25 × 9–12.5 µm, averaging 21.2 × 10.6 µm); *Anthostomella leucobasis* has smaller asci (104–130 µm) and ascospores (13.4–16.4 × 5.8–6.8 µm); whereas *Anthostomella yunnanensis* possesses larger asci (200–227 × 11.6–14.6 µm) and ascospores (23.8–26.3 × 7.6–8.6 µm), all with a thick mucilaginous sheath (Li et al. 2024a). Based on distinct morphology and phylogeny, we introduce *A. guangxiensis* as a new species.

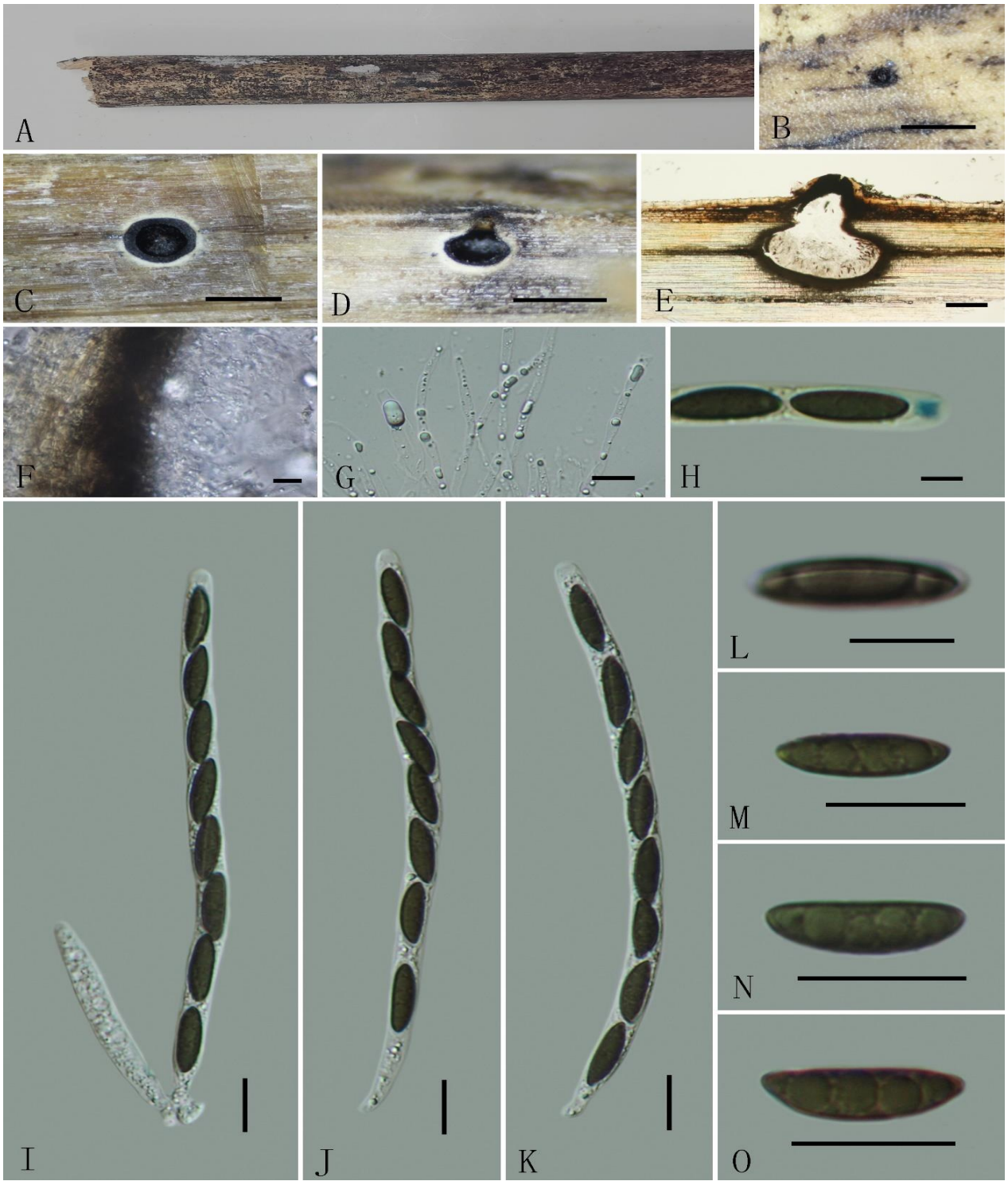

Figure 5 – *Anthostomella guangxiensis* (GMB5609 holotype). A, B Bamboo host. C Cross section of ascoma. D, E Longitudinal sections of ascomata. F Peridium. G Paraphyses. H a J+, wedge-shaped rings (stained in Melzer's reagent). I–K Asci. L–O Ascospores. Scale bars: B–D = 0.5 mm, E = 100 µm, F–O = 10 µm.

Arecophila K.D. Hyde, Nova Hedwigia 63(1–2): 82 (1996).

Type species – *Arecophila gulubiicola* K.D. Hyde, Nova Hedwigia 63(1–2): 91 (1996).

Notes – *Arecophila* is characterized by immersed, subglobose to lenticular ascomata; a peridium with *textura angularis* cells; a non- or poorly-developed clypeus; asci with a wedge-shaped apical ring, J+ in Melzer's reagent; and 2-celled, brown ascospores with wall striations, surrounded by a mucilaginous sheath (Hyde 1996, Kang et al. 1999, Umali et al. 1999).

This genus primarily occurs on monocotyledons, particularly palms and bamboo (Kang et al. 1999). As of June 2024, there are 19 *Arecophila* species listed in Index Fungorum (http://indexfungorum.org/Names/Names.asp).

Arecophila guizhouensis Y.P. Wu, K. Habib & Q.R. Li, sp. nov. Fig. 6

MycoBank number: MB854845; Facesoffungi number: FoF17252

Etymology – Named after the province where the species was collected, Guizhou Province.

Description – *Saprobic* on dead culm of bamboo. Teleomorph: *Ascomata* 326–368 × 533–640 µm ($\overline{x}$ = 340 × 588 µm, n = 10), immersed under a black clypeus, forming black ring around ostiole, solitary, slightly raised, dome-shaped areas, scattered or gregarious, subglobose to globose, with a central, erumpent, cone-shaped papilla, in vertical section. *Ostioles* papillate on the centre, black. *Peridium* 27.8–36.4 µm ($\overline{x}$ = 32 µm, n = 10) wide, comprising several layers, outer layer brown, thick-walled angular cells, inner layer hyaline. *Paraphyses* 3.6–4.8 µm ($\overline{x}$ = 4 µm, n = 10) wide, shorter than the asci, hyaline, unbranched, septate. *Asci* 160–193 × 13.4–16 µm ($\overline{x}$ = 175 × 14.2 µm, n = 30), 8-spored, unitunicate, long-cylindrical, short-pedicellate, apically rounded, with a wedge-shaped, J+, apical ring, 2.6–3.7 × 4.5–5.5 µm ($\overline{x}$ = 3.2 × 4.9 µm, n = 30). *Ascospores* 22–26.5 × 7–8.2 µm ($\overline{x}$ = 24.6 × 7.8 µm, n = 30), overlapping, uniseriate, 2-celled, light brown to dark brown, equilateral ellipsoidal, constricted at the septum, longitudinal, sulcate along the entire spore length, faint, surrounded by a mucilaginous sheath (9.1–10.6 µm, n = 30) wide, lacking germ slits and appendages. Anamorph: Undetermined.

Culture characteristics – Colonies on PDA, reached 3 cm diam. after one week, white, cottony, flat, dense, with slightly wavy margin. Not sporulating on OA nor on PDA.

Material examined – CHINA, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28º18'56.24"N, 107º06'49.04"E, altitude: 1,538 m, on dead culm of bamboo, 2 November 2022, Youpeng Wu, 2022KKS50 (GMB1138 holotype; GMBC1138 ex-type); *ibid*., KUN-HKAS 136280 isotype.

Additional specimen – CHINA, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28º18'56.48"N, 107º06'49.13"E, altitude: 1,542 m, on dead culm of bamboo, 2 November 2022, Youpeng Wu LUIAS23-2022 (GMB5614, GMBC5614).

Notes – Phylogenetically, *Arecophila guizhouensis* is closely related to *A. bambusae* and *A. xishuangbannaensis* and also shares close anatomical similarities. However, *Arecophila xishuangbannaensis* differs from *A. guizhouensis* in having large ascomata (540–700 × 320–450 µm vs. 326–368 × 533–640 µm), the white ring surrounding the ostioles of the ascomata vs. white ring absent, larger asci (180–270 × 12–14 µm vs. 160–193 × 13.4–16 µm), and ascospores surrounded by a thick mucilaginous sheath (3.5–5 µm vs. 9.1–10.6 µm) (Han et al. 2024). Based on an ITS-LSU nucleotide pairwise comparison, *A. guizhouensis* differs from *A. xishuangbannaensis* (GMB-W1283) by 15/1298 (1.3%) base pairs. *Arecophila bambusae* differ from *A. guizhouensis* in having smaller asci (132.5–140 × 7.5–8 µm vs. 160–193 × 13.4–16 µm), with a smaller subapical ring (2.5–3 µm in diam, ca. 2.5 µm high vs. 2.6–3.7 × 4.5–5.5 µm) and smaller ascospores (19–22.5 × 5.5–7 µm vs. 22–26.5 × 7–8.2 µm).

Morphologically, *Arecophila guizhouensis* resembles *A. zhaotongensis* sharing features such as a blackened clypeus, darkened raised discs, and ascospores surrounded by a similarly sized mucilaginous sheath (5–10.5 µm wide). However, *A. zhaotongensis* differs from *A. guizhouensis* in having larger ascomata (600–960 × 450–550 µm vs 326–368 × 533–640 µm), larger asci (190–240 × 10.5–14 µm vs. 160–193 × 13.4–16 µm), and slightly larger ascospores (21–30 × 6–8 µm vs. 22–26.5 × 7–8.2 µm) (Han et al. 2024). Morphologically, *A. guizhouensis* is also similar to *A. notabilis*, with similarly sized ascomata and ascospores. However, *A. notabilis* does not have a prominent clypeus, and its ascospores have a thinner mucilaginous sheath (4.4–5.2 µm vs. 9.1–10.6 µm) (Li et al. 2022). Hence, we introduce our collection as a new species based on morphology and phylogeny.

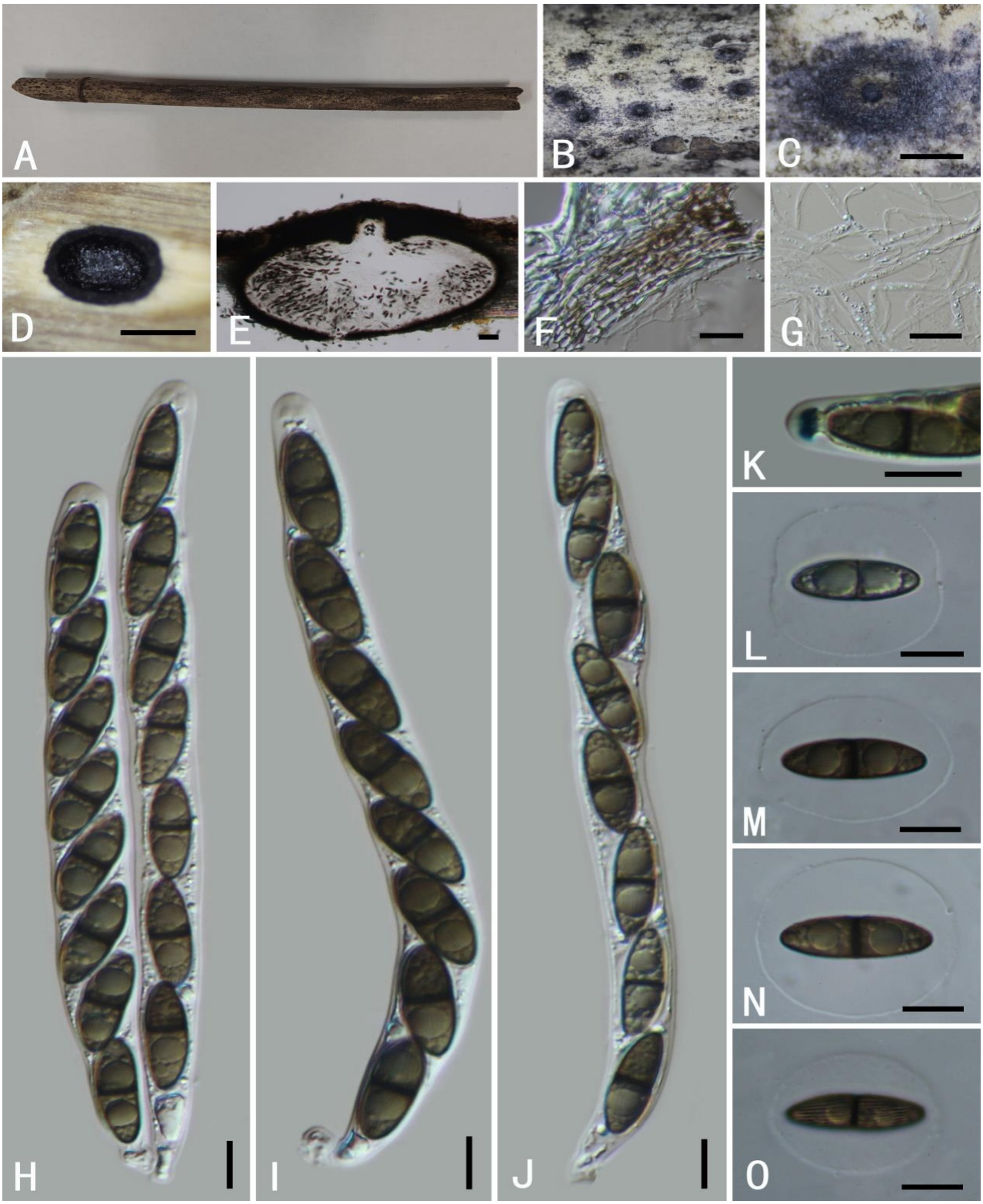

Figure 6 – *Arecophila guizhouensis* (GMB1138 holotype). A–C Bamboo host. D Transverse section of ascoma. E Longitudinal section of ascoma. F Peridium. G Paraphyses. H–J Asci in distilled water. K Ascus apical apparatus (stained in Melzer's reagent). L–O Ascospores. Scale bars: C = 0.3 mm, D = 0.5 mm, E = 50 μm, F–O = 10 μm.

Arecophila subguizhouensis Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 7

MycoBank number: MB854846; Facesoffungi number: FoF17253

Etymology – The epithet refers to its similarity with *Arecophila guizhouensis*

Description – *Saprobic* on dead culms of bamboo. Teleomorph: *Ascomata* 830–840 µm wide × 560–680 µm high ($\bar{x}$ = 874 × 616.7 µm, n = 20), immersed, solitary or scattered, sometimes gregarious, globose to subglobose, dark brown to black, lacking clypeus. *Ostioles* papillate, central, black; *Peridium* 25–35 µm thick, comprised of several layers, thick-walled, dense, brown to hyaline, cells of texture angularis. *Paraphyses* 2–7 µm ($\bar{x}$ = 3.6 µm, n = 20), hyaline, numerous, long-cylindrical, unbranched, septate. *Asci* 165–254 × 10–20 µm ($\bar{x}$ = 205.6 × 13.2 µm, n = 30), 8-spored, unitunicate, long-cylindrical, pedicellate, straight or slightly curved, apically rounded, with a wedge-shaped, J+, apical ring, 3–5 × 3.5–4.5 µm ($\bar{x}$ = 3.9 × 3.8 µm, n = 30), bluing in Melzer's reagent. *Ascospores* 21–26 × 6–8.5 µm ($\bar{x}$ = 23.5 × 7.1 µm, n = 30), overlapping, uniseriate, brown to dark brown, fusiform, 1-septate at the center, slightly constricted at the septum, tapering towards both ends, with longitudinal striation along the entire length of the ascospore, surrounded by a thick, mucilaginous sheath (6.5–9 µm, n = 30). Anamorph: Undetermined.

Materials examined – CHINA, Guangxi Zhuang Autonomous Region, Liuzhou City, Jiuwanshan National Nature Reserve, 25º12'25"N, 108º40'28"E, altitude: 1,326 m, on dead culms of bamboo, 18 November 2023, Yu-Lin Ren, 2023JWS76 (GMB5617 holotype; no culture was obtained); *ibid*., KUN-HKAS 136281 isotype.

Additional specimen – CHINA, Yunnan Province, Honghe, Daweishan National Nature Reserve, 103º43'48.48"E, 22º56'47.23"N, altitude: 1,374 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, 2023DWS13 (GMB5610).

Notes – Phylogenetically, *Arecophila subguizhouensis* is closely related to *A. bambusae*, *A. guizhouensis* and *A. xishuangbannaensis*. *Arecophila bambusae* and *A. xishuangbannaensis* mainly differ from *A. guizhouensis* in having a well-developed clypeus. Moreover, *A. xishuangbannaensis* differs from *A. guizhouensis* by having black rings around the ascomata, smaller in size (540–700 × 320–450 µm vs. 830–840 × 560–680 µm), and a wider white ring surrounding the ostioles vs. absent (Han et al. 2024), while *A. guizhouensis* has prominent black ring around ostiole (vs. absent), erumpent cone-shaped papilla (vs. not conical papillate), smaller asci (160–193 µm vs.165–254 µm) with wider apical ring (4.5–5.5 µm vs. 3.5–4.5 µm) (this study). Based on an ITS and LSU nucleotide pairwise comparison, *A. subguizhouensis* differs from *A. xishuangbannaensis* (GMB-W1283) by 7/462 bp (1.5%), and 8/818 bp [1%; from *A. guizhouensis* (GMB1138) by 8/464 bp (1.7%), and 8/818 bp (1%)].

Morphologically, *Arecophila subguizhouensis* is similar to *A. notabilis* K.D. Hyde and *A. bambusae* Umali & K.D. Hyde, both of which also lack a prominent clypeus. However, both species have smaller ascomata (400 × 360 µm and 500 × 350 µm, respectively vs. 830–840 × 560–680 µm). Moreover, *A. bambusae* has shorter asci (132.5–140 × 7.5–8 µm vs. 165–254 × 10–20 µm) and slightly smaller ascospores (19–22.5 × 5.5–7 µm vs. 21–26 × 6–8.5 µm), whereas *A. notabilis* has thinner mucilaginous sheath (4.4–5.2 µm vs. 6.5–9 µm) and smaller asci (180–220 × 11–14 µm vs. 165–254 × 10–20 µm). (Hyde 1996, Li et al. 2022). Based on distinct morphology and phylogeny, we introduce *A. subguizhouensis* as a new species.

Biscogniauxia Kuntze, Revis. gen. pl. (Leipzig) 2: 398 (1891).

Type species – *Biscogniauxia nummularia* (Bull.) Kuntze, Revis. gen. pl. (Leipzig) 2: 398 (1891).

Notes – *Biscogniauxia* has long been known as *Nummularia* Tul. & C. Tul., until Miller (1961) placed most of its members in section Applanata of *Hypoxylon*. The current concept of *Biscognauxia* was defined by Pouzar (1979, 1986) and revised by Ju et al. (1998). The genus is characterized by bipartite stromata, are internaly carbonaceous or noncarbonaceous, lacking KOH-extractable pigments, short stipe asci, iodine-positive, a broader-than-high apical ring, dark ascospores with a prominent germination slit, stout conidiophores and with nodulisporium-like or periconiella-like anamorph (Ju & Rogers 1996, Daranagama et al. 2018). *Biscogniauxia* taxa are exclusively parasites of dicotyledonous angiosperms (Ju et al. 1998). Currently, 116 *Biscogniauxia* species are listed in the MycoBank database (Accessed on October 10, 2024). In this study, one new species and a new record have been described.

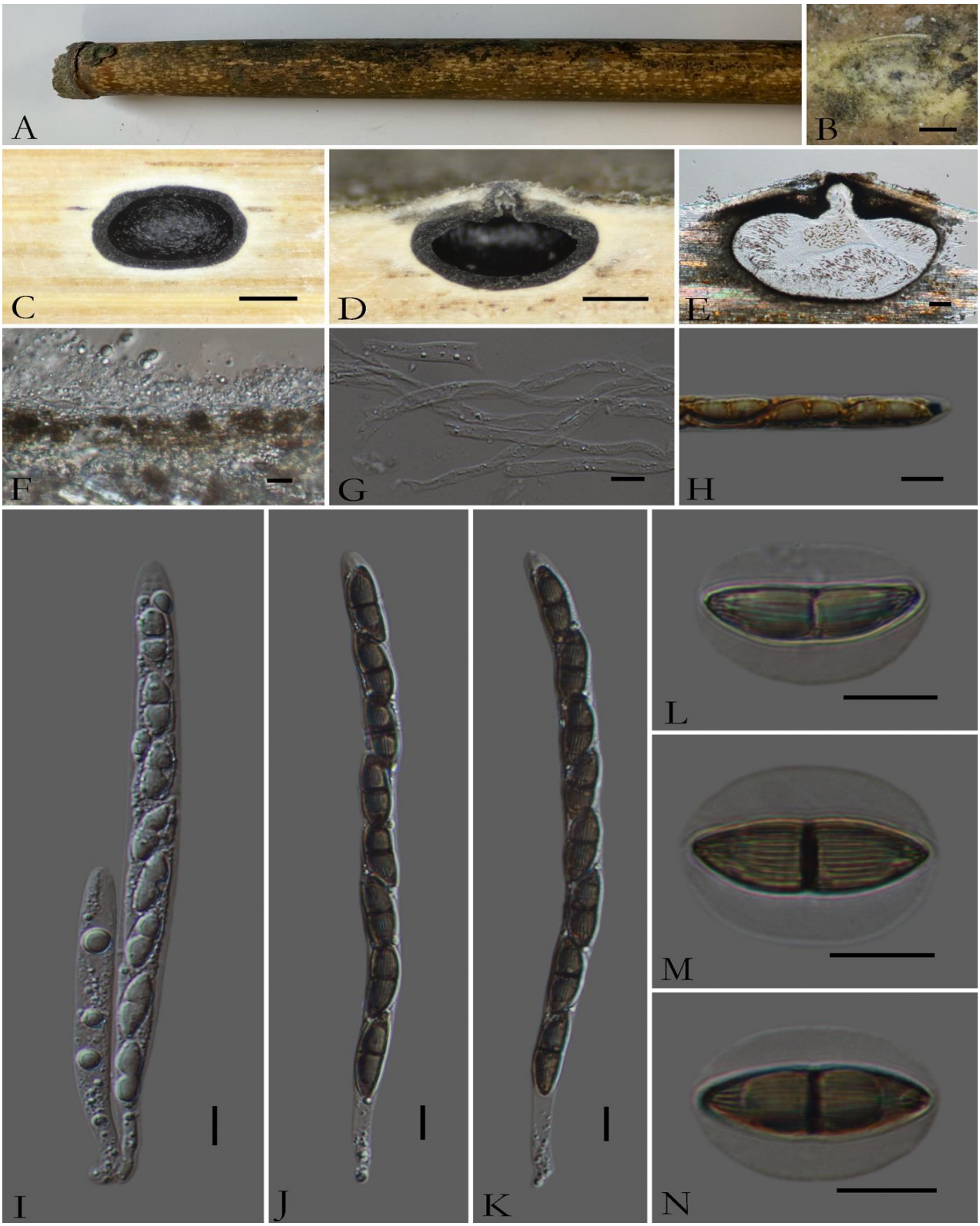

Figure 7 – *Arecophila subguizhouensis* (GMB5617 holotype). A, B. Bamboo host. C Cross section of ascoma. D, E Longitudinal section of ascoma. F Peridium. G Paraphyses. H a J+, wedge-shaped rings (Stained in Melzer's reagent). I–K Asci in distilled water. L–N Ascospores. Scale bars: C, D = 300 μm, E = 50 μm, F–N = 10 μm.

Biscogniauxia petrensis Z.F. Zhang, F. Liu & L. Cai, Persoonia 39: 11 (2017). Fig. 8
MycoBank number: MB818247

Description – *Saprobic* on dead branch of unknown plant. Teleomorph: *Stromata* 3–5 cm long, 1–2 cm wide and 0.3–0.5 mm high, flat, widely effused, black, bipartite, confluent, perithecium immersed with black ostioles. Stromatal tissue between perithecia composed entirely of carbonaceous tissue. *Ostioles* openings punctate, discretely encased by carbonaceous stromatal tissue, equal or slightly lower than stromatal surface. *Perithecia* 150–240 μm high, 100–220 μm wide ($\overline{x}$ = 117.9 × 210 μm, n = 30), solitary, black, carbonaceous, immersed, in vertical section, obovoid, globose to subglobose, ostiolate. *Asci* 82–110 × 8–10 μm ($\overline{x}$ = 94.3 × 8.8 μm, n = 20), 8-spored, unitunicate, cylindrical, short-pedicellate, apically round, with a J+, wedge apical apparatus in Melzer's reagent, 3–4.5 μm high, 3.5–4 μm wide. *Ascospores* 10–14 × 7–10 μm ($\overline{x}$ = 12.5 × 8.3 μm, n = 30), uniseriate, unicellular, hyaline when immature, dark brown to black after a while, more or less equilateral with narrowly rounded ends, smooth-walled, with a straight germ slit on the more concave side, nearly full spore length, lacking appendages and sheathes. Anamorph: undetermined.

Culture characteristics – Colonies growing on PDA reached 5 cm diam. after one week, white, cottony, flat, low, dense. Fructifications were not observed in culture.

Material examined – CHINA, Guizhou Province, Sandu Shui Autonomous County, Yaoren Mountain National Forest Park, 25º56'30.75"N, 107º57'25.52"E, altitude: 563 m, on a dead branch of an unidentified plant, 28 September 2021, Sihan Long, YRS54 (GMB0714; GMBC0714 living culture).

Note – The relationship between *Biscogniauxia petrensis* and its host is quite varied, as demonstrated by recent research (Zhang et al. 2017, Das et al. 2020, Ma et al. 2020, Samarakoon et al. 2022). *Biscogniauxia petrensis* was introduced by Zhang et al. (2017), from a karst cave based on phylogenetic analysis and examination of its anamorph morphology. Ma et al. (2020) documented this fungus living as an endophyte, within the roots of *Dendrobium harveyanum* in Thailand. In Korea, Das et al. (2020) found it within adult mosquitoes. Samarakoon et al. (2022) reported the teleomorph of this taxon. Our morphological analysis aligns with the description provided by Samarakoon et al. (2022). Additionally, BLAST searches also confirmed the similarity of our specimen to *B. petrensis.*

Biscogniauxia betulae S.H. Long, K. Habib & Q.R. Li, sp. nov. Fig. 9

MycoBank number: MB854847; Facesoffungi number: FoF17254

Etymology – Name refers to the host genus on which the fungus was collected, *Betula.*

Description – *Saprobic* on dead branch of *Betula albo-sinensis*. Teleomorph: *Stromata* 0.4–4 cm long, 0.4–1.1 cm wide and 0.3–0.4 mm high, flat, widely effused, black, bipartite, confluent, with raised margins, perithecium immersed, black. Stromatal tissue between perithecia composed entirely of carbonaceous tissue. *Ostioles* inconspicuous, discretely encased by carbonaceous stromatal tissue, equal or slightly lower than stromatal surface. *Perithecia* 150–240 μm high, 100–200 μm wide ($\overline{x}$ = 192 × 147 μm, n = 30), solitary, black, carbonaceous, immersed, in vertical section, obovoid, globose to subglobose, ostiolate. *Asci* 98.5–134 × 8–14 μm ($\overline{x}$ = 152.5 × 11.5 μm, n = 20), 8-spored, unitunicate, cylindrical, short-pedicellate, apically round, with a J+, urn-shaped apical apparatus in Melzer's reagent, 2.8–4 μm high, 3.5–4 μm wide. *Ascospores* 10–12.5 × 6.5–10 μm ($\overline{x}$ = 11.2 × 8.4 μm, n = 30), uniseriate, unicellular, hyaline when immature, dark brown to black, broadly ellipsoid to subglobose, more or less equilateral with broadly rounded ends, smooth-walled, with a straight germ slit on the more concave side, nearly full spore length, lacking appendages and sheathes. Anamorph: undetermined.

Culture characteristics: Colonies growing on PDA reached 5 cm diam. after one week at 25 ºC, white, cottony, flat, low, dense. Fructifications were not observed in culture.

Material examined – CHINA, Yunnan Province, Jinghong City, Xishuangbanna Nature Reserve, 22º11'07.21"N, 100º33'56.67"E, altitude: 1,106 m, on dead branch of *Betula albo-sinensis* Burk., 18 July 2022, Sihan Long, YGL66 (GMB0711, holotype; GMBC0711 ex-type); *ibid*., KUN-HKAS 136282 isotype.

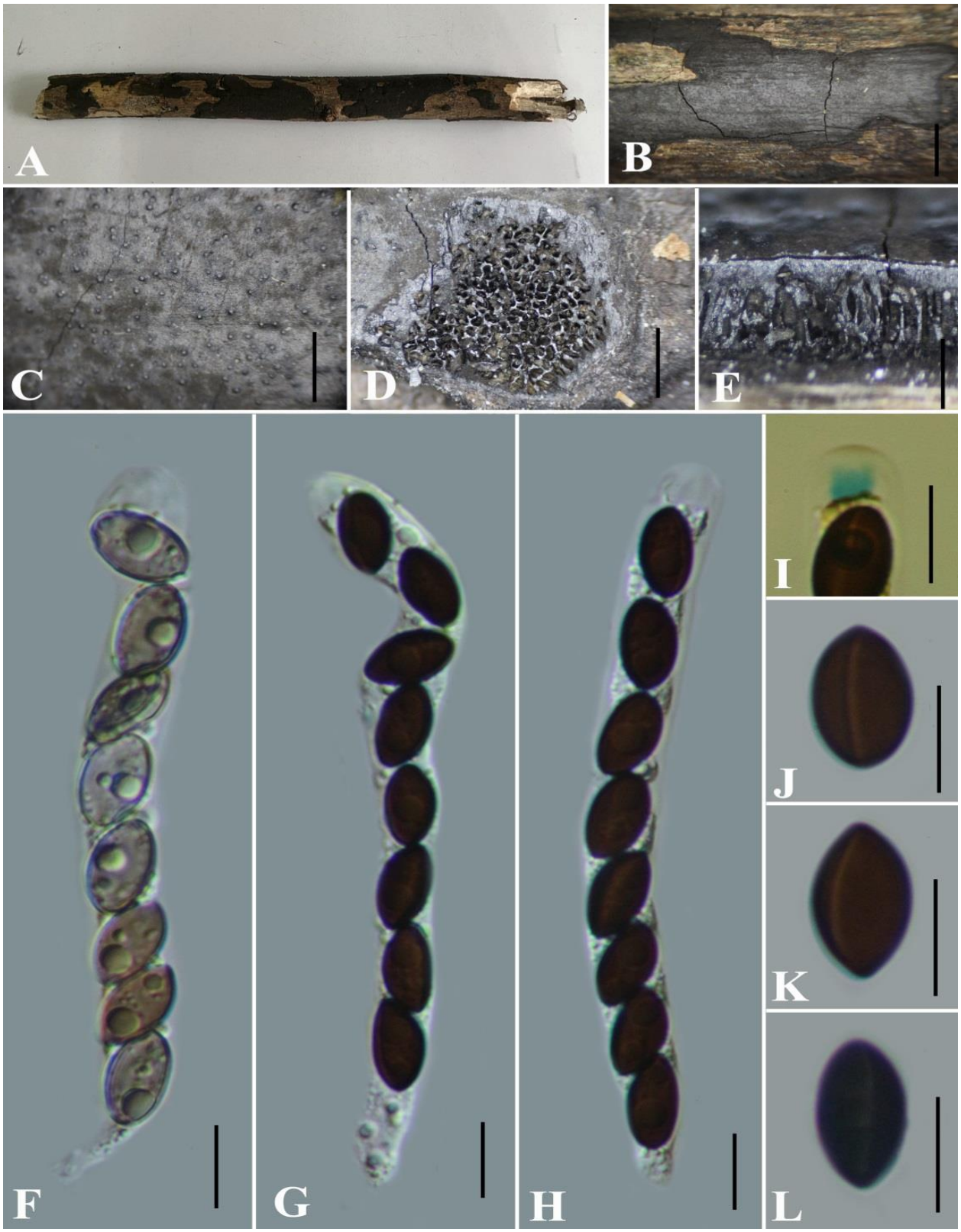

Figure 8 – *Biscogniauxia petrensis* (GMB0714). A, B Host. C Stromata on the surface of host. D Transverse section of stroma showing perithecia. E Longitudinal section of stroma. F–H Asci in distilled water. I Ascus apical apparatus (stained in Melzer's reagent). J–L Ascospores. Scale bars: B = 1 cm, C–E = 200 μm, F–L = 10 μm.

Additional specimen – CHINA, Yunnan Province, Jinghong City, Xishuangbanna Nature Reserve, 22º11'07.20"N, 100º33'56.66"E, altitude: 1116 m, on dead branch of *Betula albo-sinensis* Burk., 18 July 2022, Sihan Long, YGL173 (GMB5615, GMBC5615).

Note – *Biscogniauxia betulae* distinguished from the closely related species by its wider subglobose ascospore. In the phylogram (Fig. 1), *Biscogniauxia betulae* formed a close relationship with *B. capnodes* (99BS/1PP). However, *B. betulae* can be distinguished from *B. capnodes* by its wider ascospores (10–12.5 × 6.5–10 μm vs. 8.5–15 × 5–7.5 μm) and smaller perithecia (150–240 μm high, 100–200 μm wide vs. 0.2–0.4 mm diameter, 0.4–0.8 mm high) (Ju et al. 1998, Fournier et al. 2017). Moreover, *B. capnodes* has ellipsoidal ascospores and a smaller discoid-shaped apical apparatus (1.5–2.2 μm high) (Ju et al. 1998, Fournier et al. 2017). Morphologically, *B. betulae* shares a similar ascospore size with *B. citriformis* and *B. kalchbrenneri*. However, the ascospores of *B. citriformis* have pinched ends, and the stromata of *B. kalchbrenneri* have indistinctly raised margins, with its ascospores being narrower in size (5–6 μm) and having narrowly rounded ends (Ju & Rogers 2001). Based on these morphological differences and phylogeny, we introduce *B. betulae* as a new species.

Cainia Arx & E. Müll., Acta bot. neerl. 4(1): 111 (1955).

Type species – *Cainia graminis* (Niessl) Arx & E. Müll., Acta bot. neerl. 4(1): 112 (1955)

Notes – The genus *Cainia* was erected by von Arx & Müller (1955) to accommodate *Delitschia graminis* Niessl. The genus is characterized by immersed ascomata, cylindrical asci with a J+ apical apparatus featuring a series of rings, and two-celled, brown ascospores with longitudinal striations surrounded by a mucilaginous sheath.

Krug (1978) placed *Cainia* in a distinct family Cainiaceae because of its longitudinal germ slits in the ascospores and the complex ascus ring comprising a series of rings. Senanayake et al. (2015) designated a reference specimen for the type *Cainia graminis.* and provided phylogenetic placement to accommodate genera in Cainiaceae. Currently, seven *Cainia* species are listed in MycoBank (Accessed on September 8, 2024). In this study, two new species of *Cainia* are introduced.

Cainia daweishanensis Y. L. Ren, K. Habib & Q. R. Li, sp. nov. Fig. 10

MycoBank number: MB854848; Facesoffungi number: FoF17255

Etymology – The epithet refers to the locality of the type specimen, Daweishan National Nature Reserve

Description – *Saprobic* on dead branch of bamboo. Teleomorph: *Ascomata* 676.7–786.7 × 585–618.6 μm ($\bar{x}$ = 729.4 × 602.9 μm, n = 10), solitary, scattered, immersed under the host epidermis, black, coriaceous, ostiole at the center, visible as black dots on the surface. lacking clypeus. *Ostioles* papillate, central, black, with a cylindrical neck, 115–150 μm high, 85–100 μm wide. *Peridium* 55–71.7 μm ($\bar{x}$ = 62.9 μm, n = 10) wide, with two cell layers, outer layer thick, comprising brown to dark brown, thick-walled cells of *textura angularis*, inner layer thin, composed of hyaline, thin-walled cells of *textura angularis*. *Paraphyses* 2.4–4.8 μm ($\bar{x}$ = 3.6 μm, n = 20) wide, longer than asci, numerous, filamentous, sinuous, septate, constricted at the septa, guttulate, embedded in a gelatinous matrix. *Asci* 146–227 × 8.4–13.5μm ($\bar{x}$ = 191.7 × 13.9 μm, n = 20), 8-spored, unitunicate, cylindrical, short-pedicellate, with a layered apical apparatus, bi-lobed J+, bluing in Melzer's reagent, 3.7–4.5 × 3.2–3.8 μm ($\bar{x}$ = 4.2 × 3.5 μm, n = 10). *Ascospores* 23.7–27.8 × 6.3–7.5 μm ($\bar{x}$ = 25.4 × 7.0 μm, n = 30), uniseriate, brown, fusiform to broadly ellipsoidal, multi guttulate, with slightly rounded ends, without striation, lacking a germ slit and mucilaginous sheath. Anamorph: Undetermined.

Material examined – CHINA, Yunnan Province, Honghe, Daweishan National Nature Reserve, 103º43'48.14"E, 22º56'47.55"N, altitude: 1374 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, DWS17 (GMB5619 holotype; no culture was obtained); *ibid*., KUN-HKAS 136283 isotype.

Additional specimen – CHINA, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28º18'56.20"N, 107º06'49.02"E, altitude: 1,538 m, on dead culm of bamboo, 2 November 2022, Youpeng Wu, 2022KKS35 (GMB5624).

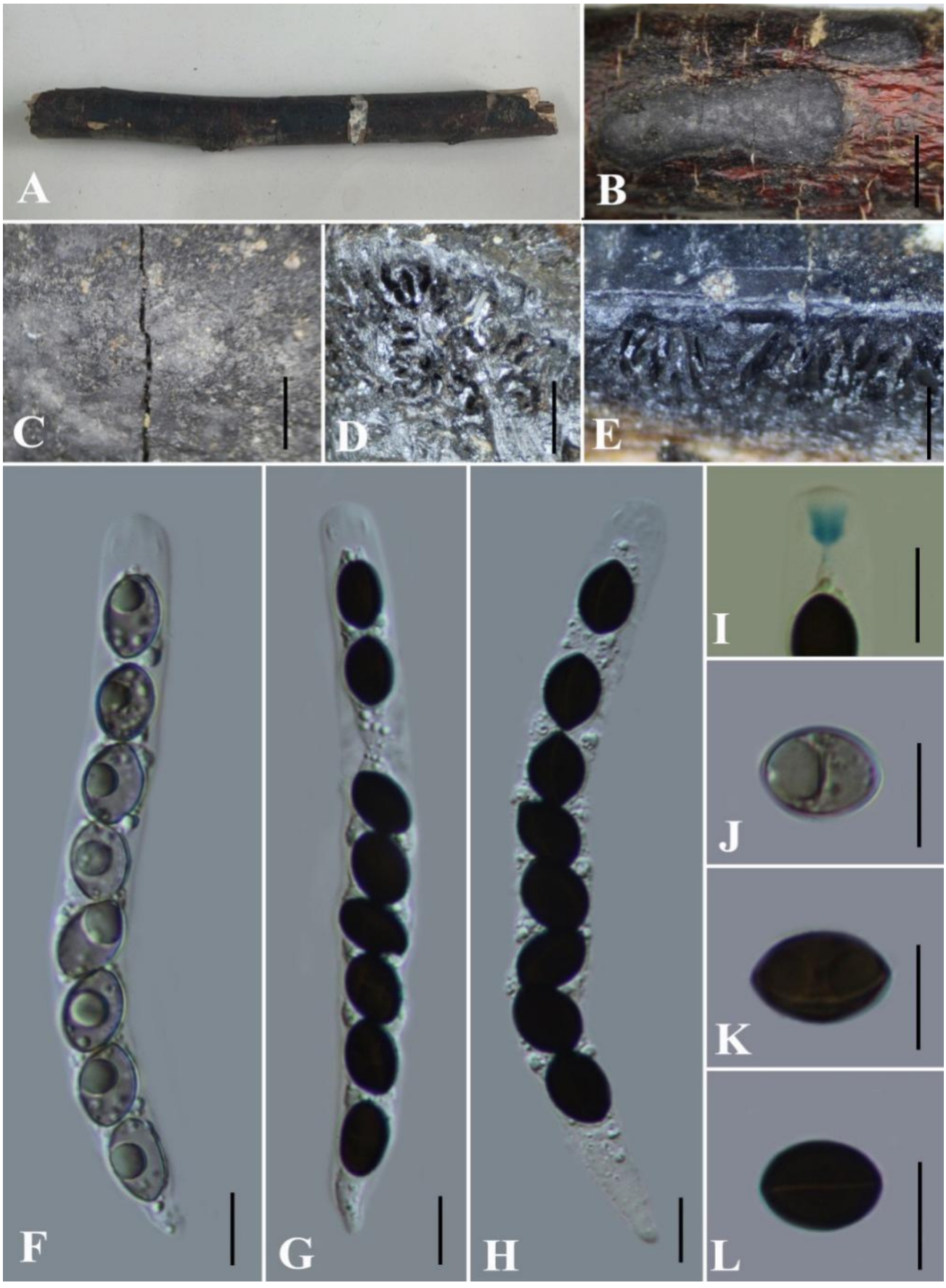

Figure 9 – *Biscogniauxia betulae* (GMB0711 holotype). A, B Host *Betula albo-sinensis*. C Stromata appearance. D Transverse section of stroma. E Longitudinal section of stroma. F–H asci

in distilled water. I Ascus apical apparatus (stained in Melzer's reagent). J–L Ascospores. Scale bars: B = 1 cm, C–E = 200 µm, F–L = 10 µm.

Notes – In the phylogram (Fig. 1), the sequences of our new *Cainia* species formed a well-supported (80BS/0.93PP) separate clade outside a group comprised of *C. anthoxanthis*, *C. desmazieri*, *C. globose* and *C. graminis*. Morphologically, *Cainia daweishanensis* is differentiated from all other species within the genus by the lack of striation on ascospores. The type species of the genus *Cainia graminis* (Niessl) Arx & E. Müll. can be differentiated by having larger stromata, (400–1000 µm diam.), with a thick clypeus, a larger apical apparatus (11–14 × 6–8 µm), and larger fusiform ascospores with a prominent apical pad (34–41 × 11–14 µm), possessing 8 longitudinal germ slits (Krug 1978).

Cainia anthoxanthis Senan. et al. differs in having smaller ascomata 230–250 µm in diameter, asci with a biseriate ascospore arrangement, a larger apical apparatus 6.5–8.5 × 6–9.5 µm, and larger ascospores 25–35 × 10–15 µm with 8 longitudinal striations (Senanayake et al. 2015).

In terms of ascospore and apical apparatus size, it is similar to *C. desmazieri* C. Moreau & E. Müll, but *C. desmazieri* differs in having a 15–20 µm thick clypeus, smaller ascomata 500–600 × 400–450 µm and thicker ascospore (9–11 µm) with 8 longitudinal striations. A bi-lobed apical apparatus was found in *Cainia globosa* Senan., Camporesi & K.D. Hyde, but it differs in having smaller ascomata 250–360 × 210–315 µm and striated larger ascospores 30–35 × 14–17 µm (Krug 1978). Based on the above differences and phylogeny, we introduce *C. daweishanensis* as a new species.

Cainia shilihetanensis Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 11

MycoBank number: MB854849; Facesoffungi number: FoF17256

Etymology – The epithet refers to the locality of the type, Shilihetan Wetland Park

Description – *Saprobic* on dead culms of bamboo. Teleomorph: *Ascomata* 736–1031 × 574–709 µm ($\overline{x}$ = 899.8 × 636.1 µm, n = 20), immersed, solitary or scattered, sometimes gregarious, globose to subglobose, dark brown to black, lacking clypeus. *Ostioles* flush with surface or slightly papillate, central, black; *Peridium* 22–25 µm thick, comprised of several layers, thick-walled, dense, brown to hyaline, cells of *textura angularis*. *Paraphyses* 4.1–6.9 µm µm ($\overline{x}$ = 5.1 µm, n = 20), hyaline, numerous, long-cylindrical, unbranched, septate. *Asci* 160–265 × 11.3–16.5 µm ($\overline{x}$ = 214.6 × 12.9 µm, n = 30), 8-spored, unitunicate, long-cylindrical, short-pedicellate, straight or slightly curved, apically rounded, with a bi-lobed, J+, apical ring, 4.3–5.4 × 3.7–4.3 µm ($\overline{x}$ = 4.9 × 4.0 µm, n = 30), bluing in Melzer's reagent. *Ascospores* 27.9–32.6 × 8.7–10.5 µm ($\overline{x}$ = 30.6 × 9.8 µm, n = 30), overlapping, uniseriate, hyaline when immature, brown to dark brown when mature, fusiform, bi-guttulate 1-septate at the center, slightly constricted at the septum, tapering towards both ends, with a single longitudinal striation in both cells, lacking mucilaginous sheath. Anamorph: Undetermined.

Material examined – CHINA, Guizhou Province, Guiyang City, Huaxi District, Shilihetan Wetland Park, 106°40'30.14"E, 26°27'13.21"N, altitude: 1,138 m, on dead culm of bamboo, 18 June 2023, Yulin Ren, SLHT33 (GMB5612 holotype; no culture was obtained); *ibid*., KUN-HKAS 136284 isotype.

Additional specimen – CHINA, Guizhou Province, Guiyang City, Huaxi District, Shilihetan Wetland Park, 106°40'30.57"E, 26°27'12.05"N, altitude: 1,135 m, on dead culm of bamboo, 18 July 2023, Yulin Ren, SLHT18 (GMB5622).

Notes – Phylogenetically and morphologically, *Cainia shilihetanensis* is closely related to *C. daweishanensis*; however, the *C. daweishanensis* differs from *C. shilihetanensis* in having smaller ascomata 676.7–786.7 × 585–618.6 µm, fusiform to broadly ellipsoidal, and multi-guttulate smaller ascospores 23.7–27.8 × 6.3–7.5 µm without striation (this study). Differentiation from other known species of the genus is discussed in the note section of the above-described *C. daweishanensis*.

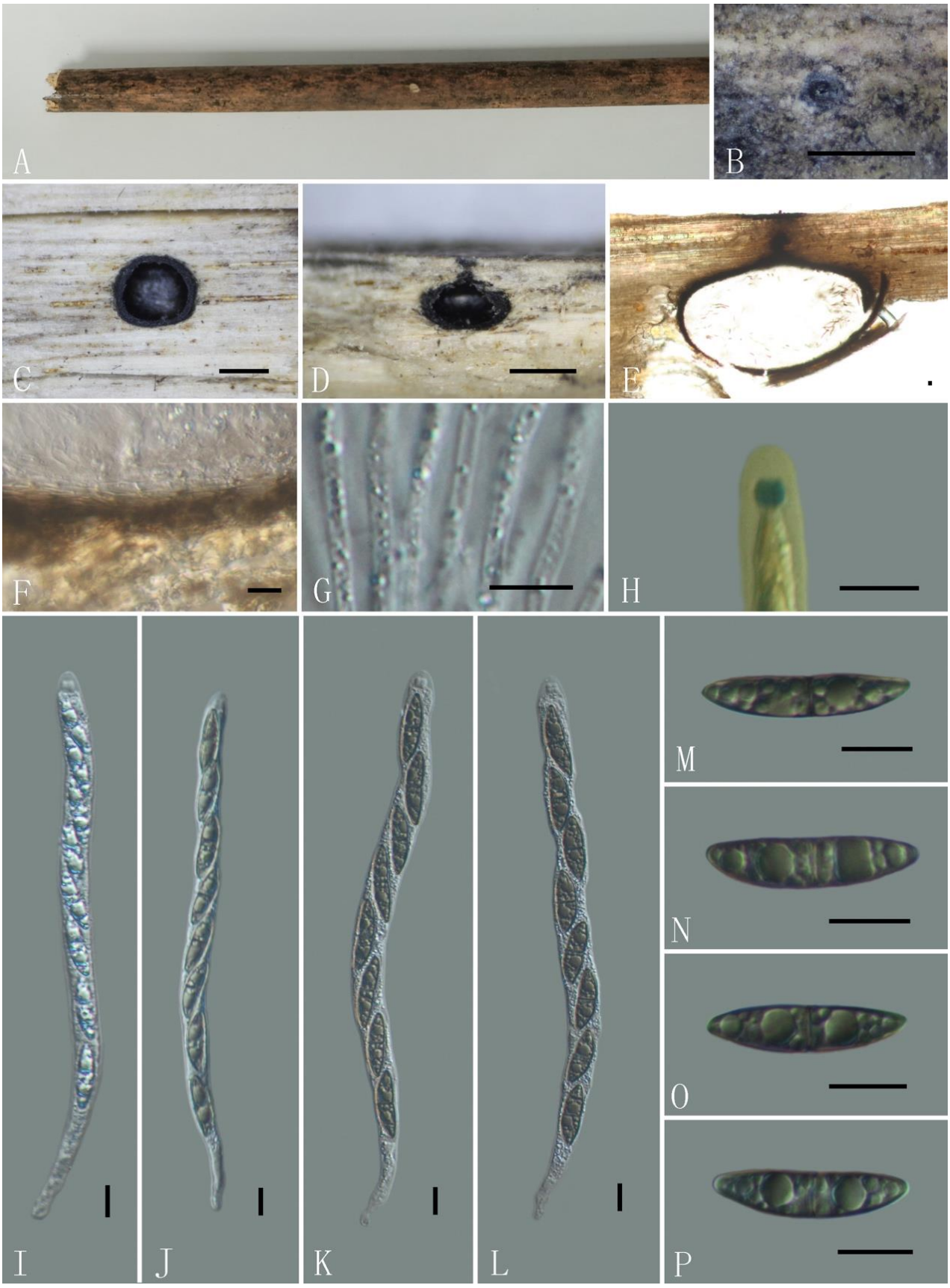

Figure 10 – *Cainia daweishanensis* (GMB5619 holotype). A, B Bamboo host. C Cross section of ascoma. D, E Longitudinal section of ascoma. F Peridium. G Paraphyses. H Apical ring (stained in Melzer's reagent). I–L Asci with ascospores. M–P Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μm, F–P = 10 μm.

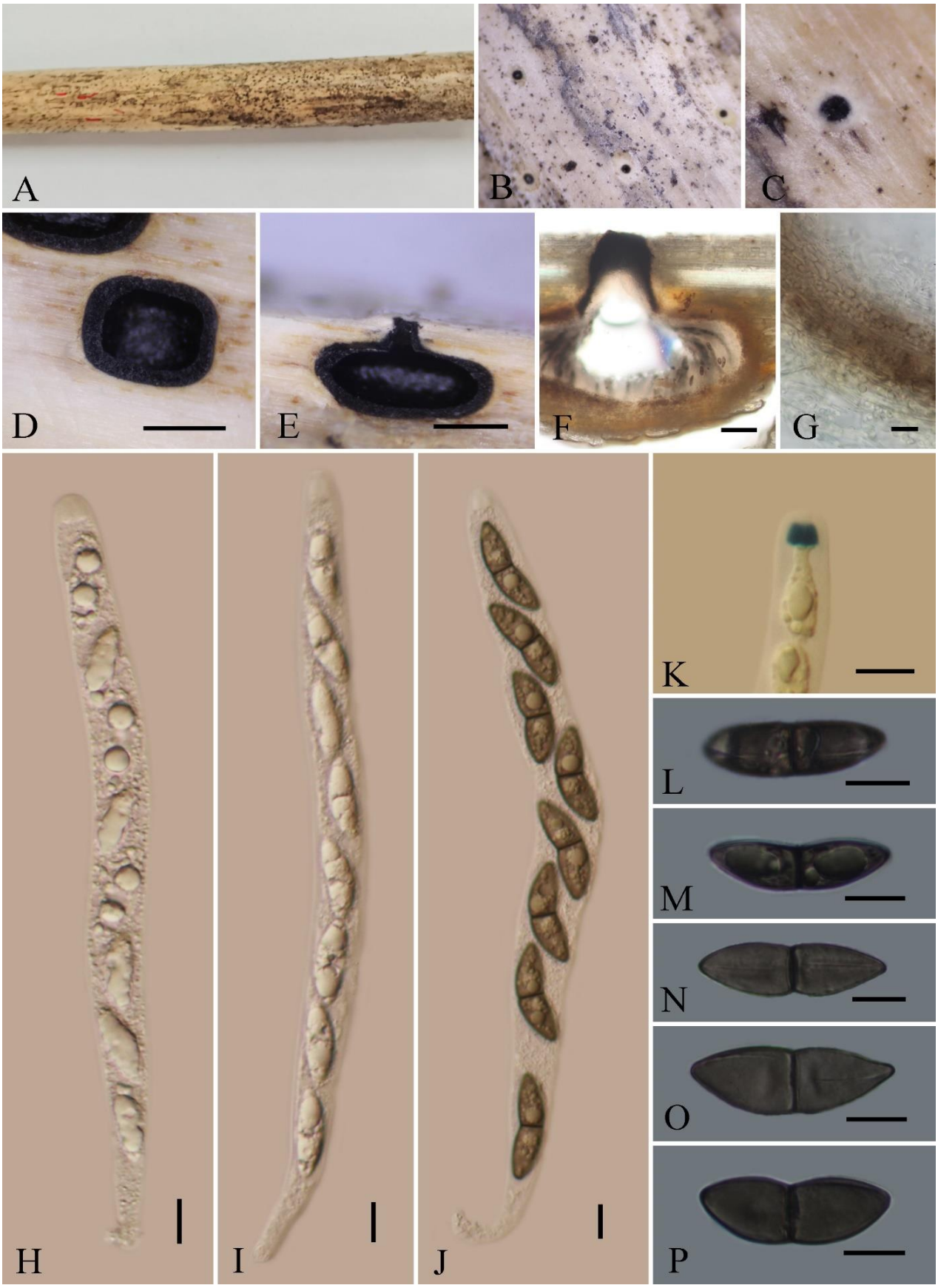

Figure 11 – *Cainia shilihetanensis* (GMB5612 holotype) A–C Bamboo host. D. Transverse section of perithecium. E, F Longitudinal section of perithecium. G Peridium. H–J Asci in distilled water. K a J+ apical rings (Stained in Melzer's reagent). L–P Ascospores. Scale bars: D, E = 0.5 mm, F = 100 µm, G–P = 10 µm.

Daldinia Ces. & De Not., Comm. Soc. crittog. Ital. 1(fasc. 4): 197 (1863).

Type species – *Daldinia concentrica* (Bolton) Ces. & De Not., Comm. Soc. crittog. Ital. 1(fasc. 4): 197 (1863).

Notes – Cesati & De Notaris (1863) introduced this genus with relatively large stromata, most of which exhibit internal alternating zones. This genus includes around 50 species that typically grow on angiosperm hosts. *Daldinia* is characterized by perithecia immersed in globose to claviform stromata, which can be copper, violet, wine, brown, or black in color, and release pigments that are ochraceous, purple, greenish, or grey when treated with KOH, cylindrical, stipitate asci with an apical amyloid pore, and ellipsoid, brown ascospores that can be smooth or ornamented (Barbosa-Resendiz et al. 2020). The anamorph of *Daldinia* was described in the genus *Nodulisporium* (Barbosa-Resendiz et al. 2020). In the present study a new species *Daldinia guizhouensis* has been described.

Daldinia guizhouensis S. H. Long & Q. R. Li, sp. nov. Fig. 12

MycoBank number: MB854850; Facesoffungi number: FoF17257

Etymology – The epithet refers to its collection location, Guizhou Province, where the holotype was collected.

Description – *Saprobic* on dead wood of unidentified wood. Teleomorph: *Stromata* subglobose, sessile, 3–4 × 3–4 × 2–3 cm; surface reddish brown in young stromata, finally blackening; tissue between perithecia brown, pithy to woody and below the perithecial layer composed of alternating zones, darker zones dark vinaceous brown, pithy to woody, 0.1–0.25 mm thick, lighter zones white to greyish brown, slightly gelatinous when fresh but becoming very hard when dry, becoming pithy to woody, persistent, 0.8–1.5 mm thick. Stromatal pigments in KOH dilute, Sepia (63), Umber (9), or Fuscous Black (104). *Perithecia* obovoid or lanceolate, 0.5–1.5 × 0.2–0.5 mm. *Ostioles* slightly papillate. *Asci* 205–225 × 8–9 µm ($\overline{x}$ = 218 ×8.5 µm, n = 20), spore bearing part (57.5) 72–88 µm, with amyloid, discoid apical apparatus 3.2–4 wide, 0.8–1.3 µm high ($\overline{x}$ = 3.5 × 1.1 µm, n = 10). *Ascospores* 12–15.5 × 5.5–7.5 µm ($\overline{x}$ = 13.7 × 6.4 µm, n = 30), hyaline when immature and dark brown when mature, slender, ellipsoid-inequilateral, with rounded ends, germ slit straight, spore length or slightly less than spore length, perispore dehiscent in 10% KOH. Anamorph: Undetermined.

Culture characteristics – Ascospores germinating on PDA after 24 hours, colonies white when young, became pale yellow circular to irregular, medium dense, flat or effuse, slightly raised, fluffy to powder, margin rough, yellow-greenish from below, no pigmentation produced on PDA medium.

Material examined – CHINA, Guizhou Province, Duyun City, The Forest on the Rock, 25°17'30.34"N, 107°56'16.20"E, altitude: 1,267 m, on branches of an unidentified plant, 12 September 2021, S. H. Long & Q. R. Li., SSSL5 (GMB0719, holotype; GMBC0719 ex-type); *ibid*., KUN-HKAS 136285 isotype.

Other material examined – CHINA, Guizhou Province, Duyun City, The Forest on the Rock, 25°17'59.36"N, 107°56'03.26"E, altitude: 1,267 m, on branches of an unidentified plant, 12 September 2021, S. H. Long, SSSL63 (GMB5611).

Note – Morphologically, *Daldinia guizhouensis* is closely related to *D. mexicana* F. San Martín et al. and *D. gelatinosa* Y.-M. Ju et al. However, the stromata of *D. mexicana* appear honey, isabelline, or fawn in 10% KOH, whereas those of *D. gelatinosa* exhibit dark livid KOH-extractable pigments. Additionally, the ascospores of both species have narrowly rounded ends (Ju et al. 1997). In contrast, *D. guizhouensis* exhibit Sepia, Umber, or Fuscous Black in 10% KOH.

The stromata coloration in 10% KOH of *Daldinia guizhouensis* is similar to that of *D. steglichii*. However, the stromata of the latter species exhibit inconspicuous perithecial outlines and wrinkles, with larger asci 220–325 × 10–11 µm. Additionally, the size of the stromata of *D. steglichii* is smaller (1–2.5 × 0.7–1.7 cm vs. 3–4 × 3–4 × 2–3 cm) (Stadler et al. 2014). The strains SAUCC 242404 and SAUCC 242405, appearing as sister to *D. guizhouensis* in the phylogenetic analysis, were recently published as *D. menghaiensis. Daldinia menghaiensis* is

distinguished from *D. guizhouensis* by its isolation from decayed leaves, with no teleomorph reported for the species. Phylogenetic analyses and morphological data showed *D. guizhouensis* to be distinct from other known species of the genus. We therefore describe these specimens as a new species.

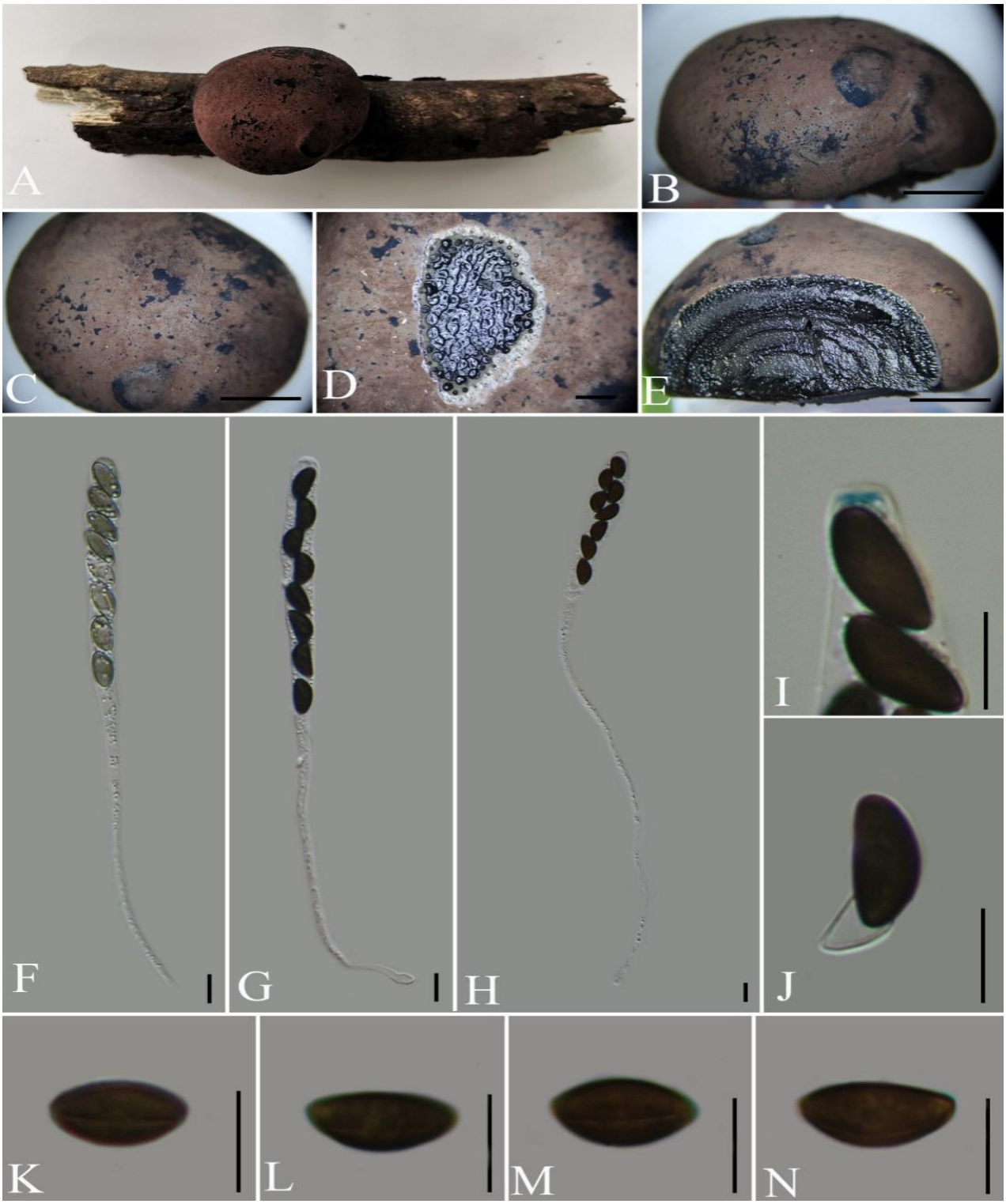

Figure 12 – *Daldinia guizhouensis* (GMB0719 holotype). A Host. B, C Enlarged view of stromata. D Transverse section of stroma showing perithecia. E Longitudinal section of stromata. F–H asci in distilled water. I Ascus apical apparatus (stained in Melzer's reagent). J Indehiscent perispore in 10% KOH. K–N Ascospores. Scale bars: B–C, E = 1 cm, D = 5 mm, F–N = 10 μm.

Digitodochium Tubaki & Kubono, Sydowia 41: 344 (1989).

Type species: *Digitodochium rhodoleucum* Tubaki & Kubono, Sydowia 41: 346 (1989).

Notes – The genus *Digitodochium* was established by Tubaki & Kubono (1989) to accommodate *D. rhodoleucum*, based on the staurosporous anamorph, found on corticated twigs of *Fagus crenata* in Japan. Voglmayr et al. (2022) described its teleomorph and provided diagnostic characteristics, lopadostoma-like pseudostromata covered by a white disc, and ascospores with a lateral poroid germination site. The morphological diagnostic characteristics given by Voglmayr et al. (2022) do not entirely match our collections, except for the poroid germination site. Sequence data from our collections confirm that our specimens are closely related to *Digitodochium* species, forming a well-supported clade. This molecular evidence supports their classification within the genus *Digitodochium*.

Digitodochium damingshanense Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 13

MycoBank number: MB854851; Facesoffungi number: FoF17258

Etymology – The epithet refers to the locality of the type specimen, Damingshan National Nature Reserve.

Description – *Saprobic* on a dead branch of bamboo. Teleomorph: *Ascomata* 422–543 µm high, 576–663 µm diam., solitary, scattered, immersed under the host epidermis, black, coriaceous, ostiole at the center. *Peridium* 45–63 µm ($\bar{x}$ = 53 µm, n = 10) wide, with two cell layers, outer layer thick, comprising brown to dark brown, thick-walled cells of texture angularis, inner layer thin, composed of hyaline, thin-walled cells of texture angularis. *Paraphyses* 3.6–6.5 µm ($\bar{x}$ = 4.8 µm, n = 20) wide, longer than asci, numerous, filamentous, sinuous, septate, constricted at the septa, guttulate, embedded in a gelatinous matrix. *Asci* 177–208 × 8.4–13.1 µm ($\bar{x}$ = 197 × 10.1 µm, n = 20), 8-spored, unitunicate, cylindrical, short-pedicellate, apically rounded with a 2.6–3.5× 3.2–4.0 µm ($\bar{x}$ = 3.8 × 3.2 µm, n = 10), J+ in Melzer's reagent. *Ascospores* 17.5–23.3 × 5.1–6.5 µm ($\bar{x}$ = 20.5 × 6.0 µm, n = 30), uniseriate, brown, aseptate, oblong to broadly ellipsoidal, covered with a mucilaginous sheath, large brown cell polar with a thin mucilaginous cap clearly visible when immature, pointed distal, basal ends with a small, hyaline, rounded, basal cell. Anamorph: Undetermined.

Culture characters – Ascospores germinating on PDA within 36 h, colonies growing slowly on PDA, reaching 5 mm in 2 weeks at 28°C, effuse, velvety to hairy, irregular circular, irregular at the margin, white from above, pale yellowish white from below. Mycelium immersed in the media, composed of branched, septate, smooth-walled, hyaline, hyphae.

Material examined – CHINA, Guangxi Zhuang Autonomous Region, Damingshan National Nature Reserve, 108º42'33.23"E, 22º47'3.52"N, altitude: 1,560 m, on dead culm of bamboo, 25 July 2023, Yulin Ren, DMS13 (GMB5605 holotype; GMBC5605, ex-type); *ibid*., KUN-HKAS 136286 isotype.

Additional specimen – CHINA, Guangxi Zhuang Autonomous Region, Damingshan National Nature Reserve, 108º42'33.13"E, 22º47'3.59"N, altitude: 1,571 m, on dead culm of bamboo, 25 July 2023, Yulin Ren, DMS_2023-09 (GMB5620, GMBC5620).

Notes – In the BLAST search, the sequences of *Digitodochium damingshanense* show a close relationship to *D. amoenum*. *Digitodochium amoenum* is distinguished by its white ectostromatic disc, 1–4 ostiolar necks per disc, perithecia arranged in a valsoid configuration, and large ascospores 20–33.5 × 8.5–14 µm (Voglmayr et al. 2022). Morphologically, *D. damingshanense* resembles *D. xishuangbannense*, and phylogenetically, it also appears as sister species. However, *D. xishuangbannense* differs in having smaller ascospores (14.7–18.9 × 5.7–7.8 µm vs. 17.5–23.3 × 5.1–6.5 µm) lacking a mucilaginous sheath (this study).

The genus *Digitodochium* can be diagnosed by lopadostoma-like pseudostromata overlain by a white disc and ascospores with a lateral poroid germination (Voglmayr et al. 2022). However, our species does not exhibit the lopadostoma-like pseudostromata overlain by a white disc. Based on phylogenetic analysis, our collections show a well-supported distinct lineage in *Digitodochium* s. str. Therefore, we classify our species within *Digitodochium*.

The close relative of the genus (Fig. 1), *Occultitheca rosae*, has ascospores of comparable size and possesses a mucilaginous sheath, but it has smaller ascocarps 360–385 × 350–420 µm, smaller asci 90–140 µm, and a much thinner mucilaginous sheath. *Magnostiolata mucida* Samarak. & K.D. Hyde, differs in having funnel-shaped ostiolar canals filled with amorphous cells and smaller ascospores 12.5–18 × 6.5–9 µm surrounded by a thicker (up to 15 µm) mucilaginous sheath (Samarakoon et al. 2022).

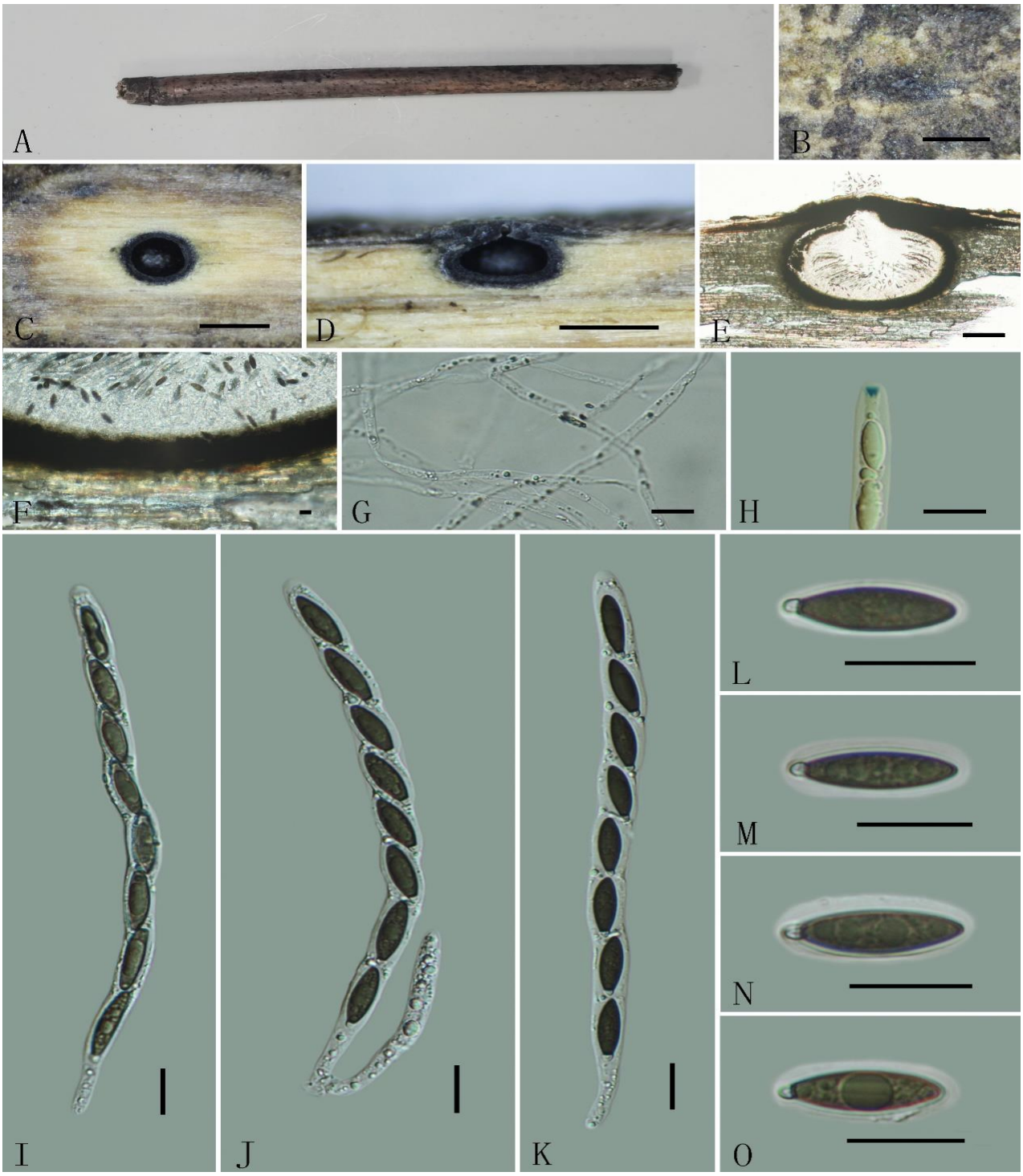

Figure 13 – *Digitodochium damingshanense* (GMB5605 holotype). A, B Bamboo host. C Cross section of ascoma. D, E Longitudinal section of ascoma. F Peridium. G Paraphyses. H subapical ring (stained in Melzer's reagent). I–K Asci in distilled water. L–O Ascospores surrounded by a gelatinous sheath. Scale bars: B–D = 0.5 mm, E = 100 µm, F–O = 10 µm.

Digitodochium xishuangbannense Y. L. Ren, K. Habib & Q. R. Li, sp. nov. Fig. 14

MycoBank number: MB854852; Facesoffungi number: FoF17259

Etymology – The epithet refers to the locality of the type specimen.

Description – *Saprobic* on dead culms of bamboo. Teleomorph: *Ascomata* 480–575 × 478–524 µm ($\bar{x}$ = 528.2 × 496.3 µm, n = 15), solitary, scattered, immersed under the host epidermis, black, coriaceous, ostiole at the center, visible as black dots surrounding with white tissue, lacking clypeus. *Peridium* 40–50 µm ($\bar{x}$ = 44 µm µm, n = 10) wide, with two or many cell layers, outer layer thick, comprising brown to dark brown, thick-walled cells of *textura angularis*, inner layer thin, composed of hyaline, thin-walled cells of *textura angularis*. *Paraphyses* 2.1–4.0 µm ($\bar{x}$ = 2.9 µm, n = 20) wide, longer than asci, numerous, filamentous, sinuous, septate, constricted at the septa, guttulate, embedded in a gelatinous matrix. *Asci* 130–191 × 6.8– 8.6 µm ($\bar{x}$ = 157.8 × 7.6 µm, n = 30), 8-spored, unitunicate, cylindrical, pedicellate, apically rounded with a J+, apical ring, blue in Melzer's reagent, 2.0–3.3 × 1.8–2.6 µm ($\bar{x}$ = 2.7 × 2.3 µm, n = 30). *Ascospores* 14.7–18.9 × 5.7–7.8 µm ($\bar{x}$ = 16.6 × 7.0 µm, n = 30), uniseriate, brown, aseptate, oblong ellipsoidal to fusiform, with a small cell on one end, large cell brown with small cell hyaline, pointed, 1.3–1.8 × 1.7–2.2 µm, lacking germ slit and a mucilaginous sheath. Anamorph: Undetermined.

Culture characters – Ascospores germinated on PDA within 36h, colonies reach the edge of the petri dish 5 cm in 3 weeks, effuse, protuberant, cottony, circular, irregular at the margin, white from above, pale yellowish white from below. Mycelium immersed in the media, composed of branched, septate, smooth-walled, hyaline hyphae.

Material examined – CHINA, Yunnan Province, Xishuangbanna Scenic Spot, 100º54' 21.10"E, 22º16'4.29"N, altitude: 969 m, on dead culm of bamboo, 18 August 2023, Yulin Ren, 2023XSBNZ41 (GMB5604 holotype; no culture was obtained); *ibid*., KUN-HKAS 136287 isotype.

Additional specimen – CHINA, Hunan Province, Zhangjiajie City, Badagongshan National Nature Reserve, 29°39'54"N 109°49'08"E, altitude: 1,452 m, on dead culms of bamboo, 25 August 2023, Yulin Ren and Lili Liu, BDGS_2023-34 (GMB5621).

Notes – In the BLAST analysis, the sequence of *Digitodochium xishuangbannense* was closely similar to *Digitodochium amoenum*. Phylogenetically, it also clustered closely, but *D. amoenum* differs from *D. xishuangbannense* in having a white ectostromatic disc, perithecia arranged in a valsoid configuration, and large ascospores (20–33.5 × 8.5–14 µm vs. 14.7–18.9 × 5.7–7.8 µm) that lack a mucilaginous sheath (Voglmayr et al. 2022).

Phylogenetically, it clustered closely with *Anthostomella eucalyptorum*, which was found on the leaves of *Eucalyptus* and differs in having smaller ascospores (7–10 × 4–5 µm vs. 14.7–18.9 × 5.7–7.8 µm) (Crous et al. 2006). In ascospore size it is similar to *Magnostiolata mucida* Samarak. & K.D. Hyde but the latter has funnel-shaped ostiolar canals, filled with amorphous cells and ascospore surrounded by thicker mucilaginous sheath (Samarakoon et al. 2022).

Digitodochium zhangjiajiense Y.L. Ren, K. Habib, & Q.R. Li, sp. nov. Fig. 15

MycoBank number: MB854853; Facesoffungi number: FoF17260

Etymology – The epithet refers to the locality of the type specimen, Zhangjiajie City.

Description – *Saprobic* on dead culms of bamboo. Pseudostromata black, Teleomorph: *Ascomata* 350–554 × 296–379 µm ($\bar{x}$ = 464.1 × 342.6 µm, n = 15), perithecial, deeply immersed in host tissue, solitary, subglobose, visible as black dots on the surface. *Clypeus*, black or central black, surrounded by a ring of light-colored tissue, with the outermost layer being black. *Ostioles* papillate, central, black, with a conical neck, 165–180 high, 85–115 µm wide. *Peridium* 50–75 µm ($\bar{x}$ = 60 µm, n = 10), composed of many layers of polygonal, dark brown cells. *Paraphyses* 2.3–4.7 µm ($\bar{x}$ = 3.3 µm, n = 20) wide, hyaline, numerous, long-cylindrical, unbranched, septate. *Asci* 132–205 × 6.5–11.5 µm ($\bar{x}$ = 163.4 × 8.8 µm, n = 30), 8-spored, unitunicate, cylindrical, pedicellate, straight or slightly curved, apically rounded, with a wedge-shaped, J+, apical ring, 2.1–3.3 × 2.6–3.1 µm ($\bar{x}$ = 2.7 × 2.8 µm, n = 30), bluing in Melzer's reagent. *Ascospores* 12–14.5 × 5–7 µm ($\bar{x}$ = 13.6 × 6 µm, n = 30), uniseriate, unicellular, inequilaterally ellipsoidal, with slightly rounded

ends, the larger cell brown, with a hyaline basal dwarf cell, which is 1.3–2.4 µm wide, smooth, lacking a germ slit and a mucilaginous sheath. Anamorph: Undetermined.

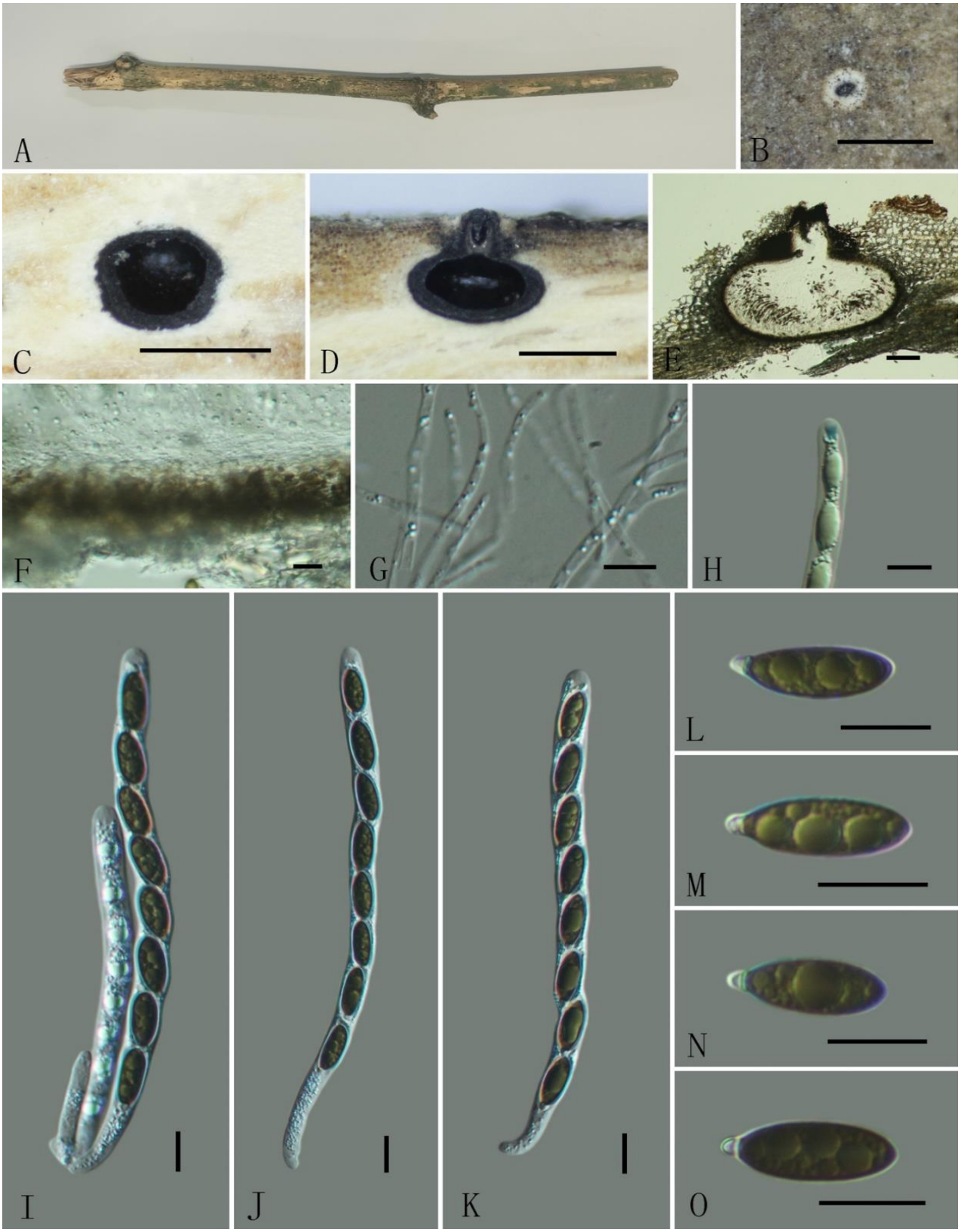

Figure 14 – *Digitodochium xishuangbannense* (GMB5604 holotype). A, B Bamboo host. C Cross section of ascoma. D, E Longitudinal sections of ascomata. F Peridium. G Paraphyses. H Apical ring (staining in Melzer's reagent). I–K Asci in distilled water. L–O Ascospores. Scale bars: B–D = 0.5 mm, E = 100 µm, F–O = 10 µm.

Materials examined – CHINA, Hunan Province, Zhangjiajie City, Badagongshan National Nature Reserve, 29°39'54"N 109°49'08"E, altitude: 1,452 m, on dead culms of bamboo, 25 August 2023, Yulin Ren and Lili Liu, 2023BDGS14 (GMB5607 holotype; no culture was obtained).

Additional specimen – CHINA, Guangxi, Zhuang Autonomous Region, Liuzhou City, Jiuwanshan National Nature Reserve, 25°12'25"N, 108°40'18"E, 1 altitude: 1,326 m, on dead culms of bamboo, 18 November 2023, Yulin Ren, 2023JWS74 (GMB5623).

Notes – In the phylogram (Fig. 1), *Digitodochium zhangjiajiense* forms a well-supported sister clade with *D. ailaoshanense*, sharing similarly sized ascomata and ascospores. However, *D. ailaoshanense* differs from *D. zhangjiajiense* by having much smaller asci (70–110 × 6–9 μm, $\overline{x}$ = 85.9 × 8.1 μm vs. 132–205 × 6.5–11.5 μm, $\overline{x}$ = 163.4 × 8.8 μm), a smaller ostiole that is not surrounded by a white ring (40–60 μm high × 12–20 μm wide vs. 165–180 μm high × 85–115 μm wide, surrounded by a white ring), and ascospores surrounded by a thicker mucilaginous sheath (vs. lack of mucilaginous sheath). Another phylogenetically close species, *D. yunnanense*, differs from *D. zhangjiajiense* by having smaller asci (90–130 × 8–12 μm vs. 132–205 × 6.5–11.5 μm) and slightly larger ascospores (13–18 × 4–6 μm), also surrounded by a thicker mucilaginous sheath.

Digitodochium amoenum is distinguished by its white ectostromatic disc, 1–4 ostiolar necks per disc, perithecia arranged in a valsoid configuration, and large ascospores 20–33.5 × 8.5–14 μm (Voglmayr et al. 2022).

The teleomorph of *D. rhodoleucum* is unknown, and anamorph is characterized by cushion-shaped sporodochia, hemispherical to irregular, pale pink to orange in color, and emerge from bark (Tubaki & Kubono 1989), features that are absent in *D. zhangjiajiense*. For the *D. rhodoleucum*, only an ITS-LSU sequence (LC146732; 1148 bp) from the ex-holotype culture NBRC 32296 is available. Sequence analysis indicates 93% similarity and presence of 0.8% gaps.

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

Type species – *Fasciatispora nypae* K.D. Hyde, Trans. Mycol. Soc. Japan 32(2): 267 (1991).

Notes – *Fasciatispora* was established by Hyde (1991), designating *F. nypae* as its type species. The genus is characterized by ascomata beneath a black clypeus, asci with a J+ or J-, wedge-shaped apical ring, and pale brown to brown, ellipsoidal, ovoid, or rhomboid ascospores that are aseptate with a central pallid band (Hyde et al. 2020a). Liu et al. (2015) designated a reference specimen for *F. nypae* and classified it within the order Xylariales based on molecular data analysis. Currently, the MycoBank database lists eleven species of *Fasciatispora*. This study introduces a new species and a new record of this genus from China.

Fasciatispora cocoes S.N. Zhang, K.D. Hyde & J.K. Liu, Fungal Diversity 100: (2020). Fig. 16

MycoBank number: MB557000; Facesofungi number: FoF06503

Description – *Saprobic* on the surface of palm stalk. Teleomorph: *Ascomata* 180–220 × 166–208 μm ($\overline{x}$ = 204 × 182 μm, n = 10), immersed, visible as black, circular dots, mostly solitary, sometimes aggregated into small groups, in cross-section subglobose or globose. *Ostioles* centric, raised, ostiolar canal periphysate. *Peridium* 8–13 μm ($\overline{x}$ = 9.4 μm, n = 10) wide, multi-layered, outer layer comprising brown, thick-walled cells of *textura angularis*, inner layer composed of hyaline, thin-walled cells of *textura angularis*. *Paraphyses* 2.2–3.6 μm ($\overline{x}$ = 2.8 μm, n = 10) wide, longer than the asci, numerous, filamentous, flexuous, septate, rarely branched, tapering. *Asci* 70–106 × 8.2–10.8 μm ($\overline{x}$ = 84 × 9.3 μm, n = 30), 8-spored, unitunicate, cylindrical, short pedicellate, apex rounded, wedge-shaped apical ring, J+ in Melzer's reagent, 0.6–0.8 × 2.1–3.2 μm ($\overline{x}$ = 0.7 × 2.7 μm, n = 10). *Ascospores* 9.3–12.2 × 4.6–6.3 μm ($\overline{x}$ = 11.2 × 5.6 μm, n = 30), uniseriate, hyaline when immature, yellowish brown, with wide equatorial pallid band when mature, ellipsoidal to obovoid, aseptate, 1–2-guttulate, surrounded by a mucilaginous sheath (3.6–5.8 μm, n = 30) wide, lacking a germ slit. Anamorph: Undetermined.

Materials examined – CHINA, Guizhou Province, Anshun City, Longgong Scenic Area 26º06'38.58" N, 105º52'53.17" E, altitude: 1218 m, on the Palm stalk, 20 April 2021, Youpeng Wu,

2021LG11 (GMB1154; GMBC1154); CHINA, Guizhou Province, Xishui County, Xishui Nature Reserve, 28º29'01.74"N, 106º20'29.18"E, elev. 1086 m, on the palm stalk, 28 November 2022, Youpeng Wu, 2022DXG1 (GMB1155; GMBC1155).

Notes – *Fasciatispora cocoes* was reported from Thailand by Hyde et al. (2020a), distinguishing it from *F. petrakii* (Mhaskar & V.G. Rao) K.D. Hyde which possesses ovoid or subrhomboid ascospores (Hyde et al. 2020a). Our new collections align with the morphological characteristics of *F. cocoes*. Additionally, the BLAST result confirmed the similarity of our collection to *F. cocoes*. This study reports the first record of *Fasciatispora cocoes* in China.

Fasciatispora guizhouensis K. Habib & Q.R. Li, sp. nov. Fig. 17

MycoBank number: MB854854; Facesoffungi number: FoF17261

Etymology – The epithet refers to the locality of type specimen, Guizhou Province.

Description – *Saprobic* on the surface of dead bamboo. Teleomorph: *Ascomata* 316–355 × 248–336 μm ($\overline{x}$ = 328 × 286 μm, n = 10), immersed under a black clypeus, visible as black, circular dots, clustered or most solitary, in vertical section subglobose, with a central periphysate. *Clypeus* black, comprising host cells mixed with blacked intracellular fungal hyape. *Peridium* 10–22 μm ($\overline{x}$ = 14 μm, n = 10) wide, comprising several layers of compressed cells, walls hyaline at inside, and brown and thick-walled towards the outside. *Paraphyses* 3.6–4.6 μm ($\overline{x}$ = 4.1 μm, n = 10) wide, filamentous, embedded in a gelatinous matrix, shorter than the asci. *Asci* 131–182 × 10.4–15.6 μm ($\overline{x}$ = 158 × 13 μm, n = 30), 8-spored, unitunicate, cylindrical, short-pedicellate, apically rounded, with a weakly J+, discoid subapical ring in Melzer's reagent, 1.4–2.8 × 2.1–3.3 μm ($\overline{x}$ = 2.2 × 2.8 μm, n = 10). *Ascospores* 13.4–16.4 × 5.8–6.8 μm ($\overline{x}$ = 14.4 × 6 μm, n = 30), partly overlapping uniseriate, inequilaterally ellipsoidal, dark-brown, unicellular, smooth-walled, with broadly rounded ends, with straight germ slit, nearly the spore-length, surrounded by a mucilaginous sheath (3–4 μm, n = 30) wide, lacking appendages. Anamorph: undetermined.

Material examined – CHINA, Guizhou Province, Xishui City, Xishui National Nature Reserve, 28º24'58.37"N, 106º11'14.14"E, altitude: 872 m, on dead bamboo, 4 November 2022, Youpeng Wu, 2022CQG11 (GMB1147 holotype; no culture was obtained); *ibid*., KUN-HKAS 136288 isotype.

Additional specimen – CHINA, Guizhou Province, Libo County, Maolan National Nature Reserve, 25°25'26"N, 107°53'56"E, altitude: 582 m, on dead bamboo, 28 November 2022, Youpeng Wu, 2022MLB18 (GMB1148).

Notes – The family Fasciatisporaceae was established to accommodate the monotypic genus *Fasciatispora* K.D. Hyde, based on its unique features of unicellular ascospores with a central pallid band and its distinct placement in the phylogeny. In the phylogram, the sequences of *F. guizhouensis* (GMB1147 & GMB1148) clustered within the clade of *Fasciatispora* with well-supported statistical values (83 BS/0.99 BI). However, our collection lacks the defining feature of *Fasciatispora*, ascospores with a central pallid band.

In key comparisons with *Anthostomella* species, the new species closely resembles *Anthostomella raphiae*. However, *Anthostomella raphiae* can be distinguished by its smaller asci (90–143 μm long vs. 131–182 × 10.4–15.6 μm) with short pedicels and a larger subapical ring (4.4–6.3 μm wide vs. 1.4–2.8 × 2.1–3.3 μm) (Lu & Hyde 2000).

We have analyzed three different collections of this new species. The morphological characteristics of this taxon do not align with its placement within *Fasciatispora*. However, phylogenetic analysis supports its classification in this group. Due to the high morphological diversity in Xylariales, we prioritize phylogenetic evidence for classification. Therefore, we introduce *Fasciatispora guizhouensis* as a new species in *Fasciatispora* s. str. Phylogenetically, *Fasciatispora* always forms a distinct clade (Samarakoon et al. 2022, Dissanayake et al. 2024, Sugita et al. 2024, Fig. 1). However, its exact clade position remains uncertain, with observed changes in the studies of Samarakoon et al. (2022), Dissanayake et al. (2024), and Sugita et al. (2024), as well as in this study. This uncertainty suggests that the phylogenetic placement of *Fasciatispora* is not yet fully resolved.

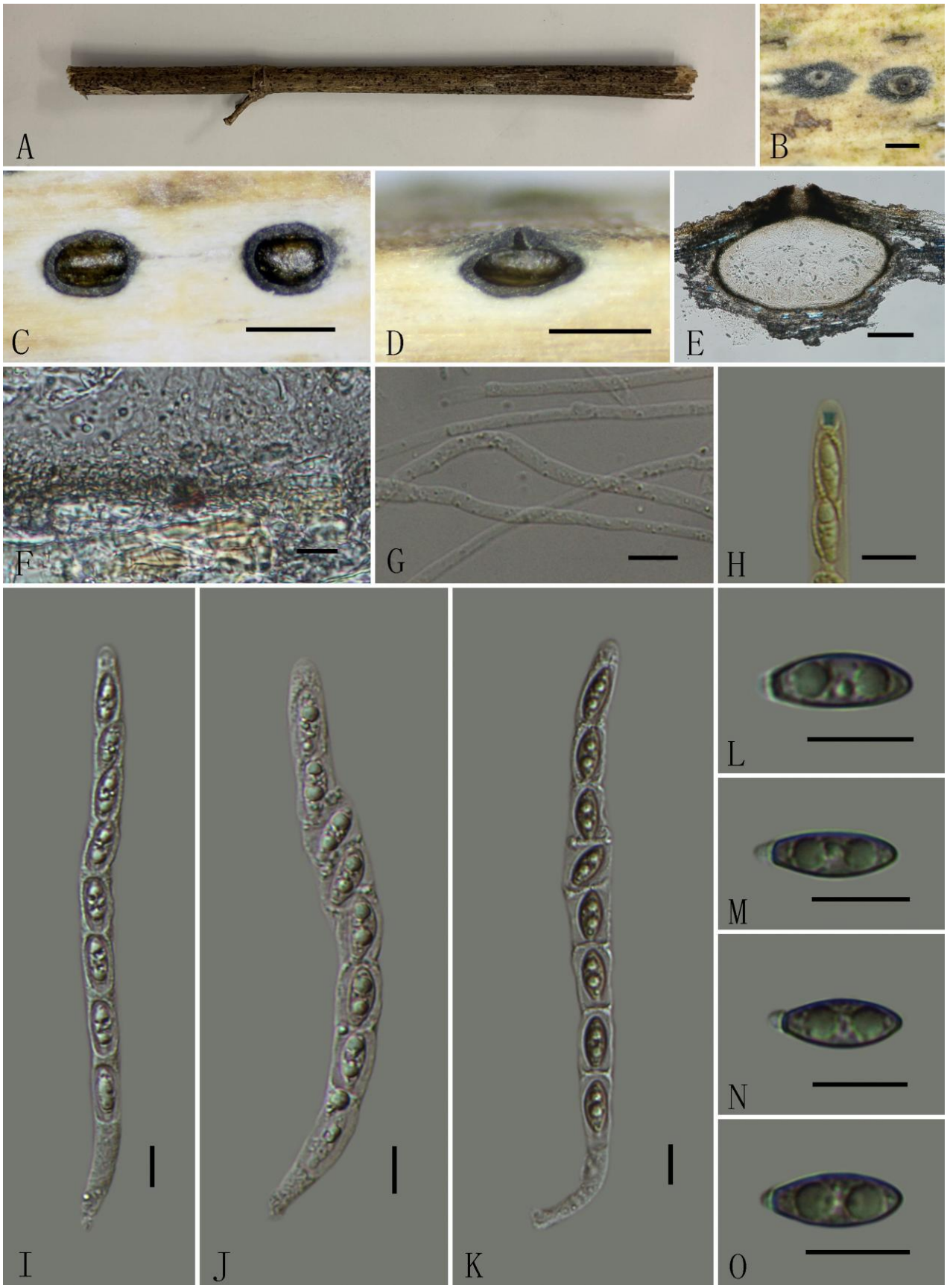

Figure 15 – *Digitodochium zhangjiajiense* (GMB5607, holotype). A, B Bamboo host. C Cross section of ascoma. D, E Longitudinal sections of ascomata. F Peridium. G Paraphyses. H J+ wedge-shaped rings (stained in Melzer's reagent). I–K Asci in distilled water. L–O Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μm, F–O = 10 μm.

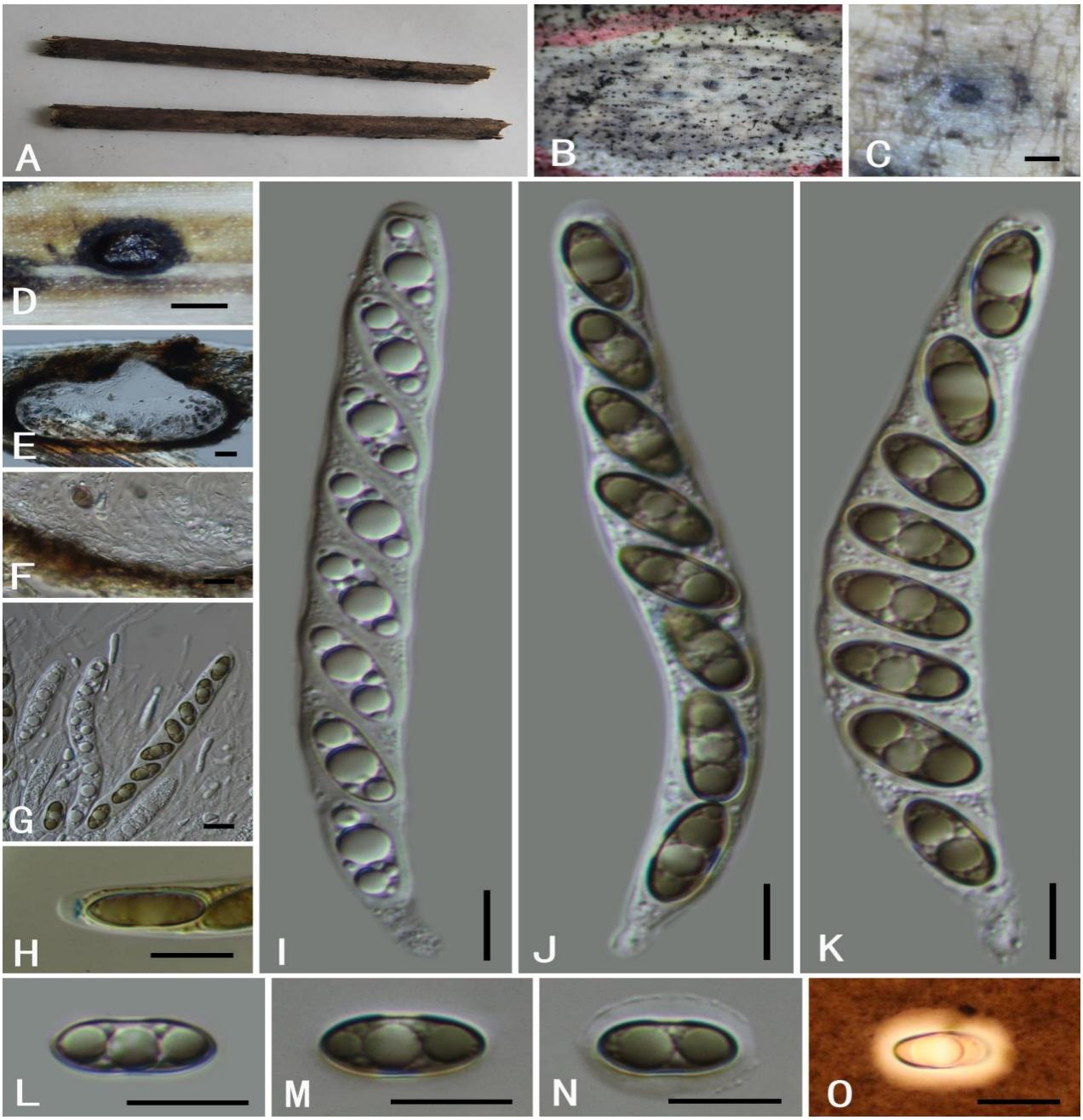

Figure 16 – *Fasciatispora cocoes* (GMB1154). A–C Bamboo host. D Transverse section of ascoma. E Longitudinal section of ascomata. F Peridium. G Paraphyses. H Ascus apical apparatus (stained in Melzer's Reagent). I–K Asci in distilled water. L–O Ascospores (O stained in India ink). Scale bars: C, D = 0.1 mm, E–O = 10 μm.

Helicogermslita Lodha & D. Hawksw., Trans. Br. mycol. Soc. 81(1): 91 (1983).

Type species – *Helicogermslita celastri* (S.B. Kale & S.V.S. Kale) Lodha & D. Hawksw., Trans. Br. mycol. Soc. 81(1): 91 (1983).

Hawksworth & Lodha (1983) established the genus *Helicogermslita* to accommodate a xylarialean species with ascospores possessing spiral germ slits. The genus is characterized by stromatic ascomata with a white ectostroma, asci with J+ apical rings, and ascospores with spiral germ slits (Petrini 2003, Daranagama et al. 2018). Currently, the MycoBank database lists nine species of *Helicogermslita*. This study describes a new species of *Helicogermslita* from China.

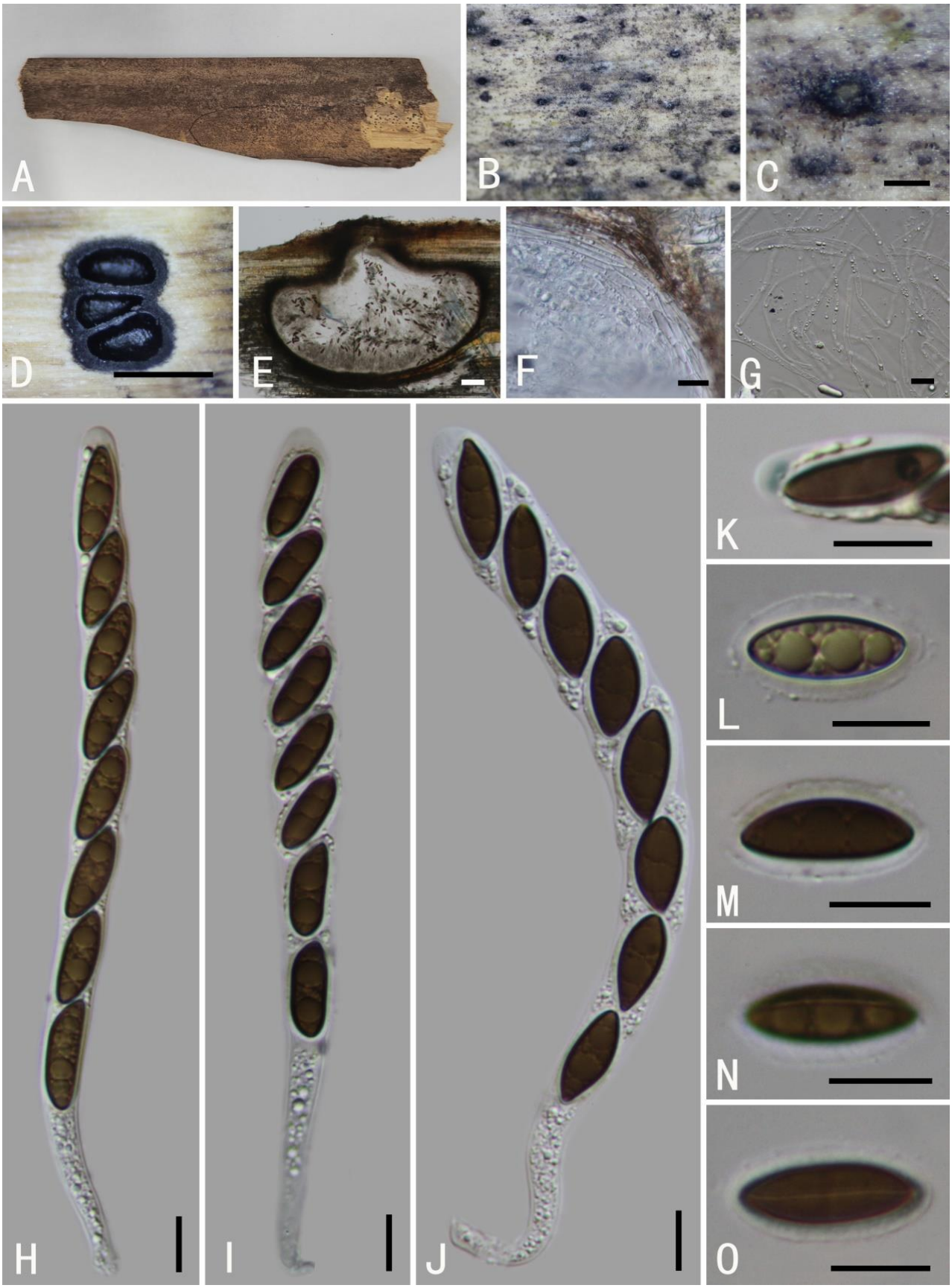

Figure 17 – *Fasciatispora guizhouensis* (GMB1147 holotype). A–C Bamboo host. D Transverse section of ascomata. E Longitudinal section of ascoma. F Peridium. G Paraphyses. H–J Asci in distilled water. K Ascus apical apparatus (stained in Melzer's reagent). L–O Ascospores. Scale bars: C = 0.2 mm, D = 0.4 mm, E–O = 10 μm.

Helicogermslita nulliclypeata Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 18

MycoBank number: MB854855; Facesoffungi number: FoF17262

Etymology – The epithet referring to the absence of a clypeus in this species.

Description – *Saprobic* on dead branch of unidentified plant. Teleomorph: *ectostromata* immersed in the substrate to slightly erumpent, forming a whitish ring or collar. *Ascomata* 710–1070 × 732–990 µm ($\bar{x}$ = 894 × 898 µm, n = 20), perithecial, immersed, solitary or scattered, sometimes gregarious, globose to subglobose, dark brown to black, ostiolar neck straight to slightly curved, black, apically flattened, lacking clypeus. *Ostioles* central, black, overlain/surrounded by a white tissue forming a basal ring; *Peridium* 35–55 µm thick, comprised of several layers, thick-walled, dense, brown, turning subhyaline inwardly, cells of *textura angularis*. *Paraphyses* 1.9–5.2 µm ($\bar{x}$ = 3.2 µm, n = 20), hyaline, numerous, long-cylindrical, unbranched, septate. *Asci* 110–135 × 12.5–16 µm ($\bar{x}$ = 124.6 × 15 µm, n = 30), 8-spored, unitunicate, long-cylindrical, short pedicellate, straight or slightly curved, apically rounded, with a wedge-shaped, J+, apical ring, 3.2–3.6 × 2.3–2.8 µm ($\bar{x}$ = 3.4 × 2.5 µm, n = 30), bluing in Melzer's reagent. *Ascospores* 13–17 × 6–8.5 µm ($\bar{x}$ = 15 × 7.3 µm, n = 30), uniseriate, brown to dark brown, ellipsoid to broadly ellipsoid or subcitriform, aseptate, equilateral, with rounded, smooth, multi-guttulate, with a spiral germ slit coiled 1 time, extending over the full length, lacking a mucilaginous sheath. Anamorph: Undetermined.

Material examined – CHINA, Guangxi Zhuang Autonomous Region, Damingshan National Nature Reserve, 108º42'33.35"E, 22º47'3.19"N, altitude: 1,560 m, on dead culm of bamboo, 25 July 2023, Yulin Ren, 2023DMS10 (GMB5625, holotype; no culture was obtained); *ibid*., KUN-HKAS 136289 isotype

Additional specimen – CHINA, Sichuan Province, Gulin County, Huangjing Old Forest Nature Reserve, 112°31'21.88"E, 23°10'53.10"N, altitude: 1,877 m, on dead culm of bamboo, 04 August 2022, Sihan Long, HOF_2022-37 (GMB5636).

Notes – In the phylogram (Fig. 1), the sequence of *Helicogermslita nulliclypeata* formed a supported sister clade to *H. clypeata* Samarak. & K.D. Hyde (Fig. 1; 98BS/1PP), morphologically also both species similar in ascospore size and shape. However, *H. clypeata* is distinguished by its prominent wide clypeus, and wider ascomata (550–775 × 600–1040 µm vs. 710–1070 × 732–990 µm). Additionally, ostioles are encircled with white tissue, and the species shows wider asci (12.5–16 µm vs. 9–11.5 µm) (Samarakoon et al. 2022). The genus is comprised of nine species (https://indexfungorum.org/names/Names.asp, accessed on June 12, 2024). *Helicogermslita nulliclypeata* differs from other *Helicogermslita* species by having large ascomata without a clypeus and an ostiole encircled with white tissue. Its ascospore size resembles that of *H. gisbornia*, *H. johnstonii*, and *H. mackenziei*, however ascospores of those species bear a cellular appendage (Petrini 2003) which is lacking in *H. nulliclypeata*. *Helicogermslita aucklandica* differs in having larger ascospores (19–23.5 × 10–14 µm) (Petrini 2003).

Magnostiolata Samarak. & K.D. Hyde, Fungal Diversity 112: 65 (2022).

Type species – *Magnostiolata mucida* Samarak. & K.D. Hyde, Fungal Diversity 112: 65 (2022)

Notes – The genus *Magnostiolata* was established by Samarakoon et al. (2022) to include anthostomella- like taxa characterized by funnel-shaped ostiolar canals filled with amorphous cells and ascospores covered with a wing-shaped mucilaginous sheath. In the present study a new combination and a new species of this genus have been introduced from China.

Magnostiolata guizhouensis (Wu & Li) K. Habib & Q. R. Li, comb. nov.

MycoBank number: MB854856

≡ *Anthostomella guizhouensis* Y.P. Wu & Q.R. Li, Mycosphere 15(1): 278 (2024).

MycoBank number: MB850405

Description – see Li et al. (2024).

Holotype – GMB1140

Notes – Recently, *Anthostomella guizhouensis* was described as a new species from China (Li et al. 2024a). Its morphological traits align with those of *Magnostiolata*, and phylogenetic analysis shows it clusters as a sister species, strongly supporting its inclusion in the *Magnostiolata* genus.

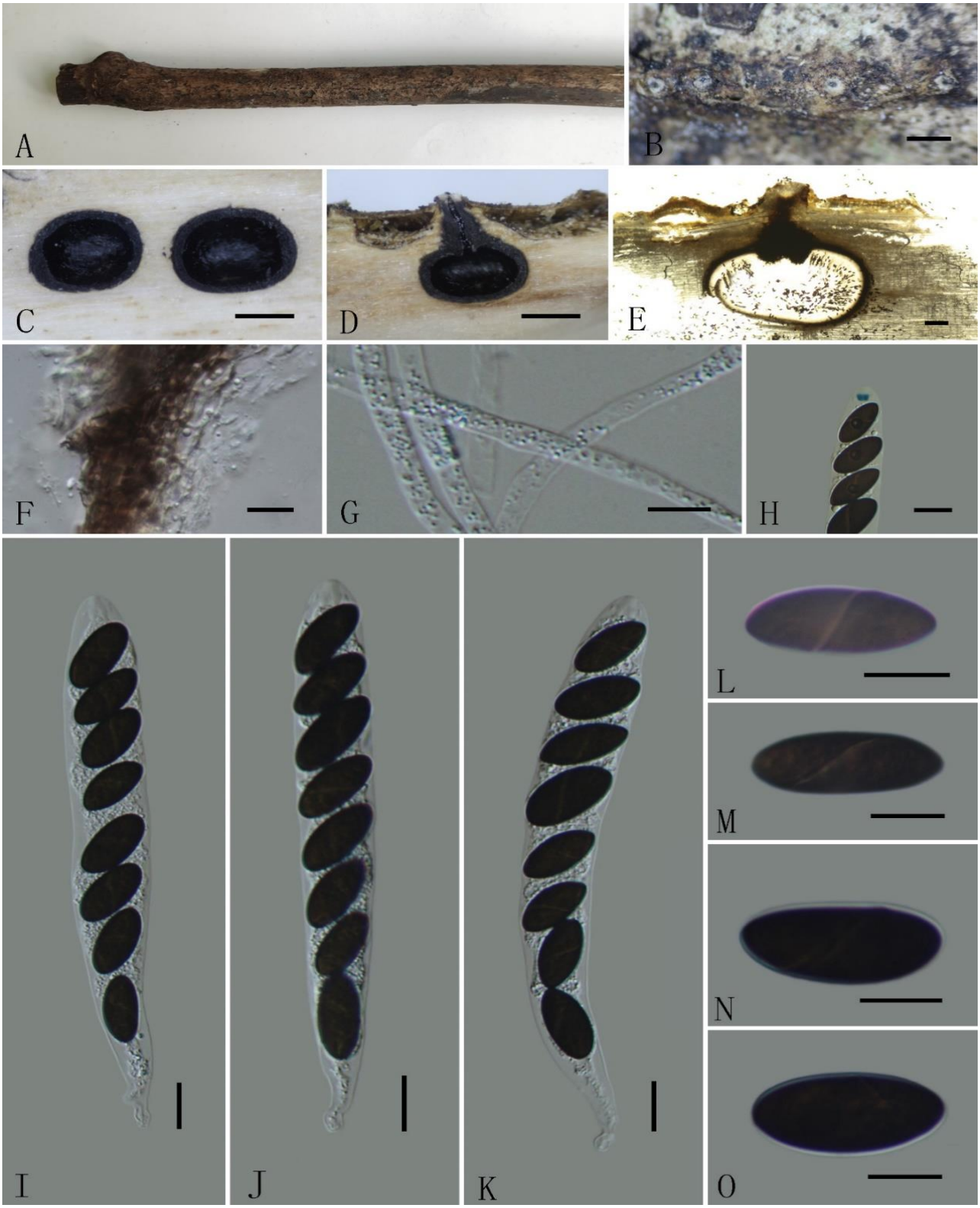

Figure 18 – *Helicogermslita nulliclypeata* (GMB5625 holotype). A, B Bamboo host. C Transverse section of ascomata. D, E Longitudinal sections of ascomata. F Peridium. G Paraphyses. H a J+ wedge-shaped rings (Stained in Melzer's reagent). I–K Asci in distilled water. L–O Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μm, F–O = 10 μm.

Magnostiolata shiwandashanensis Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 19

MycoBank number: MB854857; Facesoffungi number: FoF17263

Etymology – The epithet refers to the location where the type specimen was collected, Shiwandashan National Forest Park.

Description – *Saprobic* on the surface of decaying bamboo culms, forming black round spots. Teleomorph: *Ascomata* 451–518 µm high, 596–760 µm diam., solitary or aggregated, scattered, immersed under the host epidermis, black, coriaceous, ostiole at the center, ostiolar opening surrounded by white margin, without a clypeus or with poorly-developed clypeus. *Peridium* 43–65 µm ($\bar{x}$ = 51 µm, n = 10) wide, composed of thick walled, hyaline to brown cells of *textura angularis*. *Paraphyses* 2–3.9 µm ($\bar{x}$ = 2.8 µm, n = 20) wide, longer than asci, numerous, filamentous, sinuous, septate, constricted at the septa, guttulate, embedded in a gelatinous matrix. *Asci* 166–198 × 10.2–14.6 µm ($\bar{x}$ = 180 × 11.9 µm, n = 20), 8-spored, unitunicate, long-cylindrical, short-pedicellate, with a short- cylindrical, J+, apical ring, bluing in Melzer's reagent, 2.8–3.7 µm high, 4.7–6.6 µm diam. *Ascospores* 17.5–22.4 × 6–7.9 µm ($\bar{x}$ = 20.3 × 7 µm, n = 30), uniseriate, brown, aseptate, oblong to broadly ellipsoidal, multi guttulate, germ slit on ventral side of the ascospore, straight, nearly the spore-length, lacking mucilaginous sheath. Anamorph: Undetermined.

Culture characters – Ascospores germinating on PDA within 48h and germ tubes produced from upper cells. Colonies growing slowly on PDA, reaching 3 mm in 2 weeks at 28°C, effuse, velvety to hairy, nearly circular, irregular at the margin, white from above, Pale yellowish white from below. Mycelium immersed in the media, composed of branched, septate, smooth-walled, hyaline, hyphae.

Material examined – CHINA, Guangxi Zhuang Autonomous Region, Shiwandashan National Forest Park, 107º33'53.65"E, 21º41'51.50"N, altitude: 1,506 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, 2023SWDS10 (GMB5626, holotype; GMBC5626, ex-type); *ibid*., KUN-HKAS 136290 isotype.

Additional specimen – CHINA, Guangxi Zhuang Autonomous Region, Damingshan National Nature Reserve, 108º42'33.21"E, 22º47'3.31"N, altitude: 1,571 m, on dead culm of bamboo, 02 August 2023, Lili Liu, DMS_2023-51 (GMB5639, GMBC5639).

Notes – Phylogenetically, *Magnostiolata shiwandashanensis* is closely related to *M. guizhouensis* (formerly *Anthostomella guizhouensis*). However, *M. guizhouensis* differs in having rounded-shaped ostiolar canals filled with amorphous, hyaline cells, larger ascospores (22.3–25.2 × 7.5–8.5 µm) with two guttulae, and surrounded by a mucilaginous sheath (5.3–7.2 µm). *Magnostiolata mucida* Samarak. & K.D. Hyde differs from the novel species by having funnel-shaped ostiolar canals filled with amorphous cells, bi-guttulate ascospores mostly with a large guttule, and a thicker mucilaginous sheath (Samarakoon et al. 2022).

The genus *Magnostiolata* is characterized by funnel-shaped ostiolar canals filled with amorphous cells and ascospores covered with a wing-shaped mucilaginous sheath. However, neither of these characteristics is observed in the new taxon. Despite this, it phylogenetically clusters within the same clade with strong support (Fig. 1). Therefore, we introduce it as a new taxon within the genus *Magnostiolata*.

Minuticlypeus R. Sugita & Kaz. Tanaka, Mycoscience 65(1): 37 (2024).

Type species – *Minuticlypeus discosporus* R. Sugita & Kaz. Tanaka, Mycoscience 65(1): 37 (2024).

The genus *Minuticlypeus* is characterized by immersed perithecia, conical ostiolar necks, periphysate, with sparse setose hyphae, surrounded by pseudostromatic tissue, with a minute clypeus, unitunicate, cylindrical asci, J+ apical ring, brown, ellipsoid to oblong, unicellular ascospores, surrounded by a mucilaginous sheath (Sugita et al. 2024). *Minuticlypeus* is differentiated from the closely related genus *Nigropunctata* by the structure of its ostiolar neck, which is short, conical, and covered with sparse setose hyphae (Sugita et al. 2024). The genus is

currently monotypic. In the present study, we introduce the second species of *Minuticlypeus* from China.

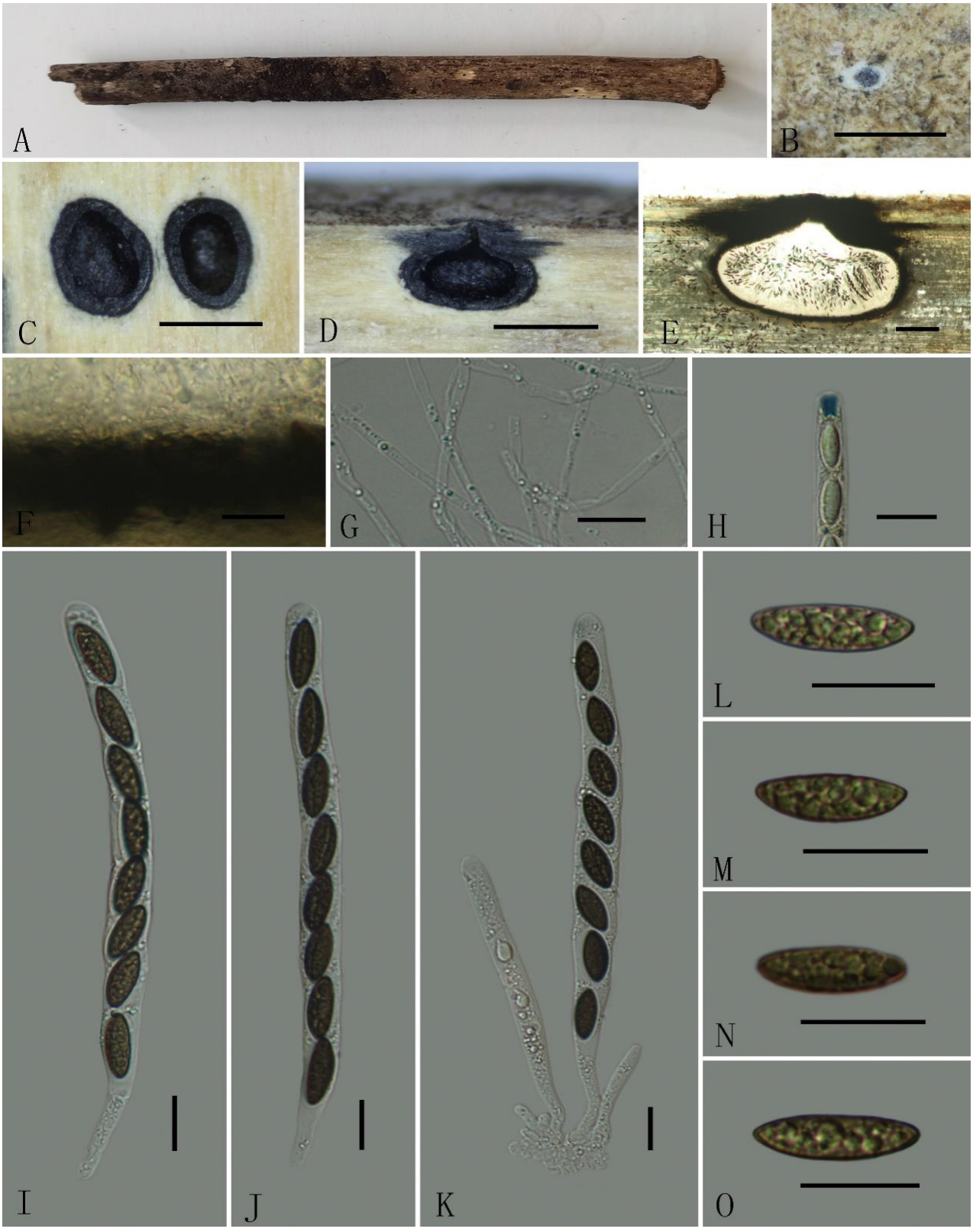

Figure 19 – *Magnostiolata shiwandashanensis* (GMB5626, holotype). A, B Bamboo host. C Transverse section of ascomata. D, E Longitudinal sections of ascomata. F Peridium. G Paraphyses. H Subapical ring staining by Melzer's reagent. I–K Asci with ascospores. L–O Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μm, F–O = 10 μm.

Minuticlypeus yunnanensis Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 20

MycoBank number: MB54858; Facesoffungi number: FoF17264

Etymology – The epithet refers to the locality of the type specimen, Yunnan Province.

Description – *Saprobic* on dead culms of bamboo. Teleomorph: *Ascomata* 301–342.4 µm high, 351.6–489.9 µm wide ($\overline{x}$ = 331.7 × 413.3 µm, n = 15), perithecial, deeply immersed in host tissue, solitary, subglobose, visible as black dots on the surface, clypeus black, minute. *Ostioles* conical, central, black. *Peridium* 31.7–55.5 µm ($\overline{x}$ = 41.7 µm), composed of many layers of polygonal, dark brown cells. *Paraphyses* 1.8–3.9 µm ($\overline{x}$ = 3.1 µm, n = 20) wide, hyaline, numerous, long-cylindrical, unbranched, septate. *Asci* 149.9–202.4 × 10.7–13.3 µm ($\overline{x}$ = 177 × 12.1 µm, n = 30), 8-spored, unitunicate, cylindrical, pedicellate, straight or slightly curved, apically rounded, with a discoid-shaped, J+, apical ring, 1–1.7 × 3.1–5.4 µm ($\overline{x}$ = 2.2 × 4.5 µm, n = 30), bluing in Melzer's reagent. *Ascospores* 19.3–22.4 × 7.8–11.3 µm ($\overline{x}$ = 20.8 × 9.8 µm, n = 50), uniseriate, unicellular, ellipsoid to rugby-shaped, with rounded ends, brown, surface rough, without a short germ slit, surrounded by a mucilaginous sheath 4.2–6 µm thick ($\overline{x}$ = 5.3 µm, n = 30). Anamorph: Undetermined.

Material examined – CHINA, Yunnan Province, Honghe, Daweishan National Nature Reserve, 103º41'0.29"E, 22º54'1.85"N, altitude: 1,637 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, 2023DWS16 (GMB5631, holotype; no culture was obtained); *ibid*., KUN-HKAS 136291 isotype.

Additional specimen – CHINA, Yunnan Province, Honghe, Daweishan National Nature Reserve, 103º41'0.67"E, 22º54'1.76"N, altitude: 1,630 m, on dead culm of bamboo, 29 July 2023, Yulin Ren, DWS_2023-04(GMB5638).

Notes – Phylogenetically, *Minuticlypeus yunnanensis* forms a supported sister clade with *M. discosporus* R. Sugita & Kaz. Tanaka. Morphologically, the latter differs by an ostiole with a thin clypeus surrounded by pale to dark brown pseudostromatic tissue, smaller asci 105–130 × 12.5–16.5 µm, larger inverted hat-shaped apical ring 1–2.5 high, 3.5–6 µm diam, and slightly smaller ascospores (15–20.5 × 7.5–10.5 µm) with a germ slit extending over the full length (Sugita et al. 2024). Morphologically, *Minuticlypeus yunnanensis* shows resemblance to *Anthostomella rhaphidophylli* B.S. Lu & K.D. Hyde, but the latter has smaller asci (137.5–155 × 12.5–15 µm) and slightly larger ascospores (16.5–25 × 9–12.5 µm, average 21.2 × 10.6 µm) with a straight germ slit surrounded by a mucilaginous sheath (7.2–9.4 µm) (Li et al. 2024a). With its strong phylogenetic affinity to *Minuticlypeus discosporus*, we introduce the new collection as new species of *Minuticlypeus*.

Nemania Gray, Nat. Arr. Brit. Pl. (London) 1: 516 (1821).

Type species – *Nemania serpens* (Pers.) Gray, Nat. Arr. Brit. Pl. (London) 1: 516 (1821).

Nemania Gray (1821), is a species-rich genus within Xylariaceae, characterized by carbonaceous, multiperitheciate, effused-pulvinate stromata with papillate ostioles and variable presence of soft, whitish, brownish, grey or yellow internal tissue, absence of pigments in 10% KOH, possessing unitunicate cylindrical asci, and ascospores with a conspicuous or inconspicuous germ slit of spore length to much less than spore-length (Daranagama et al. 2018). Index Fungorum (2024) (Accessed on July 5, 2024) lists 93 epithets of *Nemania* that have been reported worldwide. Recently, Li et al. (2024) described seven new species, raising the total number of species reported in China to 22. In this study, we introduce a new species of *Nemania* from China.

Nemania huangjingensis S.H. Long, K. Habib & Q.R. Li, sp. nov. Fig. 21

MycoBank number: MB854859; Facesoffungi number: FoF17265

Etymology – The epithet refers to the locality of type specimens, Huangjing Old Forest Nature Reserve.

Description – *Saprobic* on the surface of decaying wood. Teleomorph: *Stromata*, effused scattered to gregarious, 1–7 mm long × 1–7 mm wide × 0.6–1 mm thick, with inconspicuous perithecial contours; surface brown to black; mature black, outer crust weakly carbonaceous, 40–50

μm thick; interior light brown to white, loosely fibrous to cottony. *Perithecia* subglobose, 0.4–0.8 high × 0.55–0.8 mm diam., directly seated on the substrate. *Ostioles* coarsely slightly higher than the stromatal surface, with openings slightly papillate; mature stromata lacking KOH extractable pigments. *Perithecia* 0.4–0.55 mm diam. × 0.6–0.8 mm high, subglobose to depressed-spherical. *Ostioles* slightly higher than stromatal surface, conical-papillate, black. *Asci* 163.5–207 × 5.5–8.5 μm ($\overline{x}$ = 179.9 × 6.7 μm, n = 30), 8-spored, unitunicate, cylindrical, long-stipitate, the spore-bearing parts 60–90 μm long, with a J+, short-cylindrical apical apparatus, 2–3.5 × 1.5–2.5 μm ($\overline{x}$ = 2.6 × 1.9 μm, n = 30). *Ascospores* 9.5–13 × 5–7 μm ($\overline{x}$ = 11.4 × 5.9 μm, n = 30), uniseriate unicellular, smooth, dark brown, ellipsoid strongly inequilateral, with narrowly rounded ends, with a conspicuous, straight germ slit spore-length on the flattened side; perispore indehiscent in 10% KOH. Anamorph: Undetermined.

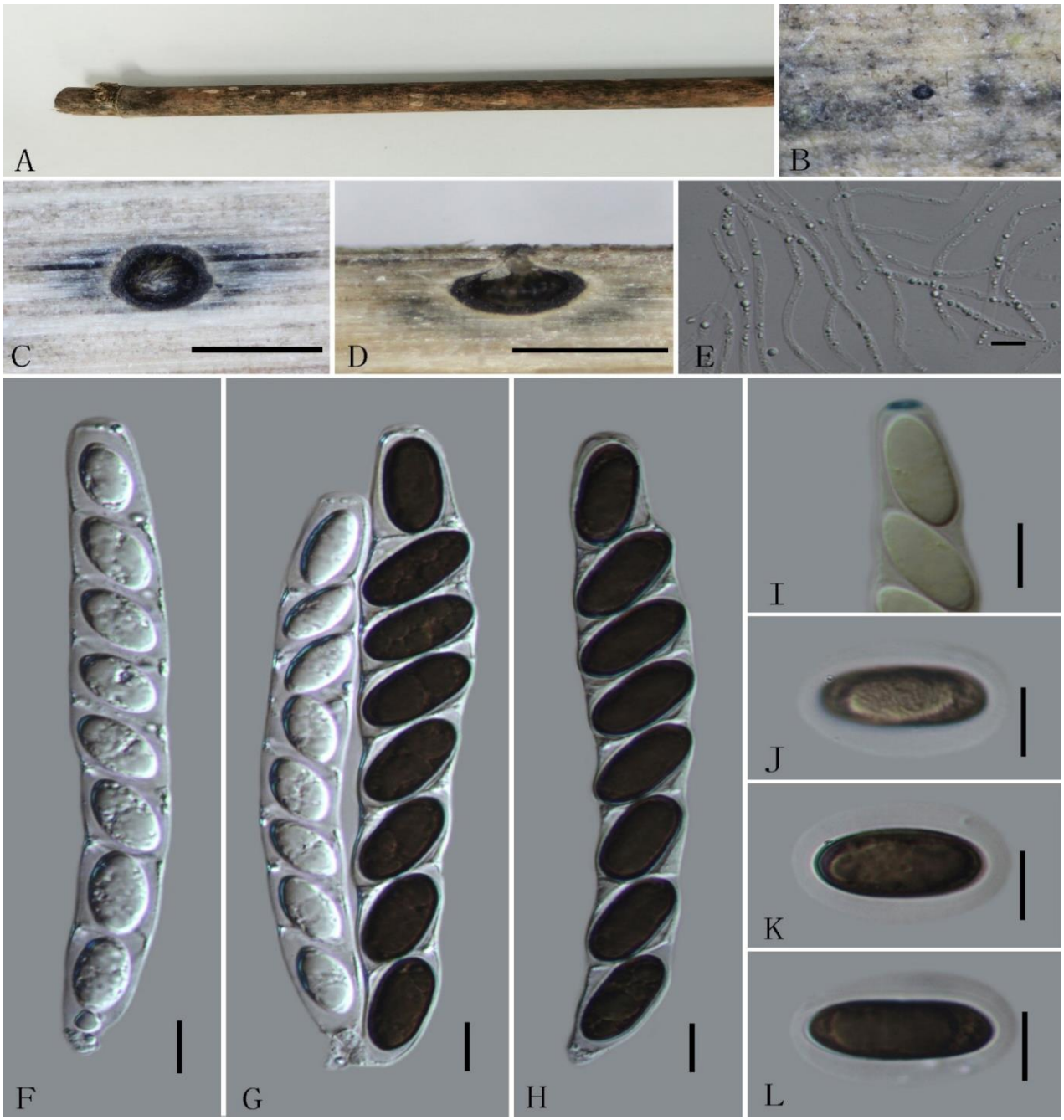

Figure 20 – *Minuticlypeus yunnanensis* (GMB5631, holotype). A, B Bamboo host. C Transverse section of ascoma. D Longitudinal section of ascoma. E Paraphyses. F–H Asci. I a wedge-shaped ring (Stained in Melzer's reagent). J–L Ascospores. Scale bars: C, D = 0.5 mm, E–L = 10 μm.

Culture characteristics – Colonies on OA reaching the edge of the Petri dish 5 cm in one week, white, velvety to hairy, zonate, rosette, high convex in center, dense, white to cream from above, white irregular edge with light yellow to slightly brown at center from the below.

Material examined – CHINA, Sichuan Province, Gulin Country, Huangjing Old Forest Nature Reserve, 23°10'91.33"N, 112°32'30.12"E, altitude: 1,863 m, on dead branch of an unidentified plant, 04 August 2022, Sihan Long, HJLL11 (GMB0746, holotype; GMBC00746 ex-type); *ibid*., KUN-HKAS 136292 isotype.

Additional specimens – CHINA, Sichuan Province, Gulin County, Huangjing Old Forest Nature Reserve, 23°10'92.11"N, 112°32'10.32"E, altitude: 1,850 m, on dead branch of an unidentified plant, 4 August 2022, Sihan Long, HJLL23 (GMB0747); CHINA, Sichuan Province, Gulin County, Huangjing Old Forest Nature Reserve, 23°10'53.10"N, 112°31'21.88"E, altitude: 1,877 m, on dead branch of an unidentified plant, 4 August 2022, Sihan Long, HJLL38 (GMB0748).

Note – In the phylogram (Fig. 1), the sequences of *Nemania huangjingensis* formed a separate clade outside a group comprised of *N. primolutea* Y.M. Ju et al., *N. aquilariae* Tibpromma & Zhang Lu, *N. feicuiensis* Y.H. Pi & Q.R. Li, and *N. abortiva* J.D. Rogers et al., demonstrating its status as an independent species.

As per the key available at http://pyrenomycetes.free.fr/nemania/html/N_diffusa.htm, the new species keys out to *N. diffusa* (Sowerby) S. F. Gray. Both species share similar dark brown ascospores with a conspicuous germ slit spore-length. However, *N. diffusa* differs in having larger stromata 5–55 mm long × 5–15 mm broad (1–7 mm long × 1–7 mm wide), larger asci 130–250 × 6–10 μm (vs. 163.5–207 × 5.5–8.5 μm), and dark grey or blackish carbonaceous interperithecial tissue (vs. light brown to white) (Ju & Rogers 2002, Pi et al. 2021). Moreover, *N. diffusa* has strongly carbonaceous stromata which keep a brown tinge even when fully mature (Ju & Rogers 2002, Pi et al. 2021).

In terms of ascospore size and shape, it also matches *N. carbonacea* Pouzar. However, the stromata of *N. carbonacea* are distinguished by conspicuous perithecial mounds and have white soft tissue between perithecia (Ju & Rogers 2002). *Nemania chestersii* (J.D. Rogers & Whalley) Pouzar also shares the same size ascospores but exhibits parallel longitudinal striations on their surface, with the ascospore germ slit reported as lacking by Rogers & Whalley (1978), Petrini and Müller (1986), and Granmo et al. (1999). Based on distinct morphology and phylogeny, we introduce *N. huangjingensis* as a new species.

Spirodecospora B.S. Lu, K.D. Hyde & W.H. Ho, Fungal Diversity Res. Ser. 1: 170 (1998).

Type species – *Spirodecospora bambusicola* B.S. Lu et al. Fungal Diversity 1: 172 (1998).

Spirodecospora was established to accommodate *S. bambusicola* found on *Bambusa* sp. (Lu et al. 1998). The genus is characterized by having deeply immersed ascomata with a cylindrical ostiolar neck, unitunicate, cylindrical asci with J+, wedgeshaped apical ring, and broadly ellipsoidal to fusoid, aseptate, brown, verruculose ascospores with spirally or almost straight linear ornamentation (Lu et al. 1998, Sugita et al. 2022). The genus is distinguished from the closely related *Anthostomella* by its comparatively large ascomata and ascospores with spiral ornamentation (Lu et al. 1998). Species Fungorum (2024) (Accessed on July 5, 2024), lists only four species of this genus that have been reported globally. In this study, we introduce four new species of *Spirodecospora* from China.

Spirodecospora anshunensis K. Habib, Y.L. Ren & Q.R. Li, sp. nov. Fig. 22

MycoBank Number: MB854860; Facesoffungi number: FoF 17266

Etymology – The epithet refers to the locality of the type specimen, Anshun City.

Description – *Saprobic* on dead bamboo culms. Teleomorph: *Ascomata* 681–1107 × 798–1040 μm, ($\overline{x}$ = 887.5 × 915.1 μm, n = 10*)*, solitary scattered, deeply immersed within the host cortex, visible as black, in cross section subglobose to pyriform, with a central, periphysate ostiolar canal, lacking clypeus. *Ostiole* slightly raised or flush with the surface of the host, centric. *Peridium*

50–85 µm ($\bar{x}$ = 64.6 µm, n = 20), composed of hyaline inner layer and dark brown to dark outer layer. *Paraphyses* 1.9–4.1 µm ($\bar{x}$ = 2.9 µm, n = 20) wide, long, hyaline, unbranched, septate, filamentous, numerous. *Asci* 256–275 × 17.9–22.7 µm ($\bar{x}$ = 269.5 × 19.9 µm, n = 30), 8-spored, unitunicate, straight or slightly curved, long-cylindrical, short-pedicellate, with a wedge-shaped shaped, J+, apical ring, bluing in Melzer's reagent, 7.3–8.1 × 3.6–4.6 µm ($\bar{x}$ = 7.7 × 4.0 µm, n = 30). *Ascospores* 29–32.5 × 14–17 µm ($\bar{x}$ = 30.7 × 15.3 µm, n = 30), uniseriate or partly overlapping uniseriate, unicellular, inequilaterally ellipsoidal, with broadly round ends, dark brown to black, with 3 spirally arranged wall ornamentations around the ascospores, with small protrusions on the surface, without a mucilaginous sheath. Anamorph: Undetermined.

Culture characters – Ascospores germinated on PDA within 36h, Colonies reached 20 mm diam. within three weeks at 28℃, effuse, oval, Protuberant, cottony. White from above; white to paled brown in the center, dark brown around from below.

Material examined – CHINA, Guizhou Province, Anshun City, Pingba District, Gaofeng Town, 106º24'23.23"E, 26º17'34.47"N, altitude: 1,261 m, on dead culm of bamboo, 30 October 2023, Yulin Ren, GFZ9 (GMB5629, holotype; GMBC5629, ex-type); *ibid*., KUN-HKAS 136293 isotype.

Additional specimen – CHINA, Yunnan Province, Jinghong City, Xishuangbanna Nature Reserve, 22º11'07.20"N, 100º33'56.14"E, altitude: 1,106 m, on dead bamboo, 8 August 2021, Youpeng Wu, 2021XSBN37 (GMB5640, GMBC5640).

Notes – Phylogenetically, the sequence of *Spirodecospora anshunensis* clusters closely with *S. paulospiralis* R. Sugita & Kaz. Tanaka, however, the *S. paulospiralis* differs from *S. anshunensis* in having smaller ascomata (550–630 µm high, 380–530 µm wide vs. 681–1107 × 798–1040 µm), a larger apical apparatus (5.5–9.5 × 3.5–6.5 µm vs. 7.3–8.1 × 3.6–4.6 µm), and larger ascospores (28–36.5 × 11–14 µm vs. 29–32.5 × 14–17 µm) with gently curved to almost straight linear ornamentations around the ascospores (Sugita et al. 2022). *Spirodecospora bambusicola*, another species of the genus found on bamboo, differs by having smaller ascomata (300–500 µm diam., 500–600 µm high vs. 681–1107 × 798–1040 µm), a wider apical apparatus (8.8–10 µm vs. 3.6–4.6 µm), and larger ascospores (28–45 × 11–15 µm vs. 29–32.5 × 14–17 µm) (Lu et al. 1998, Sugita et al. 2022).

The other two species of the genus *Spirodecospora paramelnikii* and *S. melnikii* (differ by having larger ascospores and apical rings (37–46.5 × 13.5–20 µm and 8–10 × 4.5–6.5 µm for *S. paramelnikii*; 30–36.5 × 12–17 µm and 8–9 × 3.5–4.5 µm for *S. melnikii*) (Sugita et al. 2022).

Spirodecospora daweishanensis Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 23

MycoBank number: MB854861; Facesoffungi number: FoF17267

Etymology – The epithet refers to the locality of the type specimen, Daweishan National Nature Reserve.

Description – *Saprobic* on dead bamboo culms. Teleomorph: *Ascomata* 636–771 × 659–874 µm ($\bar{x}$ = 685 × 791 µm, n = 10*)*, solitary scattered, deeply immersed within the host cortex, visible as black, in cross-section globose to subglobose, with a central, periphysate ostiolar canal, lacking clypeus. *Ostiole* slightly raised or flush with the surface of the host, cylindrical neck, centric. *Peridium* 30-40 µm ($\bar{x}$ = 34.5 µm, n = 20), composed of hyaline inner layer and dark brown to dark outer layer. *Paraphyses* 3.2–6.6 µm ($\bar{x}$ = 4.8 µm, n = 20) wide, long, hyaline, unbranched, septate, filamentous, numerous. *Asci* 236–331 × 19.4–28.3 µm ($\bar{x}$ = 285.2 × 24.1 µm, n = 30), 8-spored, unitunicate, straight or slightly curved, long-cylindrical, short-pedicellate, with a cloud-like or blurred shape, J+, apical ring, bluing in Melzer's reagent, 4.5–5.6 µm high × 7.5–8.7 µm wide ($\bar{x}$ = 5.0 ×8.1 µm, n = 30). *Ascospores* 57.9–66.9 × 20.6–28.6 µm ($\bar{x}$ = 61.8 ×26.1 µm, n = 30), uniseriate, or partly overlapping uniseriate, unicellular, inequilaterally ellipsoidal with round ends, tapered towards both ends, dark brown, smooth-walled, conspicuously verrucose, with 3 spirally arranged wall ornamentations around the ascospores, surrounded by a mucilaginous sheath. Anamorph: Undetermined.

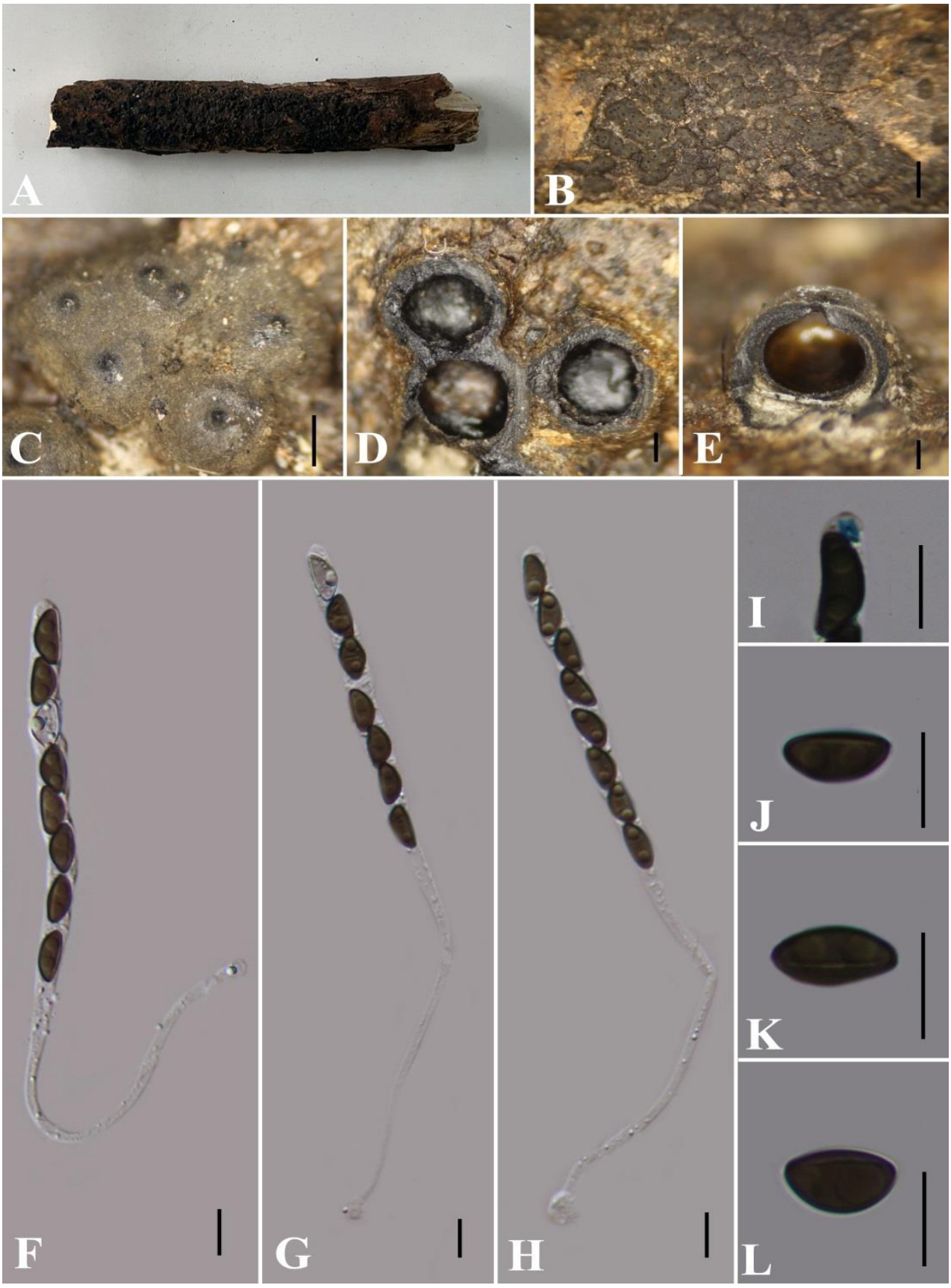

Figure 21 – *Nemania huangjingensis* (GMB0746, holotype). A, B Stromatal habitat. C Stromata surface. D Transverse section of stroma showing perithecia. E Longitudinal section of stroma. F–H Asci in distilled water. I Ascus apical apparatus (stained in Melzer's reagent). J–L Ascospores. Scale bars: B = 2 mm, C = 500 μm, D–E = 200 μm, F–L = 10 μm.

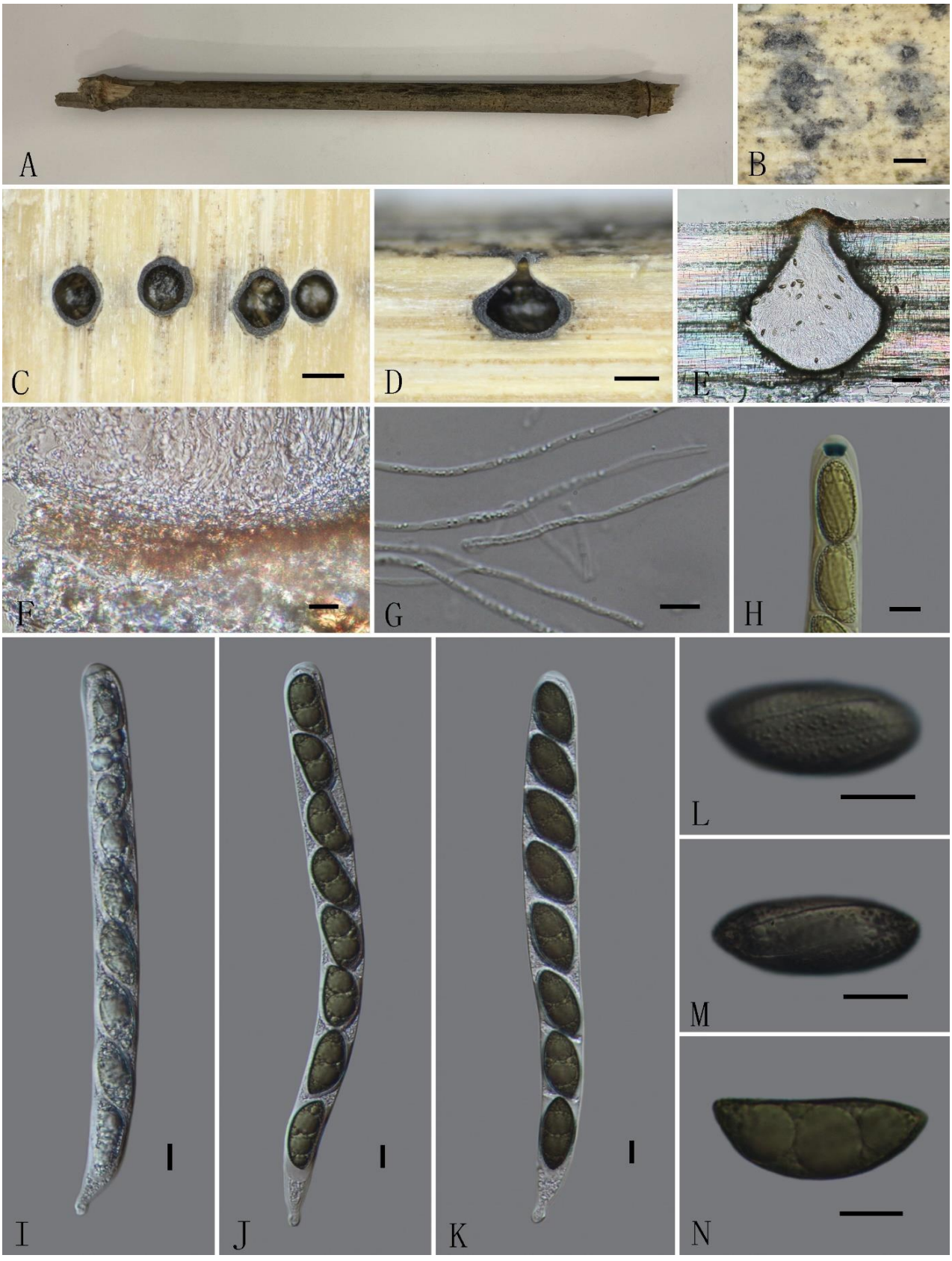

Figure 22 – *Spirodecospora anshunensis* (GMB5629, holotype). A, B Bamboo host. C Cross sections of ascomata. D, E Longitudinal sections of ascomata. F Peridium. G Paraphyses. H Ascus apical apparatus (stained in Melzer's Reagent). I–K Asci in distilled water. L–N Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μm, F–N = 10 μm.

Culture characters – Ascospores germinated on PDA within 18h. Colonies reached 30 mm diam. within three weeks, effuse, circular, cottony. White from above; brown to dark brown in the center, white to pale brown around from below.

Material examined – CHINA, Yunnan Province, Honghe, Daweishan National Nature Reserve, 103º43'48.54"E, 22º56'47.53"N, altitude: 1,374 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, 2023DWS18 (GMB5633, holotype; GMBC5633 ex-type); *ibid*., KUN-HKAS 136294 isotype.

Additional specimen – CHINA, Yunnan Province, Honghe, Daweishan National Nature Reserve, 103º43'47.42"E, 22º56'47.56"N, altitude: 1,371 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, DWS_2023-03 (GMB5637).

Notes – The species can be differentiated from all other species of the genus by its significantly larger ascospores (57.9–66.9 × 20.6–28.6 µm), with net forming ornamentations. All other species of the genus have spore ranges below 45 µm (Lu et al. 1998, Sugita et al. 2022).

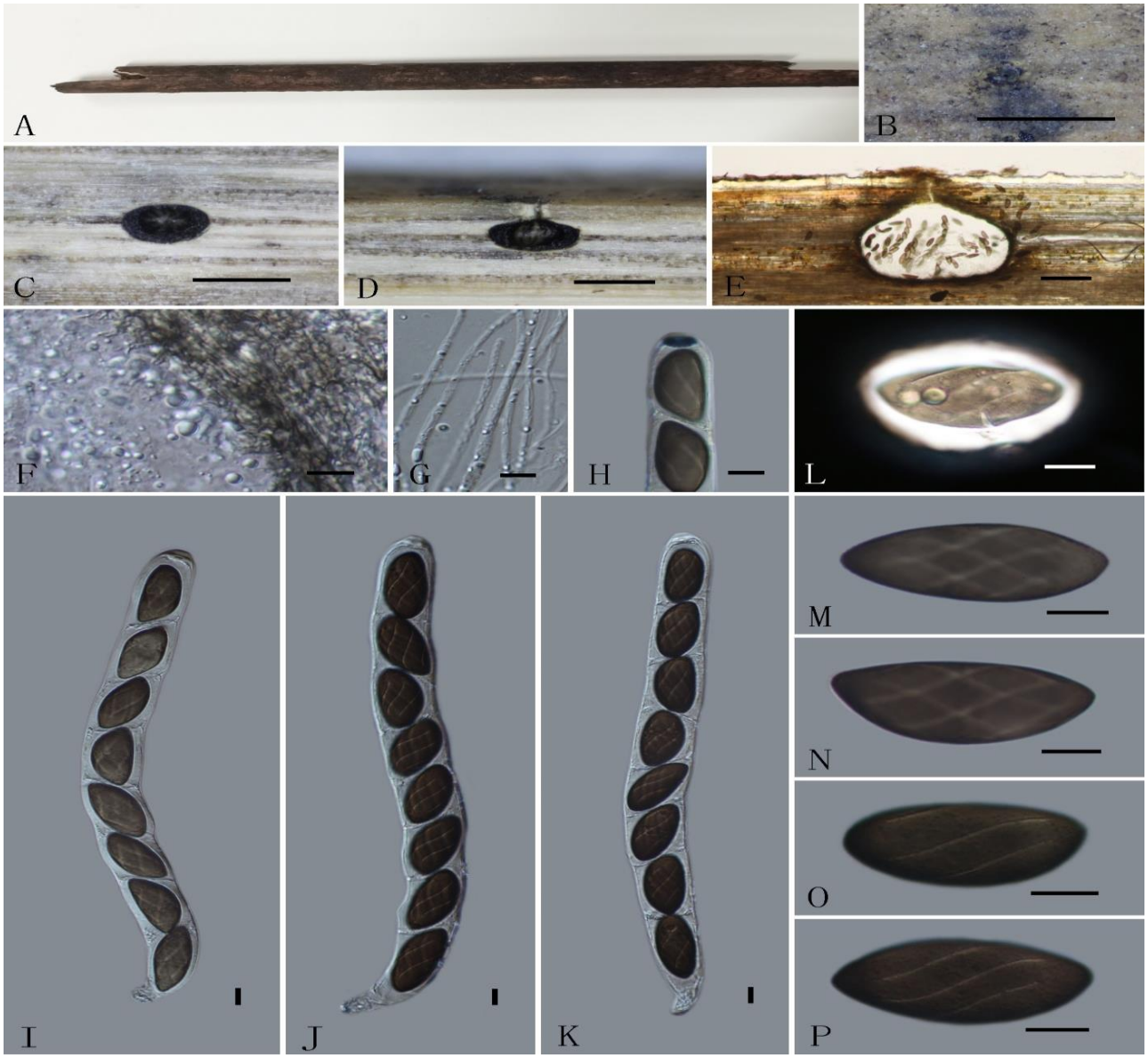

Figure 23 – *Spirodecospora daweishanensis* (GMB5633 holotype). A, B Bamboo host. C Transverse section of perithecium. D, E Longitudinal sections of the perithecium. F Peridium. G Paraphyses. H Ascus apical ring (stained in Melzer's reagent). I–K Asci in distilled water. L Ascospores stained in India ink. M–P Ascospores. Scale bars: B–D = 0.5 mm, E = 100 µm, F–P = 10 µm.

Spirodecospora jinghongensis K. Habib, Y. P. Wu & Q.R. Li, sp. nov. Fig. 24

MycoBank number: MB854862; Facesoffungi number: FoF17268

Etymology – The epithet refers to the locality of the type specimen, Jinghong City.

Description – *Saprobic* on the surface of dead bamboo. Teleomorph: *Ascomata* 646–778 × 677–752 µm ($\overline{x}$ = 718 × 719 µm, n = 10), solitary, visible as black, circular dots, scattered, in vertical-section obpyriform, with a centeral, periphysate canal. *Ostioles* centric, ostiolar canal periphysate. *Peridium* 15–25 µm ($\overline{x}$ = 20 µm, n = 10) wide, multi-layered, an inner layer of hyaline, flattened cells, and an outer layer of dark-brown, thick-walled, angular or compressed cells, fusing with host cells at periphery. *Paraphyses* 2.5–3.3 µm ($\overline{x}$ = 2.8 µm, n =10) wide, filamentous, numerous, septate, branched and longer than asci. *Asci* 162–205 × 14–19.5 µm ($\overline{x}$ = 178 × 15.9 µm, n = 30), 8-spored, unitunicate, cylindrical, short-pedicellate, apex rounded, with J+, wedge-shaped, subapical ring in Melzer's reagent, 1–2 × 3.5–5 µm ($\overline{x}$ = 1.4 × 4.5 µm, n = 10). *Ascospores* 17.5–20.5 × 9.5–11.5 µm ($\overline{x}$ = 19.2 × 10.5 µm, n = 30), uniseriate or partly overlapping uniseriate, inequilaterally broadly ellipsoildal, with one side flattened, or inequilaterally ellipsoildal, brown to olivaceous, unicellular, with conspicuous warts with 3 spirally arranged ornamentations, surrounded by a mucilaginous sheath 8.8–9.8 µm (n = 30) wide, lacking appendages. Anamorph: undetermined.

Material examined – CHINA, Yunnan Province, Jinghong City, Xishuangbanna Nature Reserve, 22º11'07.20"N, 100º33'56.14"E, elev. 1106 m, on dead culm of bamboo, 8 August 2021, Youpeng Wu, 2021XSBN36 (GMB1159, holotype; no culture was obtained); *ibid*., KUN-HKAS 136295 isotype.

Additional specimen – CHINA, Yunnan Province, Jinghong City, Xishuangbanna Nature Reserve, 22º11'07.13"N, 100º33'56.67"E, elev. 1112 m, on dead culm of bamboo, 8 August 2021, Youpeng Wu, XSBN_2021-36 (GMB5635).

Notes – We differentiate *Spirodecospora jinghongensis* from all other *Spirodecospora* species based on its smaller ascospores. Morphologically, *Spirodecospora jinghongensis* is closely related to the type species *S. bambusicola*, as both show similar-sized ascomata and are found on bamboo. However, *S. bambusicola* differs in having a wider apical apparatus (8.8–10 µm) and larger ascospores (28–45 × 11–15 µm) with 2–6 guttulae (Lu et al. 1998, Sugita et al. 2022). *Spirodecospora paulospiralis* also shares the same size ascomata, have almost straight linear ornamentations and can be found on bamboo, but differs in having larger asci (245–280 µm) with a large apical apparatus (5.5–9.5 × 3.5–6.5 µm) and larger ascospores (28–36.5 × 11–14 µm) (Sugita et al. 2022).

Spirodecospora jichuanenii Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 25

MycoBank number: MB854863; Facesoffungi number: FoF17269

Etymology – The epithet "*jichuanenii*" pays tribute to the renowned Chinese mycologist, Prof. Jichuan Kang, in recognition of his valuable contributions to the field of mycology.

Description – *Saprobic* on dead bamboo culms. Teleomorph: *Ascomata* 620–815 × 504–592 µm ($\overline{x}$ = 710 × 550 µm, n = 10), solitary scattered, deeply immersed within the host cortex, visible as black, ostiolar dots, in cross section globose to subglobose, with a central, periphysate ostiolar canal, lacking clypeus. *Ostiole* slightly raised or flush with the surface of the host, centric. *Peridium* 30–45 µm ($\overline{x}$ =33.5 µm, n = 20), composed of hyaline inner layer and dark brown to dark outer layer. *Paraphyses* 1.9–4.1 µm ($\overline{x}$ = 2.9, n = 20) wide, long, hyaline, unbranched, septate, filamentous, numerous. *Asci* 195–284 × 9.2–11.9 µm ($\overline{x}$ = 248.2 × 10.6 µm, n = 30), 8-spored, unitunicate, straight or slightly curved, long-cylindrical, pedicellate, with a wedge-shaped to square shaped, J+, apical ring, bluing in Melzer's reagent, 3.5–4.5 high× 4.0–5.0 µm wide ($\overline{x}$ = 4.1 × 4.5 µm, n = 30). *Ascospores* 19.2–24.5 × 6.1–7.7 µm ($\overline{x}$ = 21.7 × 6.8 µm, n = 30), or partly overlapping uniseriate, unicellular, inequilaterally ellipsoidal or fusiform, tapered towards both ends, dark brown, smooth-walled, with a single longitudinal striation in the middle, half length of the ascospore; without a mucilaginous sheath. Anamorph: Undetermined.

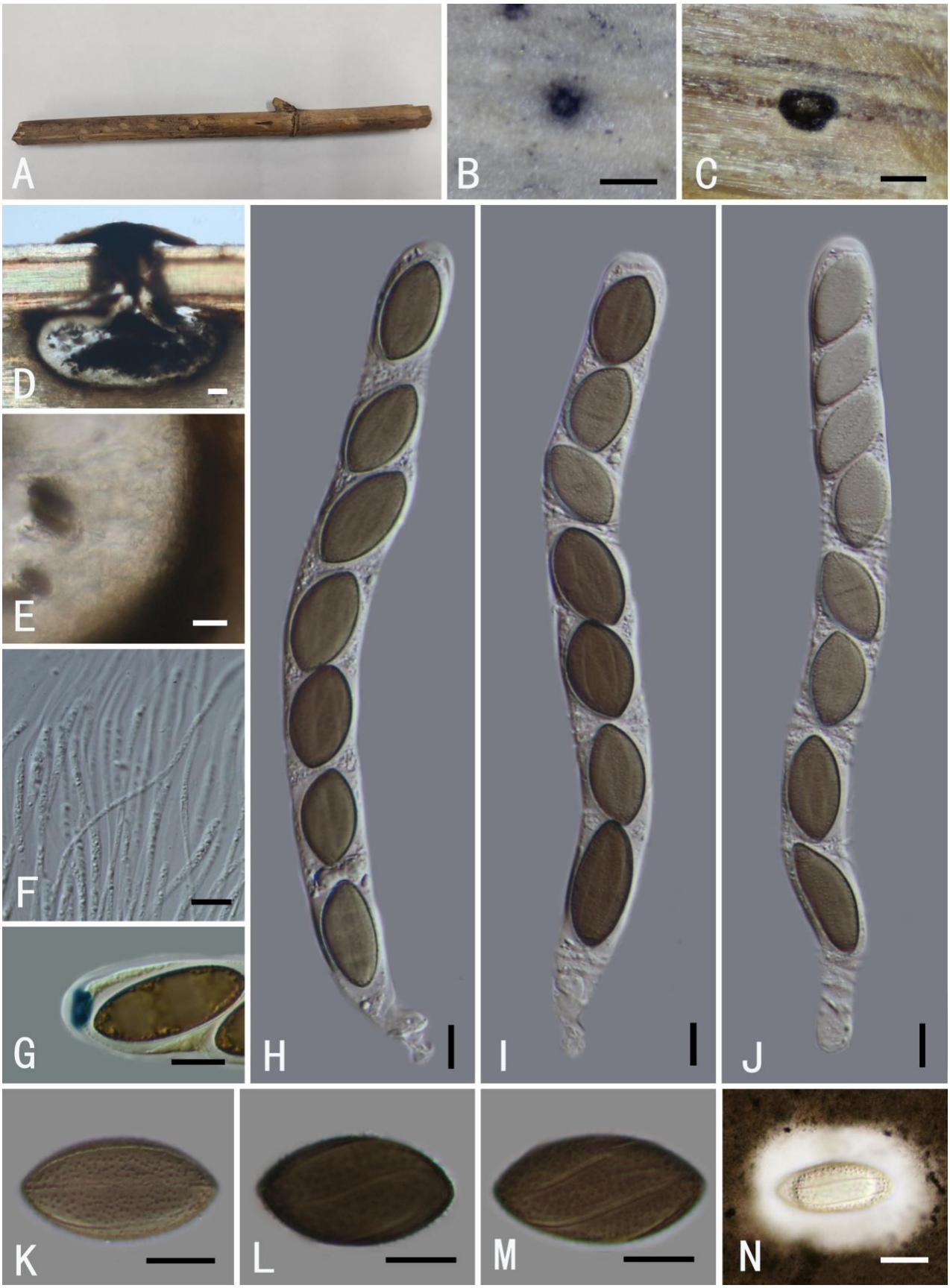

Figure 24 – *Spirodecospora jinghongensis* (GMB1159 holotype). A, B Bamboo host. C Transverse section of ascoma; D Longitudinal section of ascoma. E Peridium. F Paraphyses. G Ascus apical apparatus (stained in Melzer's Reagent). H–J Asci with ascospores. K–N Ascospores (N stained in India ink). Scale bars: B, C = 0.5 mm, D–N = 10 μm.

Culture characteristics – Colonies on PDA reaching 30 mm diam. after 3 weeks at 28 °C, flat, circular, cottony. White from above; dark and White in the center, white to pale brown around from below.

Material examined – CHINA, Guangxi Zhuang Autonomous Region, Liuzhou City, Jiuwanshan National Nature Reserve, 25°12'21"N, 108°40'17"E, altitude: 1,322 m, on dead culms of bamboo, 15 August 2023, Yulin Ren, 2023JWS7, (GMB5628 holotype; GMBC5628, ex-type); *ibid*., KUN-HKAS 136270 isotype.

Additional specimen – CHINA, Guangxi Zhuang Autonomous Region, Shiwandashan National Forest Park, 107º33'54.26"E, 21º41'52.03"N, altitude: 1,540 m, on dead culm of bamboo, 29 July 2023, Lili Liu, SWDS_2023-27 (GMB5644, GMBC5644).

Notes – The ascospores of this species differ significantly from those of other species in the genus. The ascospores are tapered at both ends and have a single longitudinal striation in the middle, covering half their length and without a mucilaginous sheath. In contrast, all other species in the genus have ascospores with spiral linear ornamentations surrounded by a mucilaginous sheath. In the phylogram (Fig. 1), the sequences of *Spirodecospora jichuanenii* formed a distinct clade basal to remaining *Spirodecospora* species with strong statistical support (100/1 BS/PP). In terms of ascospore size, it is comparable to *Spirodecospora jinghongensis*, but *S. jinghongensis* has broadly ellipsoidal ascospores that are smaller (17.5–20.5 × 9.5–11.5 µm) and thicker, with some gently curved to almost straight linear ornamentations, surrounded by a thicker mucilaginous sheath (this study).

Vamsapriya Gawas & Bhat, Mycotaxon 94: 150 (2006) [2005].

Type species: *Vamsapriya indica* Gawas & Bhat, Mycotaxon 94: 150 (2006) [2005].

Notes – *Vamsapriya* was introduced by Gawas & Bhat (2005) based on an anamorph on dead and decaying bamboo twigs from India. The genus is characterised by catenate, phragmosporous conidia on synnematous conidiophores with non-cicatrised, monotretic conidiogenous cells in the anamorph. Dai et al. (2017) later established a link between the anamorph and teleomorphs of *Vamsapriya* through a comprehensive genetic analysis, describing the teleomorph as having solitary, immersed ascomata resembling black dots, 8-spored unitunicate asci, and hyaline, fusiform two celled apiospores Currently, only the teleomorphs of hitherto four species have been described, *V. bambusicola*, *V. chiangmaiensis*, *V. mucosa*, and *V. sichuanensis* (Dai et al. 2017, Sun et al. 2021, Samarakoon et al. 2022, Dissanayake et al. 2024). According to Species Fungorum (2024) (Accessed on July 5, 2024), twelve species of *Vamsapriya* have been documented worldwide. This study describes three new species of this genus based on their teleomorphs.

Vamsapriya clypeata Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 26

MycoBank number: MB854864; Facesoffungi number: FoF17270

Etymology – The epithet refers to the well-developed clypeus.

Description – *Saprobic* on dead bamboo culms. Teleomorph: *Ascomata* 606–966 × 402–518 µm ($\bar{x}$ = 768.2 × 446.5 µm, n = 10), solitary scattered, immersed within the host cortex, visible as black, circular dots, in cross section globose to subglobose, covered with a thin and underdeveloped, black clypeus. *Ostiole* slightly raised or flush with the surface of the host, centric, periphysate ostiolar canal. *Peridium* 40–65 µm ($\bar{x}$ = 52.5 µm, n = 20), composed of hyaline inner layer and dark brown to dark outer layer. *Paraphyses* 2.2–3.1 µm ($\bar{x}$ = 2.5 µm, n = 10) wide, long, hyaline, unbranched, septate, 1.5–4 µm wide ($\bar{x}$ = 3 µm, n = 15). *Asci* 129–181 × 8.2–9.6 µm ($\bar{x}$ = 151.4 × 9.0 µm), 8-spored, unitunicate, straight or slightly curved, long-cylindrical, short-pedicellate, with a wedge-shaped, J+, apical ring, bluing in Melzer's reagent, 2.5–2.8 µm wide, 1.0–1.6 µm high ($\bar{x}$ = 2.7 × 1.3 µm, n = 20). *Ascospores* 18.5–21 × 7.2–8.9 µm ($\bar{x}$ = 19.0 × 8.1 µm, n = 30), uniseriate, fusiform to ellipse, constricted apiosporous with a large cell 15.6–18.9 µm length, guttulate; basal cell 2.9–4.1 µm length, hyaline, smooth-walled, lacking a gelatinous mucilaginous sheath. Anamorph: Undetermined.

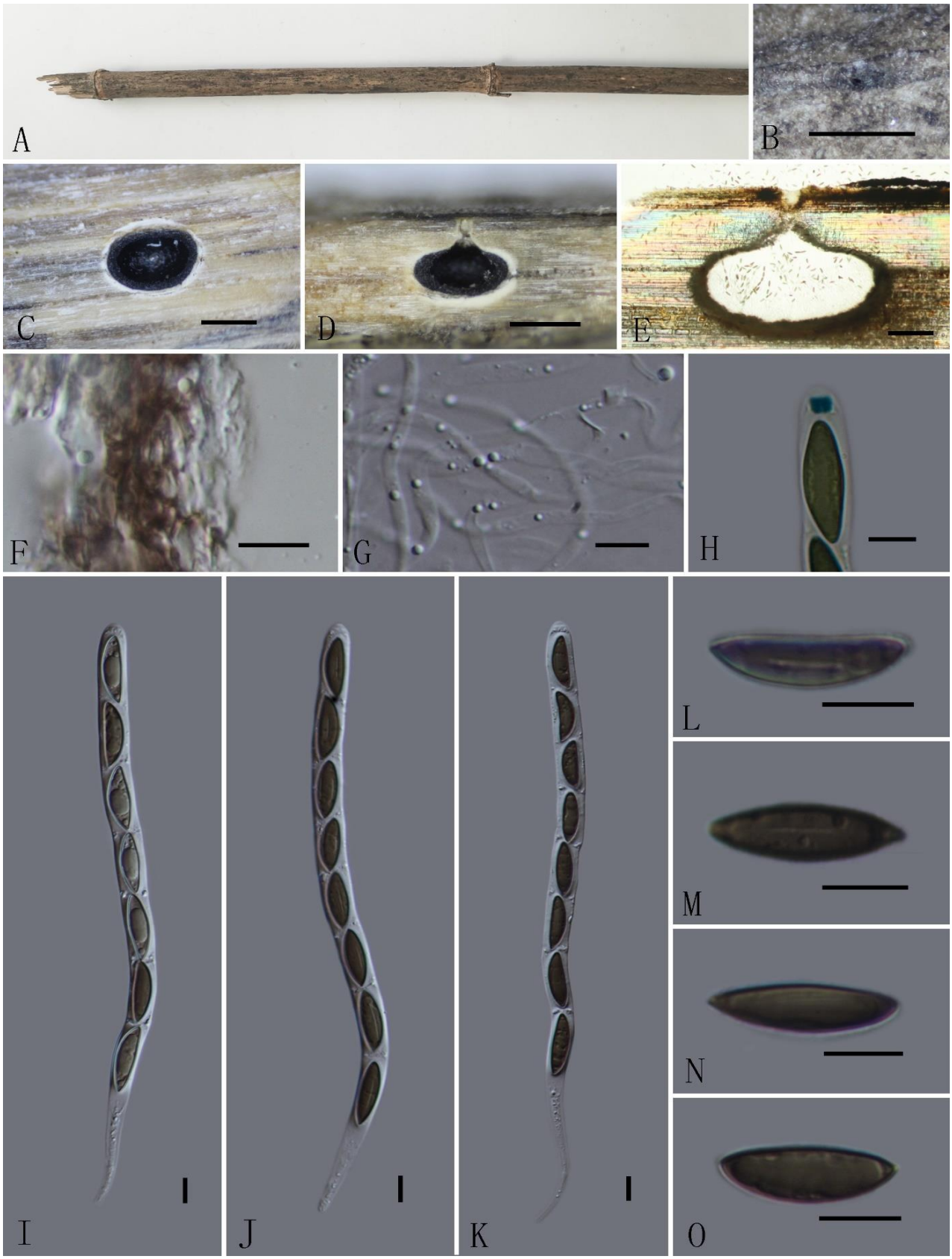

Figure 25 – *Spirodecospora jichuanenii* (GMB5628 holotype). A, B Bamboo host. C Transverse section of perithecium. D, E Longitudinal sections of the perithecium. F Peridium. G Paraphyses. H Ascus apical ring (stained in Melzer's reagent). I–K Asci in distilled water. L–P Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μm, F–O = 10 μm.

Material examined – CHINA, Guangxi Zhuang Autonomous Region, Liuzhou City, Jiuwanshan National Nature Reserve, 25°12'24"N, 108°40'13"E, altitude: 1,326 m, on dead culms of bamboo, 18 November 2023, Yu-Lin Ren, 2023JWS75, (GMB5630 holotype; no culture was obtained); *ibid*., KUN-HKAS 136271 isotype.

Additional specimen – CHINA, Yunnan Province, Honghe, Daweishan National Nature Reserve, 103º43'48.59"E, 22º56'47.38"N, altitude: 1,374 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, DWS_2023-049 (GMB5642, no culture was obtained).

Notes – Morphologically, *Vamsapriya clypeata* is similar to *V. chiangmaiensis* in having similar sized ascomata and asci. However, *V. clypeata* differs in having a well-developed clypeus. Moreover, *Vamsapriya chiangmaiensis* has larger ascospores (17–26 µm) with a large cell length of 12.5–22 µm and a basal cell length of 3.5–6.5 µm, surrounded by a thick gelatinous mucilaginous sheath (Sun et al. 2021). Among the other species in the genus with a known teleomorph, *V. mucosa* is distinguished by smaller ascomata 260–300 × 320–380 µm, significantly smaller asci (80–95 × 5–7.5 µm), and ascospores (10–14 × 3.5–4.5 µm) with a larger cell length of 7.5–10.5 µm and a basal cell length of 1.5–3 µm (Samarakoon et al. 2022); *V. bambusicola* exhibits smaller asci (115–140 × 10.5–18.5 µm), and larger ascospores (20.5–26.5 × 6.5–7.5 µm), which are pointed at both ends and surrounded by a small, inconspicuous mucilaginous sheath (Dai et al. 2017).

The below newly described *Vamsapriya damingshanensis* differs in having smaller ascomata (405–691.6 × 315.8–458.3 µm), lacking a clypeus, and thicker ascospores (21.7–24.6 × 7.3–1.1 µm), with a large cell length of 16.4–19 µm and a basal cell length of 5.3–8.5 µm, surrounded by a thin gelatinous mucilaginous sheath (this study).

Vamsapriya damingshanensis Y.L. Ren. K. Habib & Q.R. Li, sp. nov. Fig. 27

MycoBank number: MB854865; Facesoffungi number: FoF17271

Etymology – The epithet refers to the locality of type specimen, Damingshan National Nature Reserve.

Description – *Saprobic* on dead bamboo culms. Teleomorph: *Ascomata* 405–692 × 316–460 µm ($\overline{x}$ = 561.3 × 394.1 µm, n = 10), solitary scattered, immersed within the host cortex, visible as black, circular dots, in cross section globose to subglobose, lacking clypeus. *Ostiole* flush with the surface of the host, centric, periphysate ostiolar canal. *Peridium* 26.5–55 µm ($\overline{x}$ = 34.5 µm, n = 20), composed of hyaline inner layer and dark brown to dark outer layer. *Paraphyses* 2–4 µm ($\overline{x}$ = 3.0 µm, n = 20) wide, long, hyaline, unbranched, septate. *Asci* 110–200 × 9.5–12 µm ($\overline{x}$ = 166.8× 10.5 µm, n = 30), 8-spored, unitunicate, straight or slightly curved, long-cylindrical, short-pedicellate, with a wedge-shaped, J+, apical ring, bluing in Melzer's reagent, 3.4–1.5 µm high× 3.9–2.5 µm wide ($\overline{x}$ = 3.7 × 1.8 µm, n = 30). *Ascospores* 21–25 × 7–12.5 µm ($\overline{x}$ = 23.5 × 8.9 µm, n = 30), uniseriate, fusiform or ellipse, constricted apiosporous with a large cell 16.4–19 µm length, 2 guttulate; basal cell 5–8.5 µm length, 1 guttulate hyaline, smooth-walled, with a thin gelatinous mucilaginous sheath. Anamorph: Undetermined.

Material examined – CHINA, Guangxi Zhuang Autonomous Region, Damingshan National Nature Reserve, 108º 42' 33.53"E, 22º 47' 3.42"N, altitude: 1560 m, on dead culm of bamboo, 25 July 2023, Yulin Ren, 2023DMS12 (GMB5627, holotype; no culture was obtained); *ibid*., KUN-HKAS 136272 isotype.

Additional specimen – CHINA, Sichuan Province, Gulin County, Damingshan National Nature Reserve, 108º42'33.03"E, 22º47'3.19"N, altitude: 1,560 m, on dead culm of bamboo, 25 July 2023, Sihan Long, DMS_2023-18 (GMB5643).

Notes – Phylogenetically, *Vamsapriya damingshanensis* is closely related to *V. sichuanensis* and *V. chiangmaiensis*. Morphologically, *V. chiangmaiensis* differs from *V. damingshanensis* in having larger stromata (650–1000 × 650–850 µm), and narrower ascospores (5.5–8 µm) with a large cell length of 12.5–22 µm (vs. 16.4–19 µm length) and a basal cell length of 3.5–6.5 µm (vs. 5–8.5 µm length), surrounded by a thick gelatinous mucilaginous sheath (Sun et al. 2021). *Vamsapriya sichuanensis* differs from *V. damingshanensis* in having smaller asci (100–160 × 7–10 µm vs. 110–200 × 9.5–12 µm), wider paraphyses (4–6 µm vs. 2–4 µm), slightly smaller and

narrower ascospores (18–23 × 5–7 µm vs 21–25 × 7–12.5 µm) with a large cell (13–17 µm long vs. 16.4–19 µm long) and basal cell (4–6 µm long vs. 5–8.5 µm long) (Dissanayake et al. 2024).

Figure 26 – *Vamsapriya clypeata* (GMB5630, holotype). A, B Bamboo host. C Cross sections of ascoma. D, E Vertical sections of ascomata. F Peridium. G Paraphyses. H Apical ring (stained in Melzer's reagent). I–K Asci. L–O Ascospores. Scale bars: B–D = 0.5 mm, E = 100 µm, F–O = 10 µm.

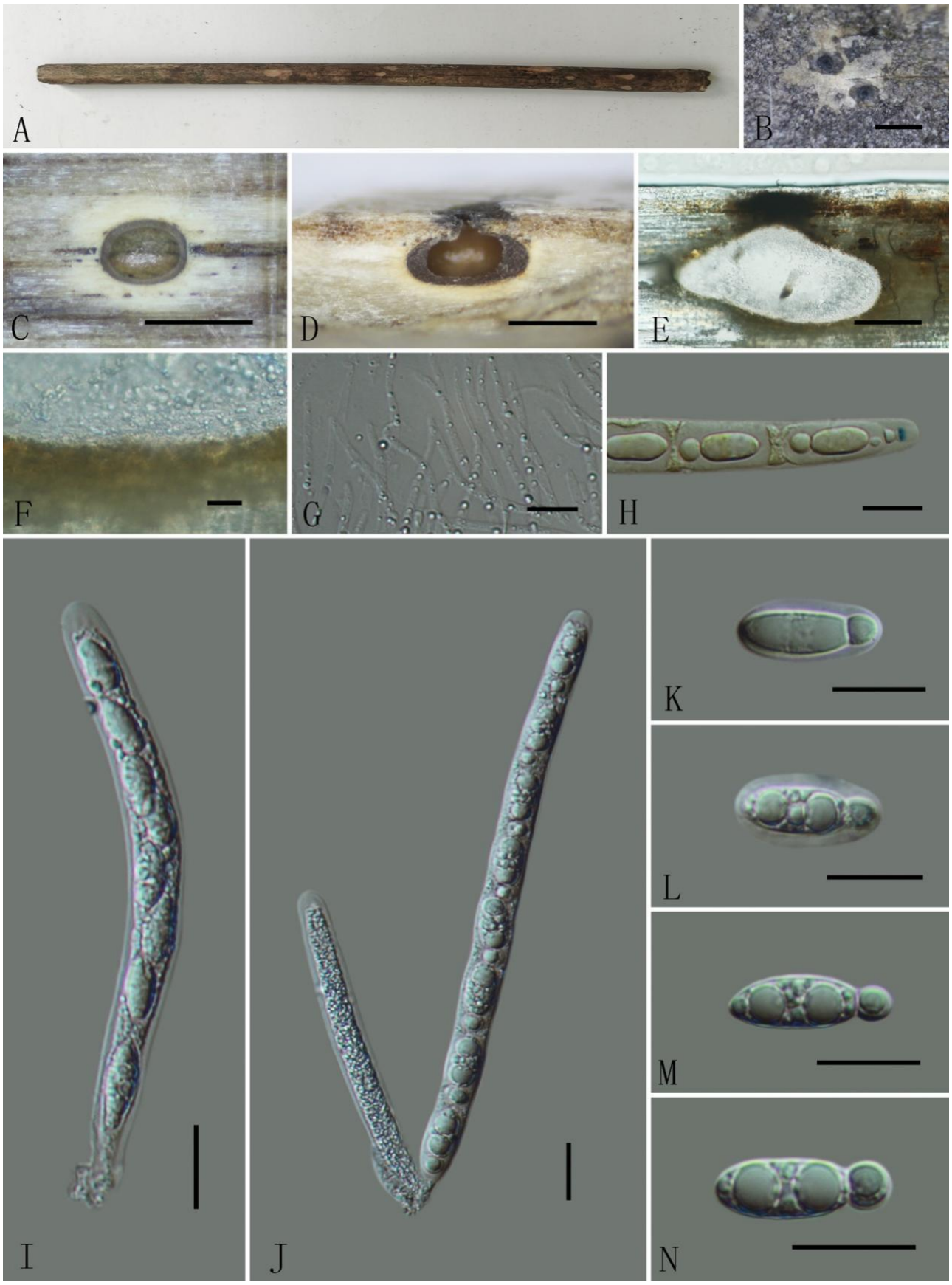

Figure 27 – *Vamsapriya damingshanensis* (GMB5627, holotype). A, B Bamboo host. C Cross sections of ascoma. D, E Vertical sections of ascomata. F Peridium. G Paraphyses. H Apical ring (stained in Melzer's reagent). I, J Asci. K–N Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μm, F–N = 10 μm.

The other species in the genus with a known teleomorph, *Vamsapriya mucosa* is distinguished by smaller ascomata (260–300 × 320–380 μm), smaller asci (80–95 × 5–7.5 μm), and ascospores (10–14 × 3.5–4.5 μm) with a larger cell length of 7.5–10.5 μm and a basal cell length of 1.5–3 μm (Samarakoon et al. 2022). *Vamsapriya bambusicola* differs in having smaller asci (115–140 × 10.5–18.5 μm) and thinner ascospores (20.5–26.5 × 6.5–7.5 μm), which are pointed at both ends usually with a single large guttule in upper cell.

Vamsapriya shiwandashanensis Y.L. Ren, K. Habib & Q.R. Li, sp. nov. Fig. 28

MycoBank number: MB854866; Facesoffungi number: FoF17272

Etymology – The epithet refers to the locality of the type specimen, Shiwandashan National Forest Park.

Description – *Saprobic* on dead bamboo culms, immersed within the host cortex, black pigmented, clypeus-like tissue around ostiolate opening, visible as black, circular spots on the host surface. Teleomorph: *Ascomata* 550–670 μm wide, 390–480 μm high ($\overline{x}$ = 607 × 437 μm, n = 30), solitary, scattered, immersed within the host cortex, subglobose, light brown, papillate, with black clypae-like tissue. *Ostioles* slightly raised or flush on the surface, with periphyses. *Peridium* laterally 35–45 μm ($\overline{x}$ = 39 μm, n = 10) thick, composed of thin-walled, light brown to hyaline cells of *textura angularis*. *Paraphyses* 1.3–3.8 μm wide ($\overline{x}$ = 2.7 μm, n = 10) comprising long, hyaline, septate paraphyses. *Asci* 120–145 × 5–7 μm ($\overline{x}$ = 127.5 × 5.8 μm, n = 20), 8-spored, unitunicate, cylindrical, short-pedicellate, with a J+, apical ring, fuzzy discrete shapes, 1.9–2.6 × 0.9–1.5 μm ($\overline{x}$ = 2.2 ×1.2 μm). *Ascospores* 20–29 × 5.5–7.5 μm ($\overline{x}$ = 26.8 × 6.4 μm, n = 20), overlapping uniseriate, 1-septate, fusiform to broad fusiform, hyaline, pointed at both ends, large cell 16–21.5 μm ($\overline{x}$ = 19.7 μm) long, with 2-3 guttulate, and a small cell triangular, 5.4–9.5 μm ($\overline{x}$ = 7.4 μm) long, lacking a mucilaginous sheath. Anamorph: Undetermined.

Culture characters – Ascospores germinated on PDA within 24h, germ tubes produced from one end. Colonies reached 45 mm diam. within three weeks at 28 °C, flat, circular, cottony. White from above; brown to dark brown in the center, white to pale brown around from below.

Material examined – CHINA, Guangxi Zhuang Autonomous Region, Shiwandashan National Forest Park, 107º33'55.26"E, 21º41'51.23"N, altitude: 1,572 m, on dead culm of bamboo, 28 July 2023, Yulin Ren, 2023SWDS9 (GMB5632, holotype; GMBC5632, ex-type); *ibid*., KUN-HKAS 136273 isotype.

Additional specimen – CHINA, Guangxi Zhuang Autonomous Region, Shiwandashan National Forest Park, 107º33'54.22"E, 21º41'50.31"N, altitude: 1,585 m, on dead culm of bamboo, 29 July 2023, Yulin Ren, SWDS2023-36 (GMB5641)

Notes – *Vamsapriya shiwandashanensis* is morphologically closely related to *V. clypeata*, which also lacks a mucilaginous sheath, but *V. clypeata* differs in having larger ascomata (606–966 × 402–518 μm vs. 550–670 μm wide, 390–480 μm high), larger asci (129–181 × 8.2–9.6 μm vs. 120–145 × 5–7 μm), and smaller ascospores (18.5–21 × 7.2–8.9 μm vs. 20–29 × 5.5–7.5 μm), with a large cell length of 15.6–18.9 μm (vs. 16–21.5 μm) and a basal cell length of 2.9–4.1 μm (vs. 5.4–9.5 μm). Moreover, the basal cell of the ascospore of *V. clypeata* is rounded in shape (this study). Phylogenetically, *Vamsapriya bambusicola* is closely related to *V. shiwandashanensis*; however, the *V. bambusicola* differs by having slightly smaller ascospores (20.5–26.5 × 6.5–7.5 μm vs. 20–29 × 5.5–7.5 μm) that are surrounded by a mucilaginous sheath and contain a single large guttule in the upper cell (Dai et al. 2017). *Vamsapriya chiangmaiensis* differs from *V. shiwandashanensis* in lacking a clypeus and having ascospores surrounded by a thick gelatinous mucilaginous sheath, with a basal cell length of 3.5–6.5 μm (Sun et al. 2021). *Vamsapriya mucosa* is distinguished by smaller ascomata (260–300 × 320–380 μm), smaller asci (80–95 × 5–7.5 μm), and ascospores (10–14 × 3.5–4.5 μm) with a larger cell length of 7.5–10.5 μm and a basal cell length of 1.5–3 μm (Samarakoon et al. 2022).

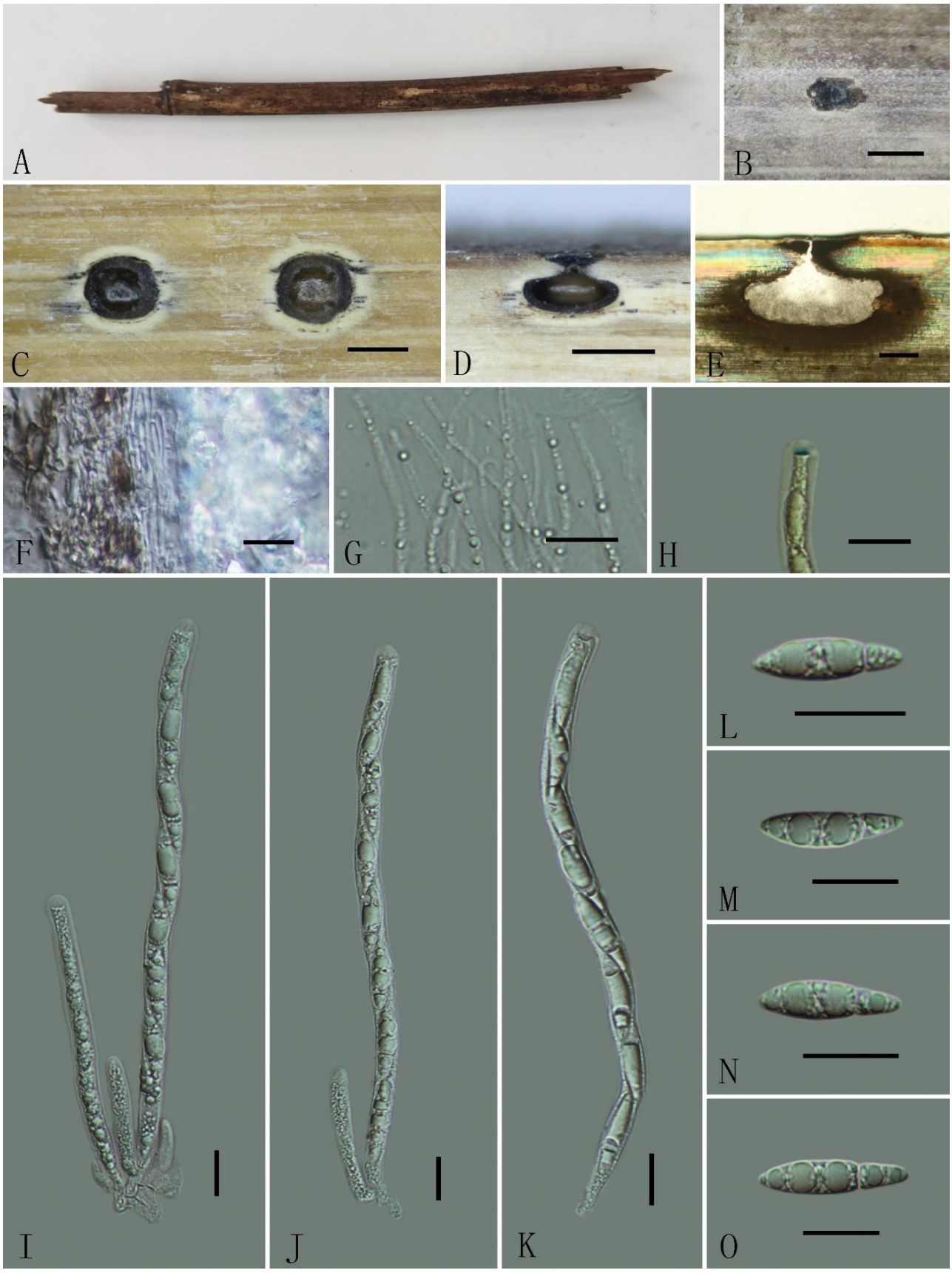

Figure 28 – *Vamsapriya shiwandashanensis* (GMB5632, holotype). A, B Bamboo host. C Cross section of ascoma. D, E Vertical sections of ascoma. F Peridium. G Paraphyses. H Apical ring (stained in Melzer's reagent). I–K Asci. L–O Ascospores. Scalebars: B–D = 0.5 mm, E = 100 μm, F–O = 10 μm.

DISCUSSION

The taxonomic study of Xylariales species presents a significant challenge due to their highly similar morphological characteristics. Prior research has primarily focused on easily identifiable stromatic forms like diatrypoid, hypoxyloid, rosellinioid, and xylarioid, neglecting the inconspicuous anthostomelloid forms (Samarakoon et al. 2022). The knowledge of species, genera, and higher taxa can only advance through the collection, isolation, sequencing, and sharing of new data on fungi worldwide. By systematically comparing data on individual species, we can better delineate and distinguish species, genera, and higher taxonomic groups (Hyde et al. 2020b). This polyphasic approach integrating the collection, isolation, sequencing, and global sharing of new fungal data, enables us to refine our taxonomic classifications and deepen our understanding of fungal diversity. Since 2018, our research has focused on the diversity and systematics of xylarialean taxa in Mainland China, unveiling a rich collection of discoveries. In 2024, we introduced more than 70 new species (Li et al. 2024a, b). Using polyphasic approaches and significant advancements in the hierarchical structure of classification, significant progress has been made in our understanding of the fungi in Mainland China. However, current classification systems and techniques, while greatly contributing to the systematics of Xylariales, remain insufficient to fully resolve all lineages. To improve resolution, integrating chemical data, such as secondary metabolites or pigments approaches that have proven effective in the taxonomy of the Hypoxylaceae (Cedeño-Sanchez et al. 2023b, 2024) should also be applied to other Xylariales groups to provide deeper insights into their evolutionary relationships, diversity and classification systems.

A total of 27 species in this study have been described, of which 23 species are reported to be associated with bamboo and are anthostomelloid. A recent study by Jiang et al. (2022) documented a vast diversity of bambusicolous ascomycetes in China, reported 512 bambusicolous ascomycete taxa from China, associated with 16 bamboo genera, which are distributed across 50 orders, 116 families, and 279 genera (including 45 genera incertae sedis), representing more than one-third of the known bambusicolous ascomycota in the world. Recent years have witnessed notable additions to the catalogue of bambusicolous fungi in China. In the last two years, a total of 30 new species of fungi associated with bamboo are reported from China (Liang et al. 2023, Wu et al. 2023, Yu et al. 2023, Li et al. 2024a, Yu et al. 2024). Our study adds 23 new species, bringing the total reported number to 565. This rapid increase in documented species highlights the previously underestimated richness of this fungal community.

Several phylogenetic studies have recognized that *Anthostomella*-like fungi are polyphyletic within Xylariales, and some are distantly related to Xylariaceae (Daranagama et al. 2015, 2016, Voglmayr et al. 2018, Samarakoon et al. 2022, Sugita et al. 2024). Several genera have been segregated from *Anthostomella*, including *Alloanthostomella*, *Anthostomelloides*, *Haploanthostomella*, *Neoanthostomella*, *Nigropunctata*, *Pseudoanthostomella*, and *Xenoanthostomella*.

Our analyses reveal some topological differences in *Anthostomella* clades compared to those by Voglmayr et al. (2018) and Samarakoon et al. (2022). The sequences of *Anthostomella helicofissa* (MFLUCC 14-0173), *A. rubicola* (MFLUCC 14-0175), *A. obesa* (MFLUCC 14-0171), and *A. torosa* (AFTOL-ID 732) consistently form a distinct clade in all the published analyses (Daranagama et al. 2015, 2016, Voglmayr et al. 2018, Samarakoon et al. 2022, Sugita et al. 2024), suggesting they may represent a distinct family. However, the exact position of this clade remains unclear.

In our study, *Pseudoanthostomella* and *Anthostomella* formed distant clades, aligning with the phylogenetic analyses of Daranagama et al. (2015, 2016). Whereas, in the analyses by Voglmayr et al. (2018) and Samarakoon et al. (2022), *Pseudoanthostomella* and *Anthostomella* clustered into a highly supported single clade. Voglmayr et al. (2018) suggested that this discrepancy might be due to the inclusion of erroneous sequences. We examined the alignment of these species (ITS, LSU, and *rpb2*) and found no alignment errors, may some nucleotide error. Therefore, it is recommended that these sequences be rechecked. Re-evaluating the chromatogram

data could clarify these phylogenetic relationships and potentially lead to the establishment of a new taxonomic framework.

Many species in these genera have unknown teleomorphs. The genus *Vamsapriya*, which contains 13 species, has had only four species previously reported with teleomorphs (Dai et al. 2017, Sun et al. 2021, Samarakoon et al. 2022, Dissanayake et al. 2024). In this study, we introduce three new species of *Vamsapriya* with teleomorphs. With the addition of these three new species, the number of species known for their teleomorphs has increased to seven, all collected from Mainland China.

Samarakoon et al. (2020) proposed the family Induratiaceae to include the genera *Emarcea*, *Induratia*, and integrated the genus *Muscodor* within *Induratia*, based on a multi-locus phylogenetic analysis that revealed that these genera form a monophyletic clade distinct from representatives of Xylariaceae, leading to the establishment of a separate family. However, Cedeño-Sánchez (2023a) later examined the type species of *Induratia*, *I. apiospora*, demonstrating its close relationship with Barrmaeliaceae and rejecting its prior classification within *Muscodor*. As a result, *Induratia apiospora* was reclassified within Barrmaeliaceae, and Induratiaceae was synonymized with this family. *Muscodor* was subsequently resurrected within Xylariaceae, with several species transferred back to the genus.

In our phylogenetic analysis, *Muscodor* and *Emarcea* form a distinct lineage, separate from Xylariaceae, a finding corroborated by previous studies (Samarakoon et al. 2022, Sun et al. 2024). This consistent finding across studies indicates that these genera should not be included in Xylariaceae. We do not support the inclusion of these genera within Xylariaceae and recommend further investigation, as phylogenetic evidence suggests these genera may represent a distinct family.

Many lineages within Xylariales, such as *Anthostomella*, *Anthostomelloides*, *Arecophila*, *Biscogniauxia*, *Diatrype*, *Diatrypella*, *Eutypella*, *Gyrothrix*, *Rosellinia*, *Stilbohypoxylon*, and *Xylaria*, exhibit significant phylogenetic deviations from existing genera despite sharing morphological similarities. The high plasticity in the morphology of Xylariales complicates the accurate placement of these fungi in phylogenetic analyses, resulting in polyphyletic groupings that disrupt classification. Hyde et al. (2020a) introduced the family Fasciatisporaceae to accommodate *Fasciatispora*, characterized by aseptate ascospores with a central pallid band, and based on a distinct multigene phylogeny. This sets it apart from other members of the Xylariales. In this study, we described *Fasciatispora guizhouensis*, which formed a well-supported clade within the genus phylogenetically. However, it lacks the characteristic feature on which the new family was established.

A similar situation arises with the newly described *Digitodochium* species in this study. These species clustered closely with previously reported *Digitodochium* species in phylogenetic analyses. However, the morphological diagnostic features outlined by Voglmayr et al. (2022) do not fully align with our collections. *Magnostiolata shiwandashanensis* forms a well-supported clade as a sister species to the genus *Magnostiolata*, established by Samarakoon et al. (2022), but its morphological characteristics do not match the genus's diagnostic traits. This mismatch highlights the potential pitfalls of creating new genera based on single characteristics, which can lead to classification issues and polyphyletic groupings.

Many genera within Xylariales, such as *Alloanthostomella*, *Amphibambusa*, *Amphisphaeria*, *Amphigermslita*, *Haploanthostomella*, *Minuticlypeus*, *Neoanthostomella*, *Nigropunctata*, Paramphibambusa, *Pseudoanthostomella*, and *Xenoanthostomella* etc., are distinguished based solely on a single morphological characteristic (Liu et al. 2015, Konta et al. 2021, Samarakoon et al. 2022, Han et al. 2024, Sugita et al. 2024). Creating new genera based on single characteristics can lead to significant classification issues particularly for taxa with poorly developed stromata, clypei, or even lacking external structures. When these characteristics do not align with phylogenetically close relatives, they may align with more distantly related genera or morphologically similar genera, resulting in polyphyletic groupings. This can create misleading taxonomic groupings that don't reflect the true evolutionary relationships.

Given these complexities, we suggest prioritizing phylogenetic analyses over morphological characteristics in the classification of Xylariales. Modern classification systems emphasize the necessity of molecular studies, as they provide more accurate and reliable phylogenetic placements. By focusing on phylogenetic analyses and incorporating chemical data, such as secondary metabolites and pigments, we can achieve a more robust and scientifically sound understanding of the relationships among Xylariales species, ultimately leading to a more accurate and consistent taxonomic framework.

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