

Exploration of ascomycetous fungi revealing novel taxa in Southwestern China

Habib K^{#1,2}, WH Li^{#1}, YL Ren^{1,2}, LL Liu^{1,2}, CT Lu^{1,2}, QF Zhang^{1,2}, ZQ Yao¹, XY Luo¹, X Zhou¹, WY Zeng¹, YQ Kang³, XC Shen^{1,2*}, Wijayawardene NN⁴, Elgorban AM⁵, Al-Rejaie S⁶, QR Li^{1,2*}

¹State Key Laboratory of Discovery and Utilization of Functional Components in Traditional Chinese Medicine & School of Pharmaceutical Sciences, Guizhou Medical University, Guiyan New District, Guizhou 550004, China

²The Key Laboratory of Optimal Utilization of Natural Medicine Resources (The Union Key Laboratory of Guiyang City-Guizhou Medical University), Guizhou Medical University, Guiyang, Guizhou province, 561113, P.R. China

³Key Laboratory of Microbiome and Infectious Disease Prevention and Control of Guizhou & Key Laboratory of Environmental Pollution Monitoring and Disease Control, Ministry of Education of Guizhou & School of Basic Medical Science & Institution of One Health Research, Guizhou Medical University, Guiyang, 550025, P.R. China

⁴Center for Yunnan Plateau Biological Resources Protection and Utilization, College of Biology and Food Engineering, Qujing Normal University, Qujing, Yunnan 655011, P.R. China

⁵Department of Botany and Microbiology, College of Science, King Saud University, Riyadh 11451, Saudi Arabia

⁶Department of Pharmacology & Toxicology, College of Pharmacy, King Saud University, Riyadh 11451, Saudi Arabia

Citation – Habib K, WH Li, YL Ren, LL Liu, CT Lu, QF Zhang, ZQ Yao, XY Luo, X Zhou, WY Zeng, Kang YQ, XC Shen, Wijayawardene NN, Elgorban AM, Al-Rejaie S, QR Li 2025 – Exploration of ascomycetous fungi revealing novel taxa in Southwestern China. Mycosphere 16(1), 1412–1529, Doi 10.5943/mycosphere/16/1/9

Abstract

This study explores the fungal diversity of Southwestern China, focusing on ascomycetous fungi associated with decaying plant materials. Through morphological and multi-locus phylogenetic analyses, we identified 31 new species and a new genus across six fungal orders, Amphisphaeriales, Chaetosphaeriales, Dyfrolomycetales, Hypocreales, Pleosporales, and Xylariales. The newly described species include *Allodiatrype flavigelida*, *Anteaglonium stromatolineum*, *Anthostomatopsis chinensis*, *An. suiyangensis*, *Apiospora anshunensis*, *Arecophila chinensis*, *Ar. amphibambusina*, *Astrocystis liuzhouensis*, *Astrosphaeriella gaofengensis*, *As. roseobrunnea*, *Coniolaria cuneiapicalis*, *Didymobotryum bambusae*, *Digitodochium anshunense*, *Fissuroma chinense*, *Immotthia chinensis*, *Lophiostoma bijiense*, *L. yunnanense*, *Magnostiolata tubulariapicalis*, *Ma. subtubularia*, *Melomastia chinensis*, *Memnoniella chrysanthemi*, *Minuticlypeus biconcavus*, *Nemania jiuwanshanensis*, *Neolinocarpon huaxiense*, *Nigropunctata chinensis*, *Ni. liuzhouensis*, *Pallidoperidium chinense*, *Peroneutypa heveae*, *Rosellinia nemaniae*, *R. putrida* and *Vamsapriya kailiensis*. Additionally, we propose six new combinations based on comparative morphological and phylogenetic analyses, *Amphigermis subyunnanensis*, *Am. yunnanensis*, *Anthostomatopsis guizhouensis*, *Minuticlypeus raphidophylli*, *M. xiaohensis* and *Pallidoperidium smilacis*. Furthermore, we report three taxa, *Astrosphaeriella bambusae*, *Didymobotryum rigidum*, and *Endocalyx melanoxanthus* as new geographical records in China. Previous studies and our phylogenetic analyses revealed that the genera *Muscodor*, *Emarcea*, and *Spiririma* form a monophyletic clade distinct from representatives of Xylariaceae, for which we propose the new family Muscodoraceae fam. nov. These findings highlight the fungal diversity of this ecologically rich region, with its varied climates and habitats ranging from subtropical forests to alpine ecosystems. The species described in this study represent only a small fraction of

Submitted: 15 January 2025; **Accepted:** 21 April 2025; **Published:** 23 May 2025

***Corresponding Author:** Li QR – e-mail – lqrd2008@163.com;

Shen XC – e-mail – shenxiangchun@126.com

Accepted by: Mingkwan Doilom

These authors contributed equally.

mycoflora in the region, emphasizing the need for further comprehensive surveys via polyphasic approaches to uncover the full extent of the mycoflora in this region.

Keywords – bambusicolous fungi – fungal diversity – novel taxa – taxonomy – Xylariales

INTRODUCTION

The global monetary value of fungi has been estimated to be around \$54.57 trillion (Niego et al. 2023), highlighting their immense significance in various sectors of the economy and ecosystem services. This valuation highlights the critical role of the Kingdom Fungi, one of the most diverse groups of organisms on Earth, which consists primarily of heterotrophic uni to multicellular species that inhabit a wide range of ecosystems, including extreme environments. Fungi are essential for ecosystem functioning, contributing to nutrient cycling, decomposition, and symbiotic relationships with plants (Kirk et al. 2008, Hyde et al. 2018).

The remarkable diversity within this kingdom is reflected in global fungal diversity estimates, which vary significantly, ranging from fewer than one million to over ten million species, depending on the methodologies and criteria applied (Hyde et al. 2024). To accurately estimate and enhance the understanding of fungal diversity, Hyde et al. (2024) emphasized the need for targeted research that includes extensive studies in tropical rainforests, focusing on canopy ecosystems, plant-associated fungi, and various fungal groups such as lichens, soil and marine fungi. Gathering such comprehensive data will facilitate the development of a more precise estimate of global fungal diversity (Hyde et al. 2024). In line with the global emphasis on understanding fungal diversity, our study focuses on Southwestern China.

Southwestern China is a region of remarkable ecological and geographical diversity, encompassing Sichuan, Chongqing, Yunnan, and Guizhou provinces, with broader definitions including Guangxi and parts of Hunan (Harper 2007). The complex topography of the region includes elevations ranging from lowland plains to high-altitude plateaus exceeding 4,000 m a.s.l. Its diverse climates transition from subtropical in the lower regions to temperate and alpine at higher altitudes, fostering an exceptional range of vegetation types, from tropical evergreen forests to alpine meadows. The region accounts for approximately 10% of the land area of China and is home to over 30% of its higher plant species (CEPF Report 2002-2013, Ptak et al. 2019). The terrain rises steeply from river valleys at a few hundred meters above sea level to mountain peaks reaching 7,000 meters. This gradient supports a complete spectrum of vegetation types, including tropical and subtropical evergreen broad-leaved forests at lower altitudes, temperate deciduous forests, mixed broad-leaved coniferous forests, subalpine coniferous forests with dense bamboo, and alpine meadows above the tree line. Approximately 29% of the more than 12,000 higher plant species found in this hotspot are endemic, making it one of the richest temperate regions for plant diversity worldwide. The tree line in this region reaches an altitude of 4,600 m a.s.l., the highest known globally (CEPF Report 2002-2013). During the summer, the Tibetan Plateau serves as a barrier to monsoon winds, creating a cloudy environment that traps moisture, giving the alpine flora lushness. The combination of complex topography and favourable humid conditions has resulted in exceptionally rich biodiversity in Southwestern China (CEPF Report 2002-2013, Tang 2015). Southwestern China has always been a focus of special attention by botanists as the region has immense topographic and varied climatic conditions that truly provide a better picture of the structural diversity of vegetation. However, these conditions also pose challenges for systematic fungal sampling, as rugged terrain, remote high-altitude areas, and variable microclimates limit exploration and taxonomic attention. This combination of unexplored diversity, exceptional biodiversity, and climatic complexity makes Southwestern China an ideal region for studying fungal diversity. While the region has been acknowledged for its microbial diversity, research on fungi, particularly microfungi, is limited compared to other kingdoms such as Plantae and Animalia (Liu et al. 2013, Chi et al. 2017, Liu et al. 2018, Dissanayake et al. 2024).

As discussed, the region adopts a wide range of topography, including mountains, lush green valleys, the world's highest peaks, dense forests, deep blue water lakes and marvellous landscapes,

making it a suitable habitat for fungal growth. In this study, ascomycetes associated with dead and decaying plant materials were collected from Southwestern China. Ascomycota is one of the largest phyla within the fungal kingdom and currently includes 24 recognized classes. These fungi, isolated from a broad range of environments across terrestrial and aquatic ecosystems, exhibit various life modes and habitats, functioning as saprobes, pathogens of plants and animals, lichen-forming, lichenicolous, fungicolous, endophytes, and yeast-like or filamentous forms (Wijayawardene et al. 2024).

The aim of this study was to explore the diversity of Ascomycetous taxa collected from Southwestern China. We report a new family, a new genus, 31 new species and 6 novel combinations, supported by morphological characteristics and multi-locus phylogenetic analyses using ITS, SSU, LSU, *rpb2*, *tub2* and *tef1- α* regions. All newly identified species are saprophytic fungi, which play an important role in the natural breakdown of organic materials and may possess unique biochemical properties with applications in agriculture, medicine, and environmental management. The findings of this study provide a strong theoretical and practical basis for future investigations into these fungi, which may lead to valuable applied research and potential biotechnological innovations.

MATERIALS AND METHODS

Sample collection

The fungal specimens were collected during the surveys conducted in the Southwestern regions of China between 2022 and 2024, with all relevant habitat information recorded in a detailed manner. Specimens were photographed using a Canon G15 camera (Canon Corporation, Tokyo, Japan). They were then placed in paper bags and transported for further examination. To remove excess humidity, they were dried in the shade 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. Afterwards, the specimens were subjected to morphological analysis. All specimens were deposited at the Herbarium of Guizhou Medical University (GMB) and the Herbarium of Cryptogams, Kunming Institute of Botany, Chinese Academy of Sciences (KUN-HKAS). Living cultures were deposited at the Guizhou Medical University Culture Collection (GMBC). All scientific names of fungi follow the entries in MycoBank and Index Fungorum, hence no authorities and years of publications are given in the text apart from the taxonomic entries.

Isolation and morphological characterization

Macroscopic characteristics were examined under an Olympus SZ61 stereomicroscope (Japan) and photographed with a Canon 700D digital camera (Canon, Tokyo, Japan). The morphological features were studied as described by Li et al. (2024a). The samples were mounted in water for microscopic examination, Melzer reagent was added to assess the amyloid reaction of the ascus apical apparatus. The Tarosoft (R) Image Frame Work (v 0.9.7) program and Adobe Photoshop CS6 software (Adobe Systems, USA) were used for measuring and processing images. Axenic cultures were obtained from single spores or tissues as described by Senanayake et al. (2015). Germinating spores were observed with a stereo Zoom microscope and transferred to potato dextrose agar (PDA; 39 g/L, Difco™). The cultures were incubated at 25–30°C for 4–6 weeks, with weekly observations of growth and development.

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 without germinating ascospores, we extracted the DNA directly from the contents of the perithecium. All DNA samples were kept at -20 °C until analysed. Small subunit (SSU), internal transcribed spacers (ITS), large subunit (LSU), translation elongation factor (*tef1- α*), *tub2* (*β -tubulin*), and RNA polymerase II second largest subunit (*rpb2*)

were amplified by PCR with primers NS1/NS4, ITS1/ITS4 (White et al. 1990, Gardes and Bruns 1993), LR0R/LR5 (Vilgalys and Hester 1990), EF1-983F/EF1-2218R (Rehner and Samuels 1994), T1/T22 (O'Donnell and Cigelnik 1997), and *rpb2*-5F/*rpb2*-7cR (Liu et al. 1999), respectively. The PCR mixture (25 µL) was composed as follows: 9.5 µL of double distilled water, 12.5 µL of PCR Master Mix, 1 µL of each primer, and 1 µL of template DNA. The PCR amplification was conducted as reported by Samarakoon et al. (2022). PCR products were checked through 1.5% agarose gel electrophoresis stained with GoldenView, and were sent to Sangon Co., China, for sequencing.

Sequence alignments and phylogenetic analyses

All assembled sequences were compared with each other and all known sequences in GenBank using the BLAST algorithm for precise identification (<https://www.ncbi.nlm.nih.gov>) (Altschul et al. 1990). The reference sequences retrieved from open databases originated from recently published data and BLASTn results of close matches. Sequences were aligned using the MAFFT v.7.110 online program (Katoh et al. 2019) with the default settings. The alignments were adjusted manually using BioEdit v.7.0.5.3 (Hall 1999) where necessary. The maximum likelihood (ML) analyses were implemented in RAxML v.8.2.12 using the GTRGAMMA substitution model with 1,000 bootstrap replicates (Stamatakis 2014). The phylogenetic analyses were also performed for Bayesian inference in MrBayes v. 3.2.2 (Ronquist et al. 2012) online. 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 1,000th generation. The first 25% of the trees were discarded as burn-ins. The remainder was used to calculate the posterior probabilities (PPs) for individual branches. 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 webportal (Miller et al. 2010). All the obtained sequences were deposited in GenBank (Table 1). The outgroups and loci used in phylogenetic analyses, tailored to specific families and genera including ITS, SSU, LSU, *rpb2*, *tub2*, and *tef1-α*, were chosen based on published literature. The best-scoring RAxML tree is presented in the phylogenetic figures, and the phylogenetic placement of isolated strains is detailed in the notes section of each respective taxon.

Table 1. GenBank accessions obtained in this study. The holotype is indicated in bold.

Species	Voucher Number	ITS	LSU	SSU	<i>rpb2</i>	<i>tub2</i>	<i>tef1-a</i>
<i>Allodiatrype flavigelida</i>	GMB6239	PQ874013	PQ860458	PQ860559	PQ826920	PQ863984	PQ826954
<i>Anteaglonium stromatolineum</i>	GMB6246	PQ874018	PQ860464	PQ860565	PQ826926	–	PQ826960
<i>Anteaglonium stromatolineum</i>	GMB6247	PQ874019	PQ860465	PQ860566	PQ826927	–	PQ826961
<i>Anthostomatopsis chinensis</i>	GMB6213	PQ874054	PQ860503	PQ860595	PQ826942	PQ864017	PQ826990
<i>Anthostomatopsis chinensis</i>	GMB6214	PQ874055	PQ860504	PQ860596	PQ826943	PQ864018	PQ826991
<i>Anthostomatopsis suiyangensis</i>	GMB6215	PQ874052	PQ860501	PQ860593	PQ826940	PQ864015	PQ826988
<i>Anthostomatopsis suiyangensis</i>	GMB6216	PQ874053	PQ860502	PQ860594	PQ826941	PQ864016	PQ826989
<i>Apiospora anshunensis</i>	GMB6208	PQ874005	PQ860451	PQ860554	PQ826917	PQ863977	PQ826947
<i>Apiospora anshunensis</i>	GMB6207	PQ874006	PQ860450	PQ860553	PQ826916	PQ863976	PQ826946
<i>Arecophila chinensis</i>	GMB6217	PQ874007	PQ860452	PQ860555	–	PQ863978	PQ826948
<i>Arecophila chinensis</i>	GMB6218	PQ874008	PQ860453	PQ860556	–	PQ863979	PQ826949
<i>Arecophila amphibambusina</i>	GMB6259	PQ874066	PQ860514	PQ871615	–	–	PQ869216
<i>Arecophila amphibambusina</i>	GMB6260	PQ874067	PQ860515	PQ871616	–	–	PQ869217
<i>Astrocystis liuzhouensis</i>	GMB6229	PQ874044	PQ860493	PQ860587	PQ826936	PQ864007	PQ826982
<i>Astrocystis liuzhouensis</i>	GMB6230	PQ874045	PQ860494	PQ860588	PQ826937	PQ864008	PQ826983
<i>Astrosphaeriella bambusae</i>	GMB6252	–	PQ860459	PQ860560	PQ826921	PQ863985	PQ826955
<i>Astrosphaeriella gaofengensis</i>	GMB6248	PQ874016	PQ860460	PQ860561	PQ826922	PQ863986	PQ826956
<i>Astrosphaeriella gaofengensis</i>	GMB6249	PQ874017	PQ860461	PQ860562	PQ826923	PQ863987	PQ826957
<i>Astrosphaeriella roseobrunnea</i>	GMB6250	PQ874014	PQ860462	PQ860563	PQ826924	PQ863988	PQ826958
<i>Astrosphaeriella roseobrunnea</i>	GMB6251	PQ874015	PQ860463	PQ860564	PQ826925	PQ863989	PQ826959
<i>Coniolaria cuneiapicalis</i>	GMB6231	PQ874046	PQ860495	PQ860589	–	PQ864009	–
<i>Coniolaria cuneiapicalis</i>	GMB6232	PQ874047	PQ860496	PQ860590	–	PQ864010	–
<i>Didymobotryum bambusae</i>	GMB6233	PQ874040	PQ860489	PQ860585	PQ826934	PQ864002	PQ826980
<i>Didymobotryum bambusae</i>	GMB6234	PQ874041	PQ860490	PQ860586	PQ826935	PQ864003	PQ826981
<i>Didymobotryum rigidum</i>	GMB6235	PQ874057	–	–	–	PQ864004	–
<i>Digitodochium anshunense</i>	GMB6209	PQ874048	PQ860497	PQ860591	–	PQ864011	PQ826984
<i>Digitodochium anshunense</i>	GMB6210	PQ874049	PQ860498	PQ860592	–	PQ864012	PQ826985

Species	Voucher Number	ITS	LSU	SSU	<i>rpb2</i>	<i>tub2</i>	<i>tef1-a</i>
<i>Endocalyx melanoxanthus</i>	GMB6238	PQ874056	PQ860505	—	—	—	—
<i>Fissuroma chinense</i>	GMB6244	PQ874020	PQ860466	PQ860567	—	—	PQ826962
<i>Fissuroma chinense</i>	GMB6245	PQ874021	PQ860467	PQ860568	—	—	PQ826963
<i>Immotthia chinensis</i>	GMB6257	PQ874009	PQ860454	—	PQ826944	PQ863980	PQ826950
<i>Immotthia chinensis</i>	GMB6258	PQ874010	PQ860454	—	PQ826945	PQ863981	PQ826951
<i>Lophiostoma bijiense</i>	GMB6255	PQ874022	PQ860468	PQ860569	—	—	PQ826964
<i>Lophiostoma bijiense</i>	GMB6256	PQ874023	PQ860469	PQ860570	—	—	PQ826965
<i>Lophiostoma yunnanense</i>	GMB6253	PQ874024	PQ860470	PQ860571	—	—	—
<i>Lophiostoma yunnanense</i>	GMB6254	PQ874025	PQ860471	PQ860572	—	—	—
<i>Magnostiolata subtubularia</i>	GMB6259	PQ874064	PQ860512	PQ871607	—	PQ869204	PQ869208
<i>Magnostiolata subtubularia</i>	GMB6260	PQ874065	PQ860513	PQ871608	—	PQ869205	PQ869209
<i>Magnostiolata tubulariapicalis</i>	GMB6211	PQ874050	PQ860499	—	PQ826938	PQ864013	PQ826986
<i>Magnostiolata tubulariapicalis</i>	GMB6212	PQ874051	PQ860500	—	PQ826939	PQ864014	PQ826987
<i>Melomastia chinensis</i>	GMB6242	PQ874026	PQ860472	PQ860573	—	PQ863990	PQ826966
<i>Melomastia chinensis</i>	GMB6243	PQ874027	PQ860473	PQ860574	—	PQ863991	PQ826967
<i>Memnoniella chrysanthemi</i>	GMB6205	PQ874028	PQ860474	PQ860575	PQ826928	PQ863992	PQ826968
<i>Memnoniella chrysanthemi</i>	GMB6206	PQ874029	PQ860475	PQ860576	PQ826929	PQ863993	PQ826969
<i>Minuticlypeus biconcavus</i>	GMB6221	PQ874038	PQ860484	PQ860583	—	—	PQ826978
<i>Minuticlypeus biconcavus</i>	GMB6222	PQ874039	PQ860485	PQ860584	—	—	PQ826979
<i>Nemania jiuwanshanensis</i>	GMB6267	PQ874060	PQ860508	PQ871609	PQ855768	PQ864021	PQ869210
<i>Nemania jiuwanshanensis</i>	GMB6268	PQ874061	PQ860509	PQ871610	PQ855769	PQ864022	PQ869211
<i>Neolinocarpon huaxiense</i>	GMB6203	PQ874030	PQ860476	PQ860577	PQ826930	PQ863994	PQ826970
<i>Neolinocarpon huaxiense</i>	GMB6204	PQ874031	PQ860477	PQ860578	PQ826931	PQ863995	PQ826971
<i>Nigropunctata chinensis</i>	GMB6223	PQ874034	PQ860480	PQ860581	PQ826932	PQ863998	PQ826974
<i>Nigropunctata chinensis</i>	GMB6224	PQ874035	PQ860481	PQ860582	PQ826933	PQ863999	PQ826975
<i>Nigropunctata liuzhouensis</i>	GMB6225	PQ874036	PQ860482	—	—	PQ864000	PQ826976
<i>Nigropunctata liuzhouensis</i>	GMB6226	PQ874037	PQ860483	—	—	PQ864001	PQ826977
<i>Pallidoperidium chinense</i>	GMB6227	PQ874032	PQ860478	PQ860579	—	PQ863996	PQ826972
<i>Pallidoperidium chinense</i>	GMB6228	PQ874033	PQ860479	PQ860580	—	PQ863997	PQ826973

Species	Voucher Number	ITS	LSU	SSU	<i>rpb2</i>	<i>tub2</i>	<i>tef1-α</i>
<i>Peroneutypa heveae</i>	GMB6240	PQ874011	PQ860456	PQ860557	PQ826918	PQ863982	PQ826952
<i>Peroneutypa heveae</i>	GMB6241	PQ874012	PQ860457	PQ860558	PQ826919	PQ863983	PQ826953
<i>Rosellinia nemaniae</i>	GMB6263	PQ874058	PQ860506	PQ871611	PQ855766	PQ869206	PQ869212
<i>Rosellinia nemaniae</i>	GMB6264	PQ874059	PQ860507	PQ871612	PQ855767	PQ869207	PQ869213
<i>Rosellinia putrida</i>	GMB6265	PQ874062	PQ860510	PQ871613	–	PQ864019	PQ869214
<i>Rosellinia putrida</i>	GMB6266	PQ874063	PQ860511	PQ871614	–	PQ864020	PQ869215
<i>Vamsapriya kailiensis</i>	GMB6236	PQ874042	PQ860491	–	–	PQ864005	–
<i>Vamsapriya kailiensis</i>	GMB6237	PQ874043	PQ860492	–	–	PQ864006	–

Note: Holotype strains are shown in bold, “–” Sequences were not obtained, SSU: Small Subunit of Ribosomal RNA, ITS: Internal transcribed spacer region, LSU: Large Subunit of Ribosomal RNA, *tef1-α*: Translation elongation factor, *tub2*: β-tubulin, *rpb2*: RNA polymerase II second largest subunit

Arrangement of taxa

Ascomycota Caval. Sm., Biol. Rev. Cambridge Philos. Soc. 73: 247 (1998)

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

Dyfoliomyces K.L. Pang, K.D. Hyde & E.B.G. Jones, Fungal Diversity 63 (1): 7 (2013)

Pleurotremataceae Walt. Watson, New Phytologist 28: 113 (1929)

Melomastia chinensis K. Habib, Y.L. Ren & Q.R. Li **sp. nov.**

Pleosporomycetidae C.L. Schoch, et al. Mycologia 98 (6): 1048 (2007)

Pleosporales Luttr. ex M.E. Barr, Prodromus to class Loculoascomycetes: 67 (1987)

Aigialaceae Suetrong et al. Studies in Mycology 64: 166 (2009)

Fissuroma chinense K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Anteagloniaceae K.D. Hyde & A. Mapook, Fungal Diversity 63 (1): 33 (2013)

Anteaglonium stromatolineum K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Astrosphaeriellaceae Phookamsak & K.D. Hyde, Fungal Diversity 74: 161 (2015)

Astrosphaeriella bambusae Phookamsak & K.D. Hyde, Fungal Diversity 74: 165 (2015)

Astrosphaeriella gaofengensis K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Astrosphaeriella roseobrunnea K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Dictyosporiaceae Boonmee & K.D. Hyde, Fungal Diversity 80: 462 (2016)

Immotitia chinensis K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Lophiostomataceae C. Luerksen, Handbuch der systematischen Botanik mit besonderer Berücksichtigung der Arzneipflanzen 1: 154 (1878)

Lophiostoma bijiense Y.L. Ren, K. Habib & Q.R. Li **sp. nov.**

Lophiostoma yunnanense C.T. Lu, K. Habib & Q.R. Li **sp. nov.**

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

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

Hypocreales Lindau, Die Natürlichen Pflanzenfamilien nebst ihren Gattungen und wichtigeren Arten 1 (1): 343 (1897)

Stachybotryaceae L. Lombard & Crous, Persoonia 32: 283 (2014)

Memnoniella chrysanthemi Q.F. Zhang, K. Habib & Q.R. Li **sp. nov.**

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

Chaetosphaeriales Huhndorf et al. Mycological Research 108 (12): 378 (2004)

Linocarpaceae Konta & K.D. Hyde, Mycosphere 8 (10): 1962 (2017)

Neolinocarpon huaxiense K. Habib, Y.L. Ren & Q.R. Li **sp. nov.**

Xylariomycetidae O.E. Erikss. & Winka, Myconet 1: 12 (1997)

Amphisphaeriales D. Hawksw. & O.E. Erikss., Systema Ascomycetum 5: 177 (1986)

Apiosporaceae K.D. Hyde, et al. Sydowia 50(1): 23 (1998)

Apiospora anshunensis K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Xylariales Nannf., Nova Acta Regiae Societatis Scientiarum Upsaliensis Ser. IV. 8 (2): 66 (1932)

Cainiaceae J.C. Krug, Sydowia 30: 123 (1978)

Arecophila amphibambusina K. Habib, Y.L. Ren & Q.R. Li **sp. nov.**

Arecophila chinensis K. Habib, Y.L. Ren & Q.R. Li **sp. nov.**

Endocalyx melanoxanthus (Berk. & Broome) Petch, Ann. Bot., Lond. 22: 390 (1908)

Clypeosphaeriaceae G. Winter, Rabenhorst Kryptogamen-Flora, Pilze - Ascomycete 1(2): 554 (1886)

Digitodochium anshunense K. Habib, Y.L. Ren & Q.R. Li, **sp. nov.**

Magnostiolata subtubularia K. Habib, Z.Q. Yao & Q.R. Li **sp. nov.**

Magnostiolata tubulariapicalis K. Habib, Z.Q. Yao & Q.R. Li **sp. nov.**

Diatrypaceae Nitschke, Pyrenomycetes Germanici 1: 62 (1867)

Allodiatrype flavigelida K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Peroneutypa heveae K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Fasciatisporaceae S.N. Zhang, K.D. Hyde & J.K. Liu, Fungal Diversity 100: 227 (2020)

Anthostomatopsis K. Habib & Q.R. Li **gen. nov.**

Anthostomatopsis chinensis K. Habib & Q.R. Li **sp. nov.**

Anthostomatopsis guizhouensis (Habib & Li) K. Habib & Q.R. Li **comb. nov.**

Anthostomatopsis suiyangensis K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Muscodoraceae K. Habib & Q.R. Li **fam. nov.**

Pallidoperidiaceae R. Sugita & Kaz. Tanaka, Mycoscience 65 (1): 30 (2024)

Minuticlypeus biconcavus K. Habib, X.Y. Luo & Q.R. Li **sp. nov.**

Minuticlypeus raphidophylli (Lu & Hyde) K. Habib & Q.R. Li **comb. nov.**

Minuticlypeus xiaohensis (Zhou et al.) K. Habib & Q.R. Li **comb. nov.**

Nigropunctata chinensis K. Habib, Y.L. Ren & Q.R. Li **sp. nov.**

Nigropunctata liuzhouensis Xin Zhou, K. Habib & Q.R. Li **sp. nov.**

Pallidoperidium chinense K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Pallidoperidium smilacis (Fabre) K. Habib & Q.R. Li **comb. nov.**

Amphigermis subyunnanensis (Wu & Li) K. Habib & Q.R. Li **comb. nov.**

Amphigermis yunnanensis (Ren & Hyde) K. Habib & Q.R. Li **comb. nov.**

Vamsapriyaceae Y.R. Sun, et al. Journal of Fungi 7 (11, no. 891): 7 (2021)

Didymobotryum bambusae K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Didymobotryum rigidum (Berk. & Broome) Sacc., Syll. Fung. 4: 627. (1886)

Vamsapriya kailiensis K. Habib & Q.R. Li **sp. nov.**

Xylariaceae Tul. & C. Tul. [as 'Xylariei'], Select. fung. carpol. 2: 3 (1861)

Astrocystis liuzhouensis K. Habib, W.H. Li & Q.R. Li **sp. nov.**

Coniolarrella cuneipicalis K. Habib, W.Y. Zeng & Q.R. Li **sp. nov.**

Nemania jiuwanshanensis W.Y. Zeng, K. Habib, & Q.R. Li, **sp. nov.**

Rosellinia nemaniae K. Habib, W.Y. Zeng & Q.R. Li **sp. nov.**

Rosellinia putrida K. Habib, W.Y. Zeng & Q.R. Li **sp. nov.**

RESULTS

Taxonomy

Ascomycota Caval. -Sm., Biol. Rev. Cambridge Philos. Soc. 73: 247 (1998)

Pezizomycotina O.E. Erikss. & Winka, Myconet 1: 9 (1997)

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

Dyfolomycetales K.L. Pang, K.D. Hyde & E.B.G. Jones, Fungal Diversity 63 (1): 7 (2013).

Pleurotremataceae Walt. Watson, New Phytologist 28: 113 (1929).

Melomastia Nitschke ex Sacc., Conspectus generum pyrenomycetum italicorum systemate carpologico dispositum: 14 (1875).

Notes – *Melomastia* was established by Saccardo (1875) to include *Melomastia friesii*, which Schröter (1894) later reclassified with *Sphaeria mastoidea* as its basionym, thereby designating *M. mastoidea* as the type species of the genus. The genus was characterized by globose ascomata with an erumpent apex, cylindrical asci, and 2-septate, ovoid ascospores, with or without gelatinous sheath (Barr 1994, Kang et al. 1999). *Melomastia* species have a cosmopolitan distribution, found across diverse habitats, including terrestrial, freshwater, marine, and mangrove ecosystems (Hyde 1992b, Hyde et al. 2017, Dayarathne et al. 2020, Li et al. 2022). Currently, Species Fungorum lists 51 species under the genus (accessed April 19, 2025).

In this study, we describe a new species of *Melomastia* characterized by 3-septate ascospores and provide a comprehensive key to species with 3-septate ascospores.

Melomastia chinensis K. Habib, Y. L. Ren & Q.R. Li, sp. nov. (Fig. 2)

Mycobank No: MB857212

Etymology – The specific epithet refers to China, where the holotype was collected.

Description – Saprobiic on dead branches of an unidentified plant. **Sexual morph:** *Ascomata* 180–240 × 220–300 µm ($\bar{x}$ = 200.9 × 253 µm, n = 10), immersed, only ostioles visible at the surface of host, solitary, gregarious, in cross section globose to subglobose, pyriform, pseudothecia, coriaceous, dark brown to black, rough-walled, lacking clypeus. *Ostioles* central, coriaceous, dark brown to black, papillate, periphyses filling the ostiolar canal, 80–110 × 50–80 µm ($\bar{x}$ = 101 × 67 µm, n = 15). *Peridium* 47–63 µm wide ($\bar{x}$ = 53.7 µm, n = 15), two-layered, an outer layer of cells of textura intricata composed of host cells interspersed with fungal hyphae, and the inner layer comprising lightly brown cells and thin. *Hamathecium* 1.0–1.8 µm ($\bar{x}$ = 1.3 µm) wide, composed of numerous, dense, filiform, unbranched, septate, cellular pseudoparaphyses. *Asci* 75–100 × 6.2–9 µm ($\bar{x}$ = 83.1 × 7.3 µm, n = 30), 8-spored, bitunicate, long-cylindrical, short pedicellate, apically round, with a small ocular chamber. *Ascospores* 17.5–22.5 × 3.4–5 µm ($\bar{x}$ = 20.5 × 4.0 µm, n = 30), biserial, broad fusiform with acute ends, tapering towards the ends, hyaline, 3-septate, slightly constricted at the septa, with 1–2 guttules in each cell, smooth-walled, lack mucilaginous sheath. **Asexual morph:** Undetermined.

Culture characteristics – Colonies on PDA reaching 35 mm diam., after 4 weeks. Culture from above, pale whitish, center dense, circular; reverse: brown in the middle, yellow toward edges.

Material examined – CHINA, Guizhou Province, Anshun City, Xixiu District, Liuguan Township, Xiaohei Village, 26°16'1.02" N, 106°13'23.10" E, altitude: 1236 m, on branch of unidentified plant, August 2023, Yulin Ren, 2023XHC8 (GMB6242 holotype; GMBC6242 ex-type); *ibid.*, KUN-HKAS 145745 isotype.

Additional specimen examined – CHINA, Hunan Province, Zhangjiajie City, Badagongshan National Nature Reserve, 29°39'54" N, 109°49'08" E, altitude: 1,452 m, on branch of an unidentified plant, August 2023, Q.R. Li, HZBN_2023-02 (GMB6243).

Notes – In the ITS, LSU, and *tef-1α* sequence BLAST analyses, *Melomastia chinensis* showed the closest match to *M. septata* MFLUCC 22-0112 with 92.03%, 99.01%, and 92.60% similarity, respectively. Morphologically, it also shares similarities in the size of its asci. However, *M. septata* differs from *M. chinensis* by having larger ascomata (166–344 µm high, 198–434 µm in diameter vs. 180–240 µm high, 220–300 µm in diameter), wider pseudoparaphyses (3–3.5 µm wide vs. 1.0–1.8 µm wide), and smaller 2-septate ascospores (12–16 × 3.5–4.5 µm vs. 3-septate, 17.5–22.5 × 3.4–5 µm) with a mucilaginous sheath (vs. lacking a mucilaginous sheath) (Hyde et al. 2023). Phylogenetically (Fig. 1), *M. chinensis* is closely related to *M. italica*, which is morphologically distinct, produces 2-septate ascospores.

Melomastia clematidis has 3-septate ascospores with acute ends, similar in size to *M. chinensis*. However, *M. clematidis* differs from *M. chinensis* having larger ascomata (300–510 × 260–445 µm, $\bar{x}$ = 420 × 400 µm vs. 180–240 × 220–300 µm, $\bar{x}$ = 200.9 × 253 µm), much longer

asci (115–160 μm long vs. 75–100 μm long), and ascospores with a mucilaginous sheath (vs. lacking a mucilaginous sheath) (Phukhamsakda et al. 2020, Li et al. 2022).

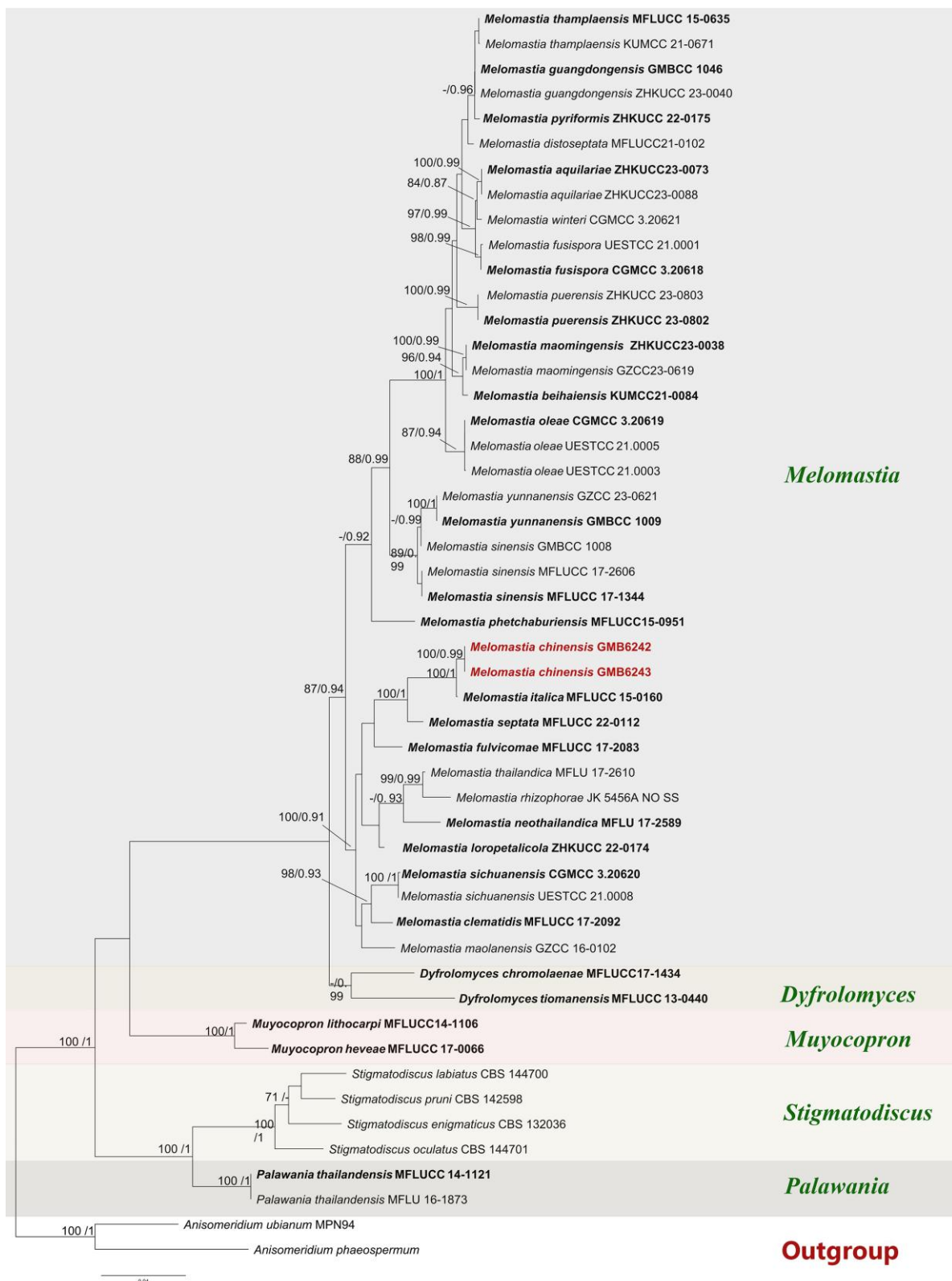


Figure 1 – RAxML tree based on a combined SSU, LSU, and *tef-1 α* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -11531.805078. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BPP). The newly described species are marked red in bold. Ex-type/type strains are indicated in black bold.

Melomastia thamplaensis also has 3-septate ascospores with acute ends and lacks a gelatinous sheath. However, it differs having uniseriate larger asci (140–170 × 5.8–6.4 µm vs. biseriate 75–100 × 6.2–9 µm) and larger ascospores (23–27 × 4.4–5.3 µm vs. 17.5–22.5 × 3.4–5 µm) (Ren et al. 2024). Differences from other 3-septate ascospore species of the genus are provided below in the key. Based on the key comparison and phylogeny we introduce our collection as a new species.

Key to identify *Melomastia* species with 3-septate ascospores

Note – No significant differences were observed between *Melomastia aquatica*, *M. fusispora*, and *M. marinospora* except for differences in habitat.

- 1a. Ascospores with mucilaginous sheath 2
- 1b. Ascospores without mucilaginous sheath 5
- 2a. Ascospores length ≤20 µm 3
- 2b. Ascospores length >20 µm 4
- 3a. Asci 115–160 µm long, ascospores 13–20 µm long *M. clematidis*
- 3b. Asci 70–90 µm long, ascospores 9–15 µm long *M. fulvicomae*
- 3c. Asci 101–112.5 µm long, ascospores 15–17.5 µm long *M. sichuanensis*
- 4a. On submerged wood (aquatic freshwater habitat), asci 185–230 × 7–9 µm, ascospores fusiform 26–34 × 6–8 µm *M. aquatica*
- 4b. On *Olea europaea* (terrestrial habitat), asci 200–231 × 7.6–9.2 µm, ascospores fusiform 27.5–32 × 6.5–7.5 µm *M. fusispora*
- 4c. On mangrove wood (intertidal habitat), asci 190–240 × 10–12 µm, ascospores cylindrical 25–31 × 7.5–10 µm *M. marinospora*
- 5a. Asci uniseriate >100 µm long 6
- 5b. Asci biseriate ≤100 µm long, ascospores 17.5–22.5 × 3.4–5 µm *M. chinensis*
- 6a. Ascospores length ≤25 µm 7
- 6b. Asci 209–237 µm long, ascospores with obtuse ends, 28–34 µm long *M. oleae*
- 6c. Asci 165–189 µm long, ascospores with acute ends, 25–30 µm long *M. winteri*
- 6d. Ascospores with acute ends 8
- 7a. Asci 126.7–146.2 µm long, ascospores 19.7–24.9 × 4.3–5 µm *M. distoseptata*
- 7b. Asci 95–122 µm long, ascospores 13.5–18 × 3.5–4.5 µm *M. maolanensis*
- 8a. Asci lacking a distinct ocular chamber, ascospores with angular ends and without constriction at the septa, 20–25 × 4.5–7 µm *M. pyriformis*
- 8b. Asci with an evident apical ring, ascospores with acute end and constricted at septum, 19.5–23.5 × 5–6.5 µm *M. thamplaensis*

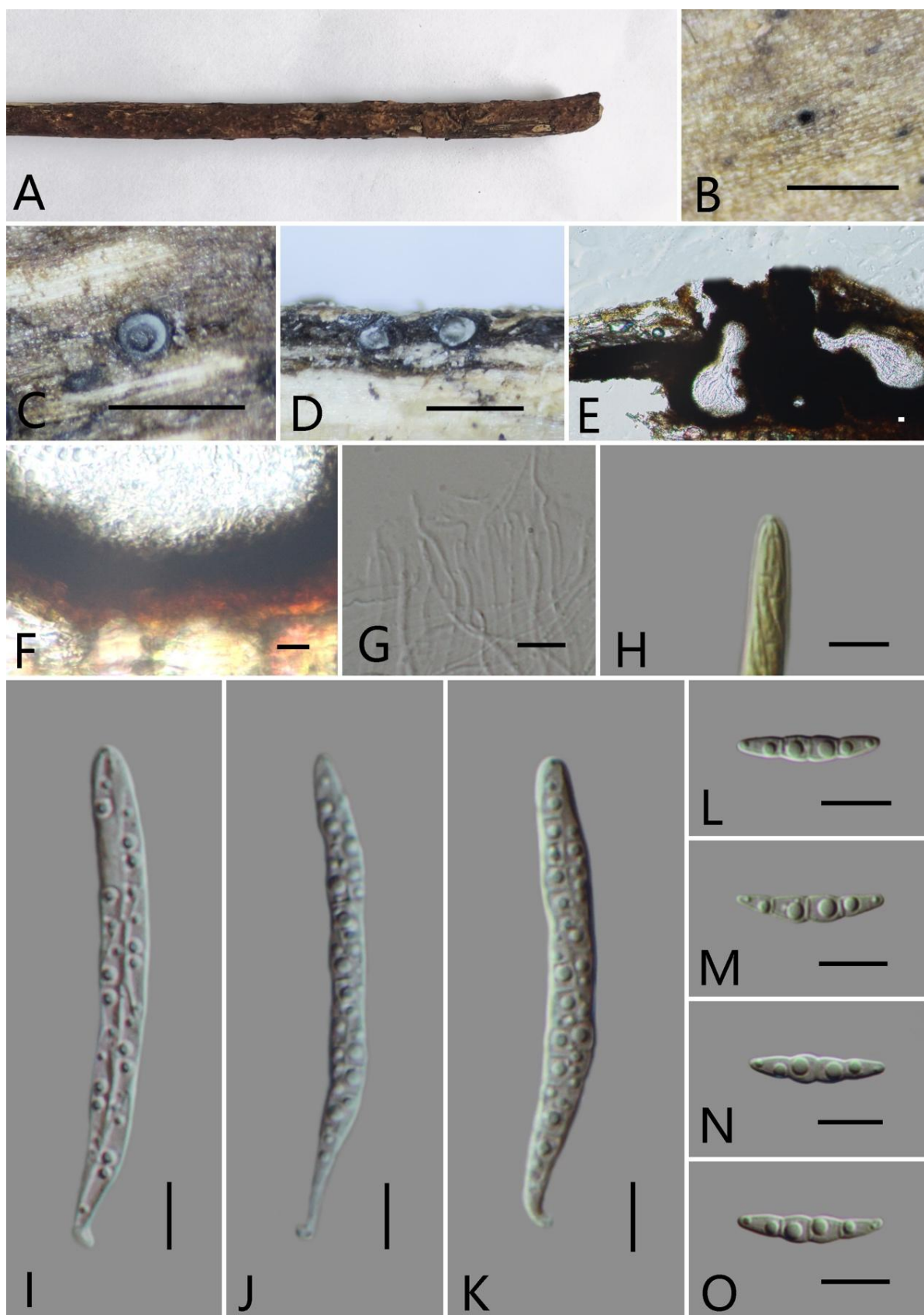


Figure 2 – *Melomastia chinensis* (GMB6242, holotype). A Host. B, Surface view of ascoma. C Cross section of ascoma. D, E Longitudinal sections of ascomata. F Peridium. G Paraphyses. H Ascus apical. I–K Asci in distilled water. L–O Ascospores. Scale bars: C–D = 1 mm, F–K = 20 μ m, L–O = 10 μ m.

Pleosporomycetidae C.L. Schoch, et al. Mycologia 98 (6): 1048 (2007)

Pleosporales Luttr. ex M.E. Barr, Prodromus to class Loculoascomycetes: 67 (1987)

Aigialaceae Suetrong et al. Studies in Mycology 64: 166 (2009)

Fissuroma J.K. Liu et al. Fungal Diversity 51 (1): 135-154 (2011).

Notes – The genus *Fissuroma* was established by Liu et al. (2011) within the family Aigialaceae to accommodate taxa previously classified under *Astrosphaeriella* but exhibiting distinct morphological and phylogenetic characteristics. The genus is typified by *Fissuroma maculans* and includes species with hemispherical to immersed ascostromata with slit-like ostioles, trabeculate pseudoparaphyses, and hyaline, fusiform, 1 to 3 septate ascospores. Currently, 15 species of *Fissuroma* are listed in Species Fungorum (accessed December 5, 2024, www.speciesfungorum.org). Herein, we introduce a new species of the genus.

Fissuroma chinense K. Habib, W.H. Li & Q.R. Li sp. nov.

(Fig. 4)

Mycobank No: MB857213

Etymology – The species epithet refers to its country of origin, the People Republic of China.

Description – Saprobic on bamboo. **Sexual morph:** *Ascomata* 400–1000 µm wide, 100–250 µm high, black, scattered, semi-immersed to erumpent, hemispherical, glabrous, uniloculate, with, thick, carbonaceous slit-like ostiole, base flattened. *Ostioles* central, apapillate, with long carbonaceous, thick slit-like opening. *Peridium* up to 40 µm wide, black, well developed at the base, composed of dark brown cells, texture rounded to angularis. *Hamathecium* composed of dense, 1–2 µm wide, filiform, anastomosing, trabeculate pseudoparaphyses, embedded in a hyaline gelatinous matrix. *Asci* 170–230 × 16–25 µm ($\bar{x}$ = 206 × 19.9 µm, n = 43), 8-spored, cylindric-clavate to obclavate, with a short pedicel, apically rounded, with a small ocular chamber. *Ascospores* 40–55 × 7.5–9.5 µm ($\bar{x}$ = 48.8 × 7.5 µm, n = 30), overlapping uni- to bi-seriate, hyaline, glistening at maturity, fusiform with slight rounded ends, 1–3-septate, slightly constricted at the septum, smooth and thick-walled (1–2.5 µm thick), with guttules, surrounded by a thick, distinct sheath, down out 4–6.8 µm at both ends, 3–6 µm wide at the center. **Asexual morph:** Undetermined.

Culture characteristics – Colonies on PDA reaching 60 mm after two weeks, entire, cottony, rounded, smooth, white to greyish white upper. Reverse pale brown with pale white edges.

Material examined – China, Guangxi Zhuang Autonomous Region, Liuzhou City, Jiuwanshan National Nature Reserve, 25°15'18" N, 108°36'06" E, altitude: 1,329 m, on dead culm of bamboo, August 2023, Q.Z. Wu, Q.R. Li. 2023JWS-33 (GMB6244 holotype; GMBC6244, ex-type); *ibid.*, KUN-HKAS 145746 isotype

Additional specimen – China, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28°18'56.48" N, 107°06'49.13" E, altitude: 1,542 m, on dead culm of bamboo, August 2024, Changtao Lu, JSK-99 (GMB6245).

Notes – *Fissuroma chinense* is morphologically distinct from all known species of *Fissuroma* due to its thick-walled ascospores and larger asci, characteristics that have not been reported in any other species of the genus. Phylogenetically (Fig. 3), it also forms a distinct clade. In a BLAST search using the ITS region, *F. chinense* showed 98% similarity to *F. aggregatum*. Both species share same sized ascomata with slit-like ostioles. However, *F. aggregatum* differs from *F. chinense* in having smaller asci (155–197 × 15–18.5 µm vs. 170–230 × 16–25 µm), larger ascospores (46–64 µm, $\bar{x}$ = 55.9 vs. 40–55 µm, $\bar{x}$ = 48.8 µm), and predominantly 1-septate ascospores (vs. 1–3-septate in *F. chinense*) surrounded by a thin sheath (vs. thick sheath) (Phookamsak et al. 2015, Zhang et al. 2020).

In having 3-septate ascospores, *Fissuroma chinense* is similar to *F. fissuristom*, but the latter has smaller asci (124–166 µm, $\bar{x}$ = 144.1 µm), a thin ascospore sheath with appendages at both ends, and its occurrence on a different host, *Calamus conirostris* (Phookamsak et al. 2015, Zhang et al. 2020).

Fissuroma microsporum also possesses 1–3-septate ascospores, but can be distinguished from *F. chinense* by its smaller ascomata (640–700 µm wide), much smaller asci (80.3–103.6 ×

7.4–8.7 μm), and smaller ascospores (14.6–21.8 $\times$ 3.5–4 μm). Additionally, *F. microsporum* has been reported on a different host, *Borassus flabellifer* (Niranjan and Sarma 2018).

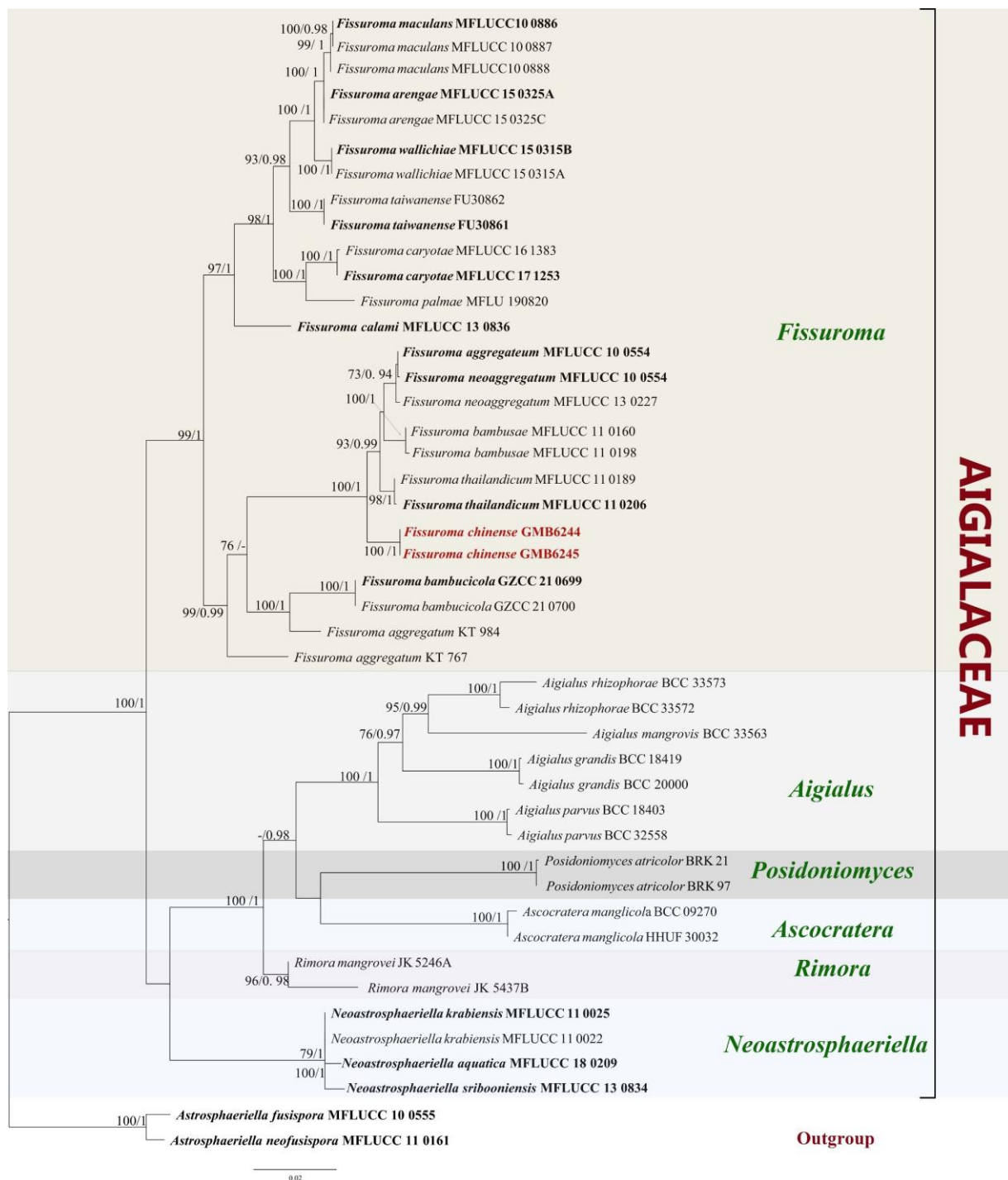


Figure 3 – RAxML tree based on a combined SSU, ITS, LSU, and *tef-1 α* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -11570.115571. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked red in bold. Ex-type/type strains are indicated in black bold.

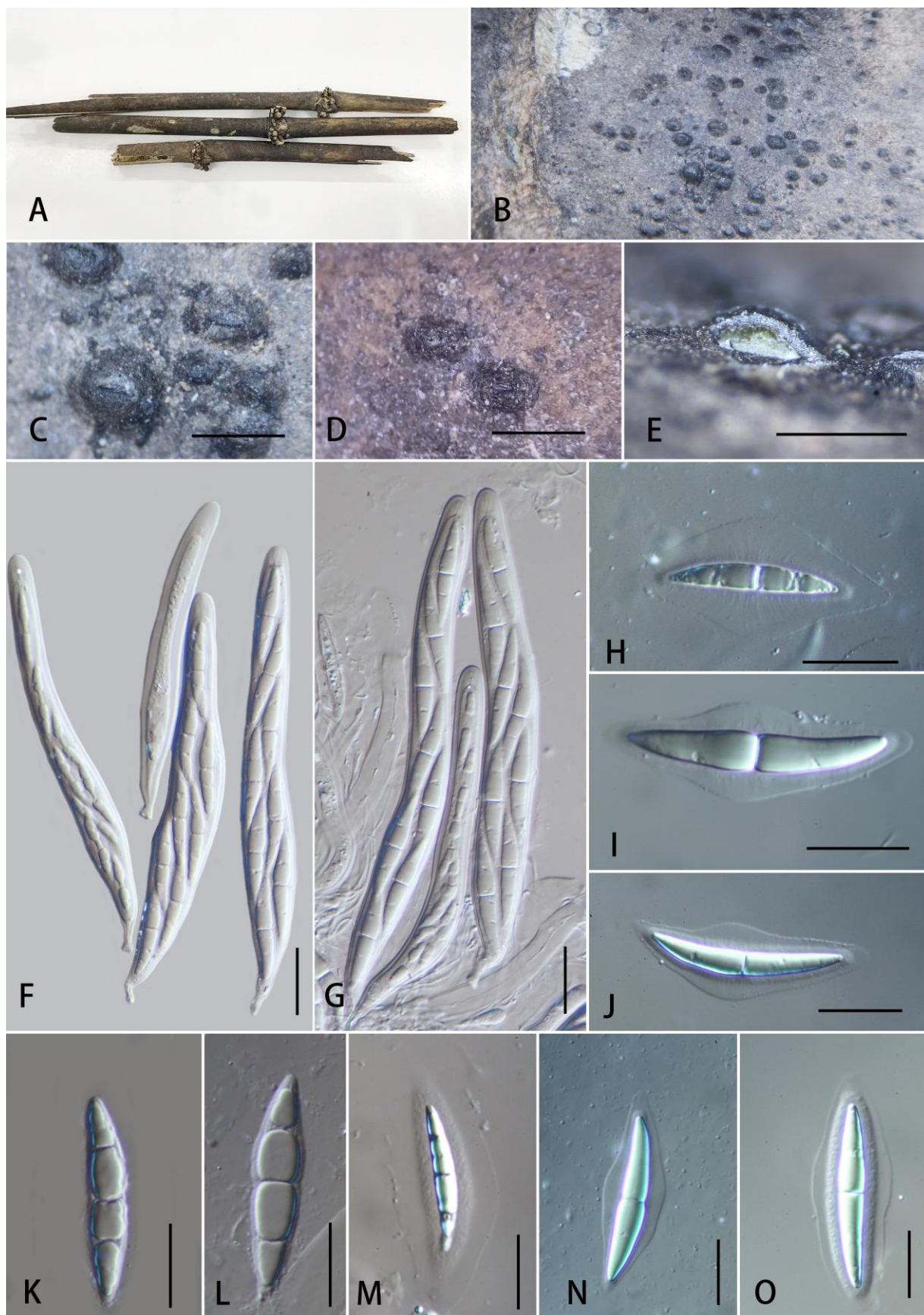


Figure 4 – *Fissuroma chinense* (GMB6244, holotype). A Bamboo host. B–D Surface view of ascomata and ostiole. E Longitudinal section of ascoma. F Asci in distilled water. H–O Ascospores. Scale bars: C–E = 1 mm, F, G = 30 µm, H–O = 20 µm.

Anteagloniaceae K.D. Hyde & A. Mapook, Fungal Diversity 63 (1): 33 (2013)

Anteaglonium Mugambi & Huhndorf, Systematics and Biodiversity 7 (4): 460 (2009)

Anteaglonium was established by Mugambi and Huhndorf (2009) to accommodate hysterothecial taxa with hyaline didymospores. It was introduced with the type species *Anteaglonium abbreviatum* (= *Glonium abbreviatum*), which was phylogenetically segregated from Gloniaceae (Mytilinidiales) and positioned within Pleosporales. Hyde et al. (2013) revised the classification of Dothideomycetes and established Anteagloniaceae to accommodate the monotypic genus *Anteaglonium*. Morphologically, *Anteaglonium* is distinguished from closely related genera by its smaller ascomata, which can be elongate or globose, and its small ascospores, typically less than 8 µm in length. Currently, eleven species are recognized within the genus (Species Fungorum, accessed December 5, 2024). However, *Anteaglonium queenslandicum*, reported from Australia, was described based solely on molecular differences. We did not find its morphological description, thus, it has not been included in the key.

In this study, we introduce a new species of *Anteaglonium* and provide a key to distinguish the known species of the genus.

Anteaglonium stromatolineum K. Habib, W.H. Li & Q.R. Li sp. nov.

(Fig. 6)

Mycobank No: MB857214

Etymology – The epithet refers to the linear appearance of the stromata.

Description – Saprobic on dead culm of bamboo. **Sexual morph:** *Stromata* 0.5–3 mm long, 80–130 µm high, 100–170 µm wide, superficial, black, initially rounded, become parallel elongate, running parallel to the wood surface, solitary to confluent, black, encasing one to several ascomata, carbonaceous, straight or curved, smooth, underlain by pink or purple subiculum, without KOH extractable pigments, parts containing ascomata forming superficial roundish pustules, erumpent over surface, appearing as black shiny papillae, in places erumpent as hysterothecioid domes ca. 400–1400 µm long and up to ca. 250 µm thick. *Hysterothecia* black, straight to curved, smooth to striate, longitudinal slit. *Ascomata* 180–300 µm diam, globose to subglobose, individually or collectively encased by stromatic tissue. *Ostiole* slightly erumpent over surface, appearing as black shiny papillae. *Peridium* 25–50 µm thick, pseudoparenchymatous, *texture angularis*, pale brown. *Hamathecium* numerous, trabeculate, 1–1.5 µm (n = 30) wide, pseudoparaphyses, aseptate, embedded in a gel matrix, branched above the asci. *Asci* 40–60 × 3–5 µm ($\bar{x}$ = 53 × 4.5 µm, n = 20), 4–8-spored, uniseriate, cylindrical, short pedicellate. *Ascospores* 6.5–10 × 2–3.5 µm ($\bar{x}$ = 9 × 2.6 µm, n = 30), ellipsoidal to fusiform, with rounded ends, 1-septate, bi-celled, disarticulating, each containing 1–2 guttules, hyaline when immature, brown when mature, smooth-walled, slightly constricted at the septum. **Asexual morph:** Undetermined.

Culture characteristics – Colonies on PDA reaching 15 mm after 8 weeks, growth slow and variable, colonies thick, fluffy, cottony, dark mouse grey, brownish and thin at edges, reverse black with olivaceous brown at edges.

Material examined – China, Guizhou Province, Anshun City, Pingba County, 26°15'11"N 105°56'51" E, altitude: 1,102 m, subtropical forest, on dead culms of *Phyllostachys* sp., August 2023, JWS-31 (GMB6246, holotype; GMCB6246 ex-type); *ibid.*, KUN-HKAS 145728 isotype.

Additional specimen examined – China, Guangxi Zhuang Autonomous Region, Liuzhou City, Jiuwanshan National Nature Reserve, 25°12'25" N, 108°40'18" E, altitude: 1,326 m, on dead culms of bamboo, August 2023, Changtau Lu JCW-113 (GMB6247).

Notes – Morphologically and phylogenetically (Fig. 5), *Anteaglonium stromatolineum* is closely related to *A. rubescens*, the only stromatic fungus in the genus, and sharing didymospores that disarticulate within the asci. However, *A. rubescens* is distinguished by its association with the host *Pistacia lentiscus* and its stromata, which are erumpent from wood or bark, forming conspicuous brown, orange, red, pink, or purple patches on the host surface. Additionally, *A. rubescens* has smaller stromata (1.8 mm long vs. 0.5–3 mm long), larger asci (65–95 × 4.3–6.2 µm vs. 40–60 × 3–5 µm), and smaller, wider ascospores (4.0–7.0 × 3.2–4.5 µm vs. 6.5–10 × 2–3.5 µm) (Jaklitsch et al. 2018).

Previously, no species of *Anteaglonium* has been described on bamboo, nor has any other species in the genus, except *A. rubescens*, been described with large linear stromata and brown ascospores that disarticulate within the ascus (Jaklitsch et al. 2018).

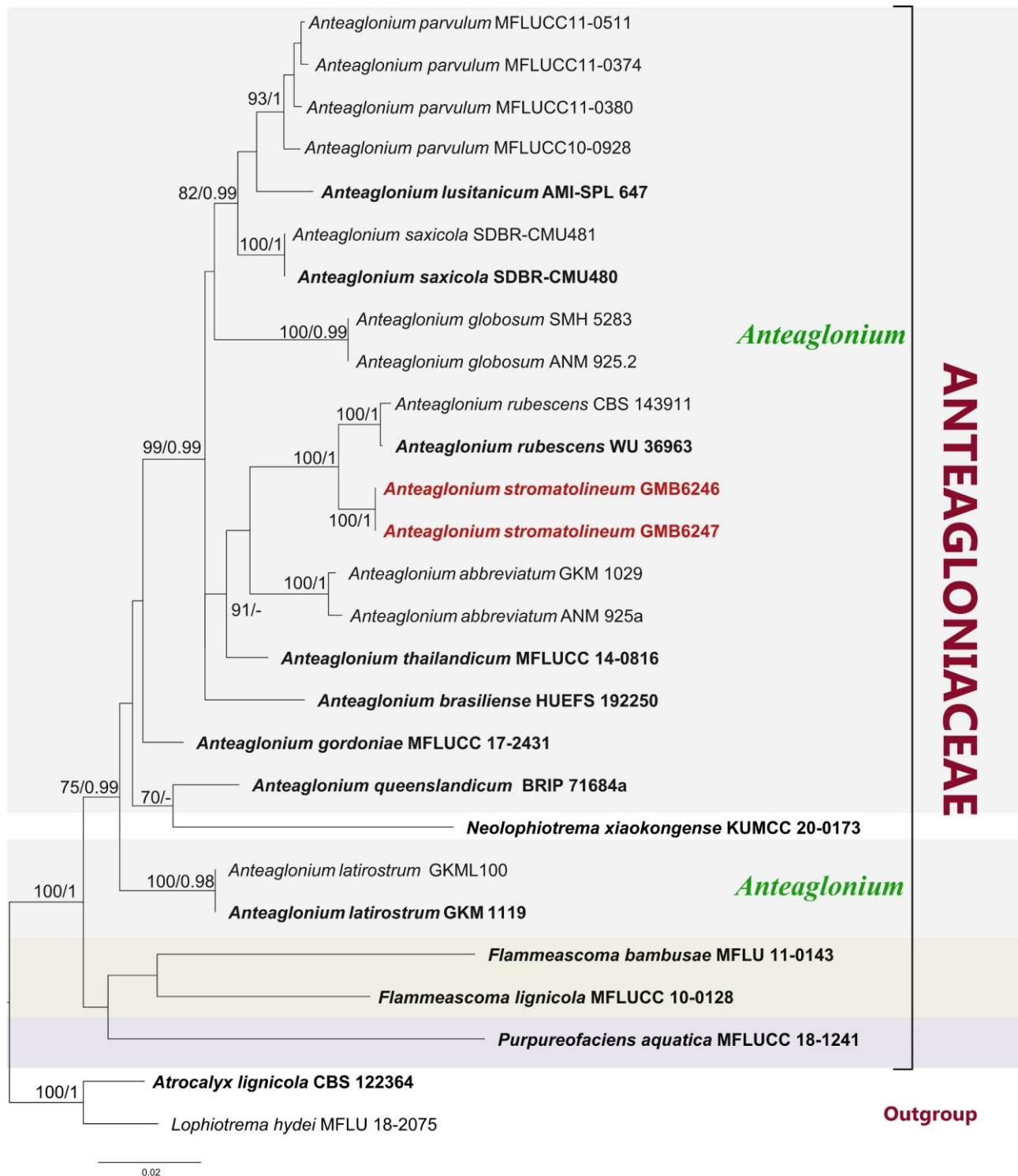


Figure 5 – RAxML tree based on a combined SSU, ITS, LSU, and *tef-1α* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -8864.042827. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked red in bold. Ex-type/type strains are indicated in black bold.

Key to *Anteaglonium* species

1a. Ascospores hyaline or pale	2
1b. Ascospores brown, disarticulate within the asci.....	3
2a. Ascospores $\geq 9\ \mu\text{m}$	4
2b. Ascospores $< 9\ \mu\text{m}$	5
3a. On <i>Pistacia lentiscus</i> , forming conspicuous brown, orange, red, pink, or purple patches on the host surface, asci 65–95 μm long.....	<i>A. rubescens</i>
3b. On bamboo, without any color patches on host surface, asci 40–60 μm long....	<i>A. stromatolineum</i>
4a. Asci 34.5–47 $\times$ 4–5.5 μm , ascospores 9–15 $\times$ 2–4 μm , 1-septate	<i>A. brasiliense</i>
4b. Asci 87–105 $\times$ 9–10.5 μm , ascospores 19.5–24 $\times$ 4.5–6 μm , 1-septate.....	<i>A. hydei</i>
4c. Asci 60–70 $\times$ 7–10 μm , ascospores 20–22 $\times$ 1.5–3 μm , 1–3 septate.....	<i>A. gordoniae</i>
4d. Asci 115–124 $\times$ 9–10 μm , ascospores 22–28 $\times$ 4–6 μm , 1–4 septate.....	<i>A. latirostrum</i>
5a. Greenish KOH extractable pigment, asci 48–56 $\times$ 5–6 μm	<i>A. globosum</i>
5b. Greenish brown extractable pigment, asci 60–70 $\times$ 7–10 μm	<i>A. lusitanicum</i>
5c. Hysterothecia without KOH extractable pigment.....	6
6a. Hysterothecia with flattened apices, asci 37–75 $\times$ 4–5 μm	<i>A. abbreviatum</i>
6b. Hysterothecia with flattened apices, asci 45–50 $\times$ 3.5–5.5 μm , conidiomata wall 30–50 μm	<i>A. thailandicum</i>
6c. Hysterothecia with acuminate apices, asci 30–52 $\times$ 3.2–5.8 μm , conidiomata wall 19–23 μm	<i>A. parvulum</i>

Astrosphaeriellaceae Phookamsak & K.D. Hyde, Fungal Diversity 74: 161 (2015).

Astrosphaeriella Syd. & P. Syd., Annales Mycologici 11: 260 (1913).

Astrosphaeriella was established to include dothideomycetous fungi with distinct carbonaceous, conical to mammiform ascostromata, often surrounded by reflexed, stellate remnants of the host tissue at the base. It is characterized by bitunicate, cylindrical to cylindric-clavate asci, trabeculate pseudoparaphyses, and pale brown to brown fusiform ascospores (Barr 1990, Tanaka and Harada 2005, Liu et al. 2011, Phookamsak et al. 2015). *Astrosphaeriella* is divided into two groups based on ascostromatal morphology: (1) *Astrosphaeriella sensu stricto*, which includes species with carbonaceous, erumpent, conical ascostromata, and (2) *Astrosphaeriella sensu lato*, comprising species with immersed, coriaceous ascostromata bearing short to long papillae (Phookamsak et al. 2015). Species of the genus are commonly found in tropical regions, and are mostly associated with monocotyledons. However, some species have been found in subtropical and temperate regions (Barr 1990, Zhou et al. 2003, Tanaka and Harada 2005, Hu 2010, Zhang et al. 2012), and some have also been reported on dicotyledons (Yamamoto et al. 1954, Scheinpflug 1958, Hyde and Fröhlich 1998, Tanaka and Harada 2005, Hu 2010, Zhang et al. 2012). Species Fungorum currently lists 52 species of the genus (accessed December 5, 2024). In this study, we describe two new species and a new record for the genus, based on comprehensive morphological comparisons and phylogenetic analysis.

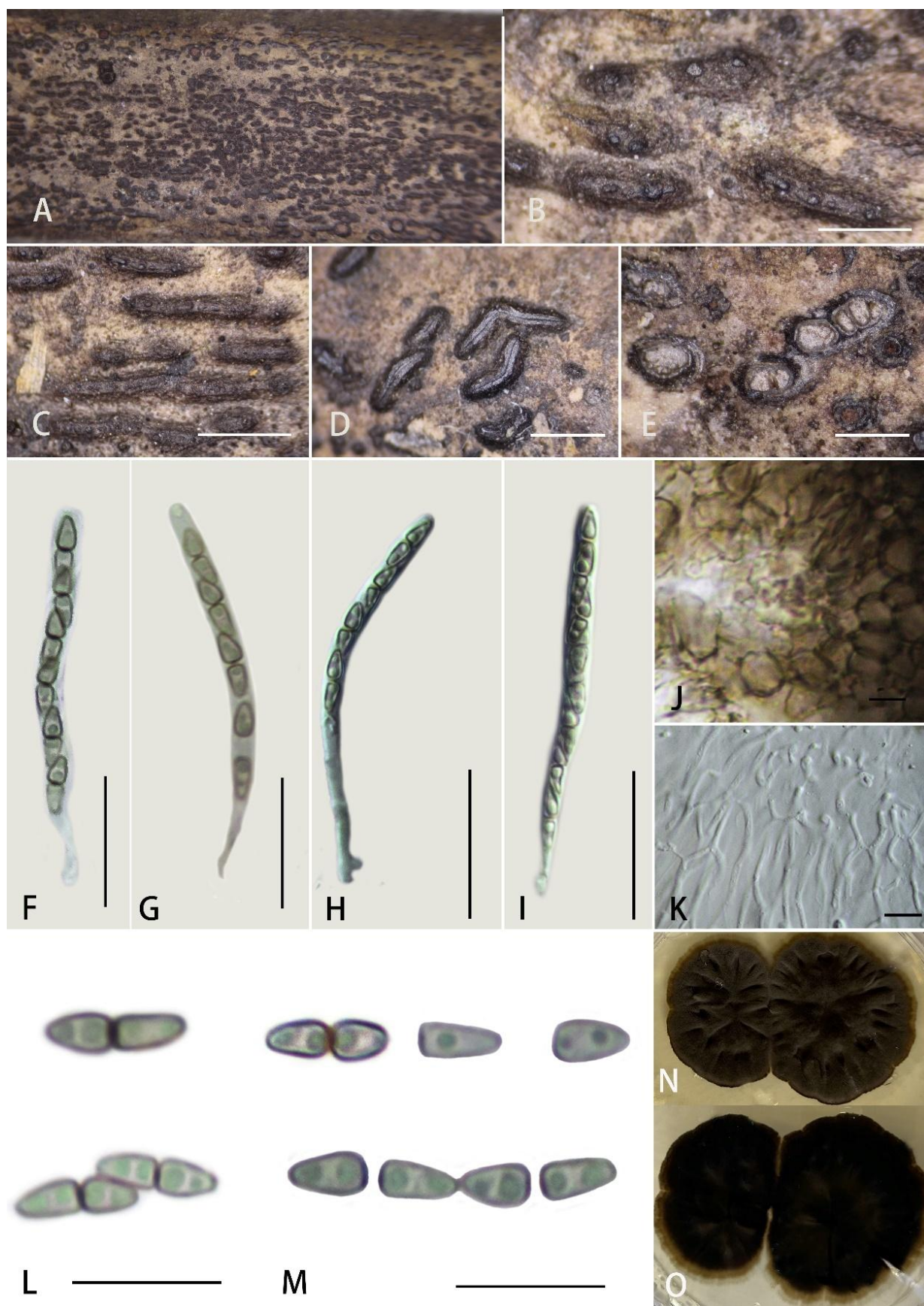
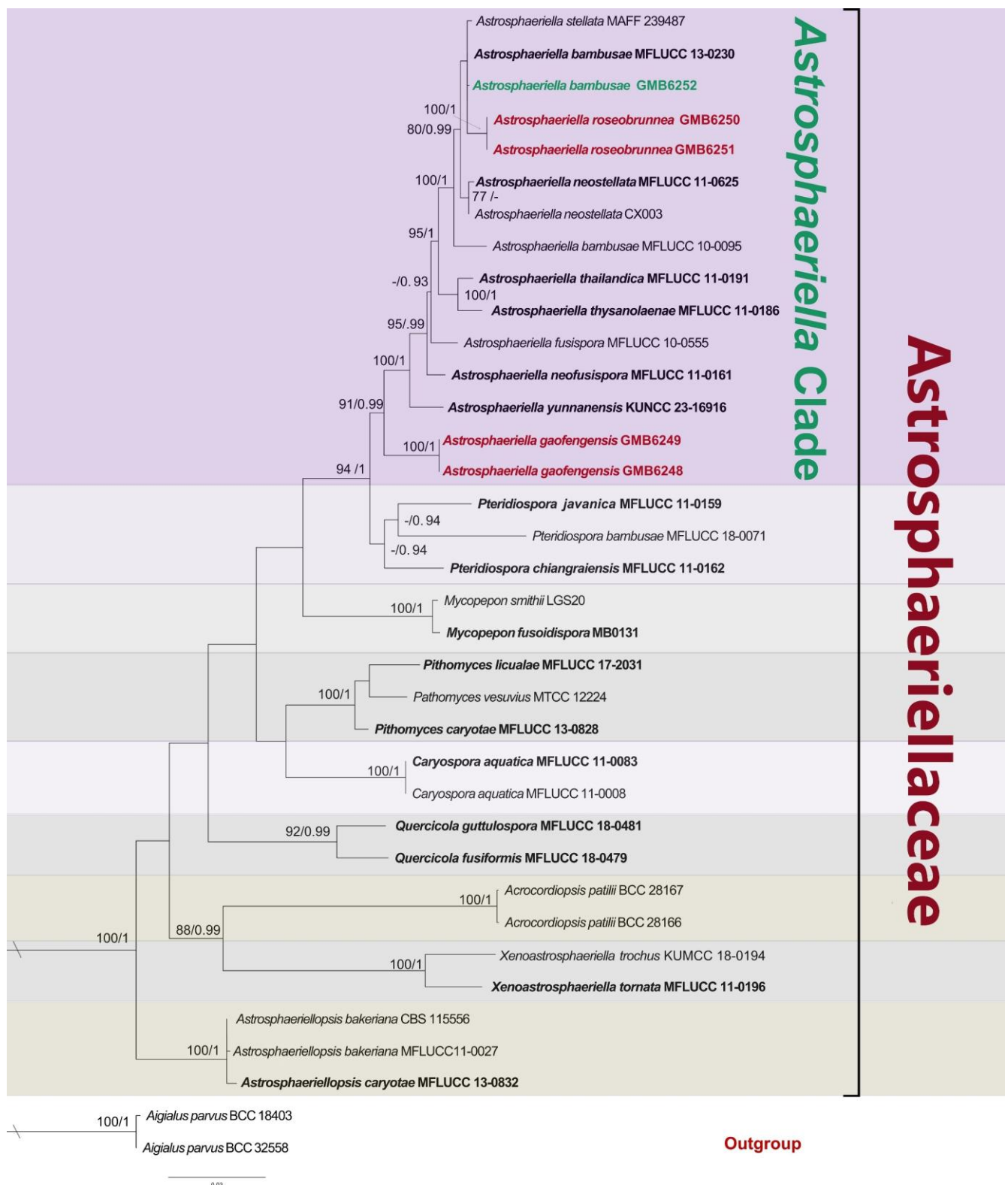


Figure 6 – *Anteaglonium stromatolineum* (GMB6246, holotype). A–C Stromata in face view. D Hysterothecia. E Cross section of ascomata. F–I Asci. J Peridial cells. K Paraphyses. L, M Ascospores. N Culture upper view. O Culture back view. Scale bars: B–E = 0.5 mm, F–K = 20 μ m, L, M = 10 μ m.



MycoBank No: MB551633

Description – Saprobiic on bamboo. **Sexual morph:** *Ascomata* 400–800 µm diam., 400–750 µm high, black, scattered to clustered, conical, flattened at the base, uni-loculate, brittle, carbonaceous, erumpent through the host tissue, immersed at the base, surrounded by ruptured, jagged, reflexed fragments at the base. *Peridium* 30–80 µm thick, carbonaceous, weakly developed at base, composed of dark brown cells. *Ostiole* central, acute, conspicuous. *Hamathecium* composed of dense, up to 1 µm wide, pseudoparaphyses, trabeculate, anastomosing, frequently branched, embedded in a hyaline gelatinous matrix. *Asci* 125–200 × 7.5–11 µm ($\bar{x}$ = 178 × 7.8 µm, n = 30), 8-spored, cylindrical, short pedicellate, apically rounded, with ocular chamber. *Ascospores* 30–44 × 4.5–6.2 µm ($\bar{x}$ = 38.9 × 5.6 µm, n = 30), overlapping biseriate, elongate-fusiform, hyaline when young, pale when mature, with small guttules, smooth-walled, acute ends, slightly constricted at the septum, surrounded by a thin mucilaginous sheath 0.8–1.8 µm wide. **Asexual morph:** Undetermined.

Material examined – China, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28°18'56.20" N, 107°06'49.02" E, altitude: 1,538 m, on dead culm of bamboo, August 2024, W.H. Li, Q.R. Li, R20 (GMB6252).

Notes – Our collection exhibits morphological characteristics closely resembling *Astrosphaeriella bambusae*. Molecular analysis of ITS, LSU, and *tef-1α* sequences revealed a high similarity (>99%) to *A. bambusae* (MFLUCC 13-0230).

Morphologically and phylogenetically (Fig. 7), *Astrosphaeriella bambusae* is closely related to *A. neostellata* and *A. stellata*. It can be distinguished from *A. neostellata* by its smaller ascospores (30–44 × 4.5–6.2 µm vs. 40–60 × 5–8 µm), asci (125–200 × 7.5–11 µm vs. 170–230 × 8.6–13.5 µm), and ascomata (400–750 µm high vs. 700–1000 µm high). Compared to *A. stellata*, *A. bambusae* differs in having hyaline to pale ascospores (vs. brown), slightly smaller ascospores (30–44 × 4.5–6.2 µm vs. 36–47 × 5–7 µm) with acute ends (vs. rounded ends) (Phookamsak et al. 2015).

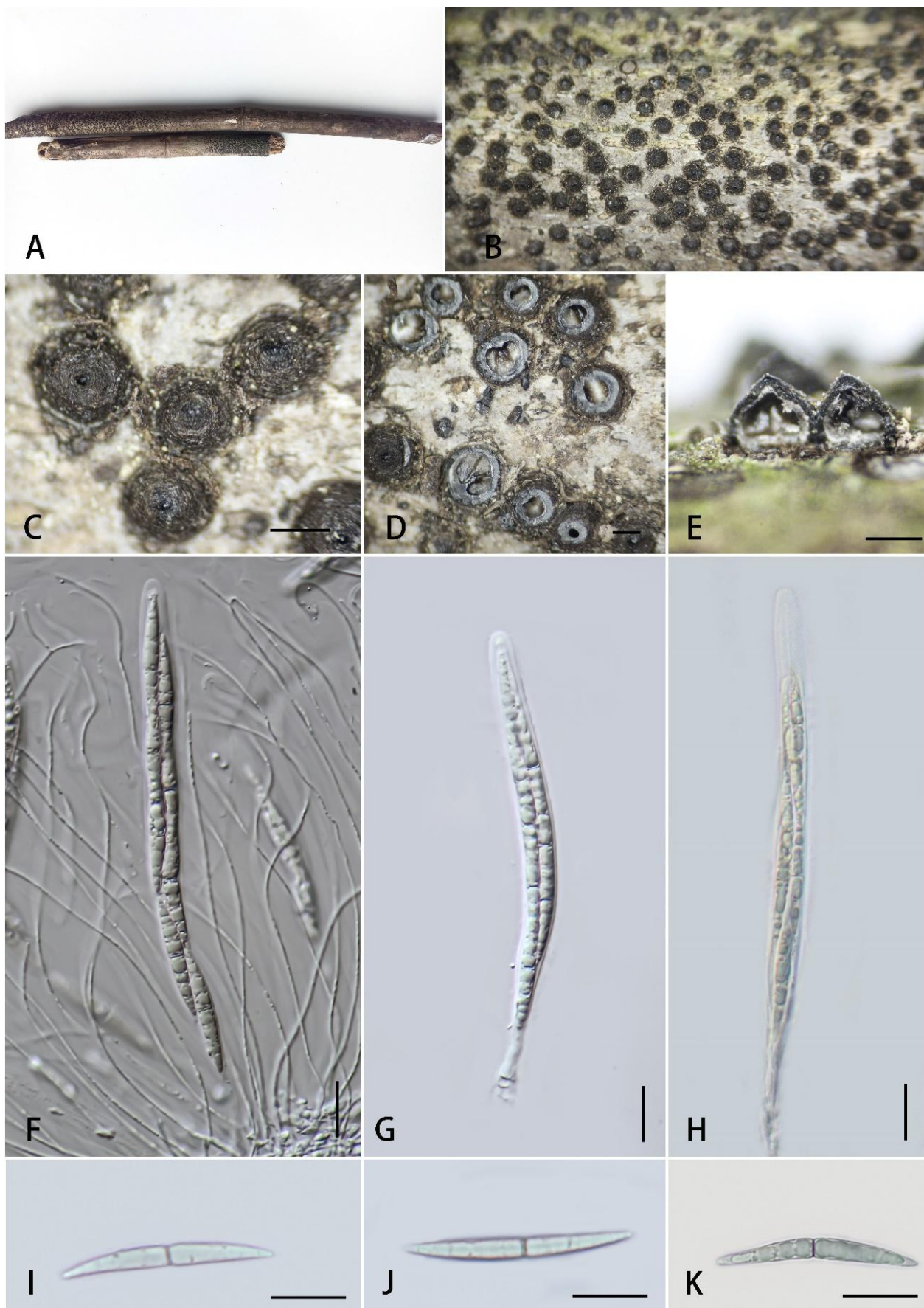


Figure 8 – *Astrosphaeriella bambusae* (GMB6252). A Bamboo host. B, C Surface view of ascostromata. D. Cross section of ascostromata. E Vertical section of ascostromata. F–H Asci. I–K Ascospores. Scale bars: C–E = 0.5 mm, F–H = 20 µm, I–K = 15 µm.

Astrosphaeriella gaofengensis K. Habib, W.H. Li & Q.R. Li sp. nov.

(Fig. 9)

MycoBank No: MB857215

Etymology – The epithet *gaofengensis* refers to the locality of the type species, Gaofeng Village.

Description – Saprobic on decaying bamboo culms. **Sexual morph:** *Ascostromata* 600–1200 µm diam., 500–900 µm high, black, scattered to clustered, brittle, conical become dome shaped, flattened at the base, unruptured, smooth, mature slight verrucose, without host remnants around the base, apex papillate, stellate, with broad arms up to 800 µm long. *Peridium* 30–60 µm thick, carbonaceous, weakly developed at base, composed of melanized cells. *Ostiole* papillate, conspicuous. *Hamathecium* pseudoparaphyses up to 0.8 µm wide, trabeculate, anastomosing, frequently branched, embedded in a hyaline gelatinous matrix. *Asci* 185–250 × 10–15 µm ($\bar{x}$ = 226 × 12.2 µm, n = 30), 8-spored, cylindrical, long pedicellate, apically rounded with an ocular chamber (3–7 µm). *Ascospores* 50–65 × 4.5–6 µm ($\bar{x}$ = 61 × 5.7 µm, n = 30), uniseriate to biseriate, elongate-fusiform, reddish brown, pale yellow when mature, with small guttules, smooth walled, slightly constricted at the septum, sheath drawn out at both ends, forming polar appendages, tilted, with rounded end caps visible at the tips of the appendages. **Asexual morph:** Undetermined.

Material examined – China, Guizhou Province, Guiyang City, Xifeng County, Gaofeng Village 26°33'97.54" N, 106°34'93.13" E, altitude: 1148 m, on dead culm of bamboo, July 2024, X. Zhou and W.Y. Zeng, F2 (GMB6248, holotype); *ibid.*, KUN-HKAS 145729 isotype.

Additional examined material – China, Guiyang City, Huaxi District, Xiaohe Village 26°24'35" N 106°40'13" E, altitude: 1105 m, on dead culm of bamboo, July 2024, Qirui Li, FWS2 (GMB6249).

Notes – *Astrosphaeriella gaofengensis* is morphologically similar to several species within the genus, including *A. bambusae*, *A. neofusispora*, *A. neostellata*, and *A. stellata*. *Astrosphaeriella bambusae* differs from *A. gaofengensis* in having smaller ascostromata, 360–600 µm high, 380–660 µm in diameter (vs. 500–900 µm high and 600–1200 µm in diameter in *A. gaofengensis*). The ascostromata of *A. bambusae* are surrounded by ruptured, reflexed host remnants at the base (vs. lack). Additionally, *A. bambusae* has smaller asci (125–194 µm vs. 185–250 µm) and smaller ascospores (33–42 µm vs. 50–65 µm), with a thin, distinct mucilaginous sheath (vs. sheath drawn out at the ends, are rounded or hook-like in *A. gaofengensis*) (Phookamsak et al. 2015).

Astrosphaeriella neofusispora has ascostromata of comparable size to *A. gaofengensis* (520–710 µm high and 600–1100 µm in diameter). However, the ascostromata of *A. neofusispora* also possess ruptured, reflexed host remnants around the base and have smaller asci (150–220 µm vs. 185–250 µm), smaller, 1–3-septate, pale yellowish to olive-brown ascospores (42–51 µm vs. 50–65 µm), with a thin, distinctive sheath (Phookamsak et al. 2015).

In an ITS BLAST search, *Astrosphaeriella gaofengensis* showed high sequence similarity to *A. neostellata* (94.7%) and *A. stellata* (93.4%). *Astrosphaeriella neostellata* and *A. stellata* differ from *A. gaofengensis* in several shared morphological characteristics. Both species have ascostromata surrounded by ruptured, reflexed host remnants at the base. *Astrosphaeriella neostellata* has ascostromata similar in size to *A. gaofengensis* (650–850 µm high, 700–1000 µm in diameter vs. 500–900 µm high, 600–1200 µm in diameter in *A. gaofengensis*), but possesses smaller asci (170–230 µm vs. 185–250 µm) and hyaline to pale brown smaller ascospores (40–60 µm long vs. reddish brown, 50–65 µm long) that are surrounded by a thin sheath with acute ends. *Astrosphaeriella stellata* has smaller ascostromata (280–500 µm high, 420–620 µm in diameter), smaller asci, and smaller ascospores (36–47 µm) that have truncated ends, making both species distinct from *A. gaofengensis* in terms of overall size and spore morphology (Phookamsak et al. 2015).

In terms of ascospore morphology, *Astrosphaeriella gaofengensis* is closely related to *A. australiensis*. However, *A. australiensis* differs from *A. gaofengensis* in being recorded only on *Calamus* sp. (Palm) in Australia, having smaller ascostromata (350–500 µm high) that lack stellate arms and are immersed at the base, and possessing hyaline to rarely light brown, slightly smaller ascospores, 50–60 µm in length (Hyde and Fröhlich 1998).

Overall, *Astrosphaeriella gaofengensis* can be easily distinguished from *A. australiensis*, *A. bambusae*, *A. neofusispora*, *A. neostellata*, and *A. stellata* by its reddish-brown ascospores with sheath drawn out long at both ends, rounded at the ends (Hyde and Fröhlich 1998). Phylogenetically (Fig. 7), *Astrosphaeriella gaofengensis* forms a distinct clade at the base of *Astrosphaeriella*. The *tef-1α* sequence comparison of *A. gaofengensis* revealed a similarity of 93.2% (741/795 bp) with *A. bambusae* (MFLUCC 13-0230) with no gaps and 93.9% similarity (900/958 bp) with *A. neostellata* (CX003), with a single gap (1/958). Based on these morphological and molecular differences, we introduce our collections as a new species.

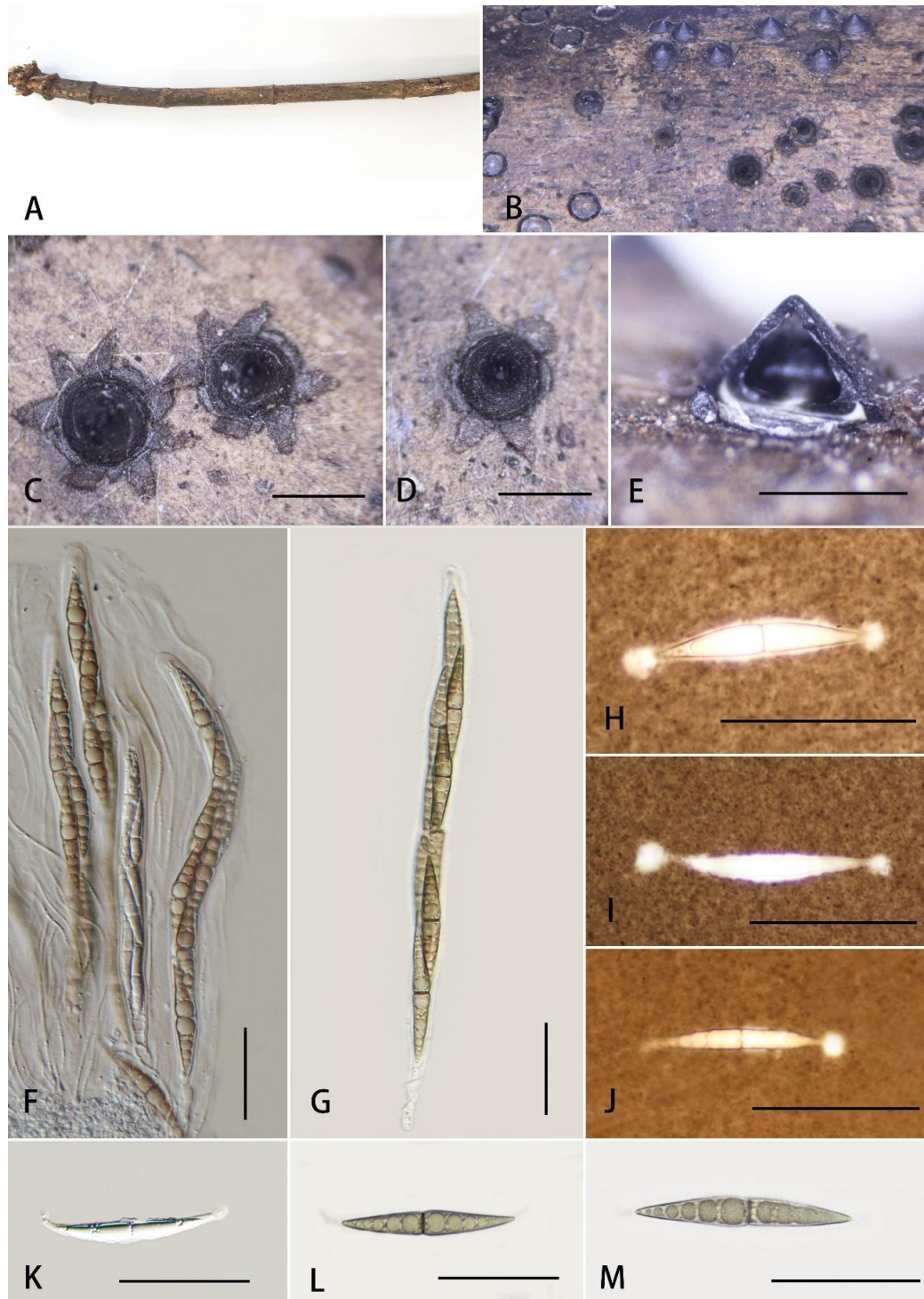


Figure 9 – *Astrosphaeriella gaofengensis* (GMB6248, holotype). A Bamboo host. B–D Surface view of ascostromata. E Vertical sections of ascostromata. F–G Asci. H–J Ascospores rounded sheath at ends (in Indian ink). K–M Ascospores in water. Scale bars: C–E = 1 mm, F–M = 40 μm.

Astrosphaeriella roseobrunnea K. Habib, W.H. Li & Q.R. Li, sp. nov.

(Fig. 10)

MycoBank No: MB857216

Etymology – The epithet "*roseobrunnea*" refers to the pinkish-brown ascospores of the species.

Description – Saprobiic on decaying bamboo culms. **Sexual morph:** *Ascostromata* 400–850 µm diam., 250–500 µm high, black, erumpent, solitary to rarely confluent, brittle, carbonaceous, conical shaped, flattened at the base, with ruptured, reflexed, host remnants, around the base, surface smooth. *Peridium* 25–70 µm thick, not developed at base, composed of melanized cells. *Ostiole* papillate, conspicuous. *Hamathecium* pseudoparaphyses up to 0.8 µm wide, trabeculate, anastomosing, frequently branched, embedded in a hyaline gelatinous matrix. *Asci* 130–180 × 9–12 µm ($\bar{x}$ = 153 × 10.9 µm, n = 30), 8-spored, cylindrical, short pedicellate, apically rounded with an ocular chamber (3–6 µm). *Ascospores* 46–58 × 5–8.5 µm ($\bar{x}$ = 53 × 7 µm, n = 30), biseriate, 1-septate, rarely aseptate, elongate-fusiform, truncated to rounded at ends, pinkish brown, with small guttules, smooth thick walled, deeply constricted at the septum, surrounded by a distinct thick 2.5–8 µm mucilaginous sheath, truncated with a central depression at the apex. **Asexual morph:** Undetermined.

Materials examined – China, Guangxi Zhuang Autonomous Region, Shiwandashan National Forest Park, 107°33'55.28" E, 21°41'51.40" N, altitude: 1,560 m, on dead culm of bamboo, July 2024, Qirui Li, RS12 (GMB6250 holotype); *ibid.*, KUN-HKAS 145730 isotype.

Additional specimen – China, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28°18'56.24" N, 107°06'49.04" E, altitude: 1,538 m, on dead branch of palm tree, August 2024, W.H. Li, Q.R. Li, GSK02 (GMB6251).

Notes – In terms of ascostromatal morphology, *Astrosphaeriella roseobrunnea* is similar to *A. bambusae*, *A. fusispora*, *A. neofusispora*, *A. neostellata*, and *A. stellata*. *Astrosphaeriella bambusae* has asci of similar size and phylogenetically also closely related, but differs from *A. roseobrunnea* having smaller ascostromata, 380–660 µm in diameter (vs. 400–850 µm) and smaller, pale yellowish ascospores (33–42 × 5–6 µm, $\bar{x}$ = 36.7 × 5.4 µm) with acute ends (vs. pinkish-brown ascospores, 46–58 × 5–8.5 µm, $\bar{x}$ = 53 × 7 µm, with truncated to rounded ends) (Phookamsak et al. 2015).

Astrosphaeriella fusispora has larger ascostromata, 710–1070 µm in diameter, and smaller ascospores (37–45 × 5–7 µm, $\bar{x}$ = 40.6 × 5.8 µm) with acute ends. *Astrosphaeriella neofusispora* has larger ascostromata (600–1100 µm in diameter), larger asci (150–220 µm), and smaller, 1–3 septate ascospores (42–51 × 6–7.5 µm, $\bar{x}$ = 46.4 × 6.8 µm) that are surrounded by a thin mucilaginous sheath (Phookamsak et al. 2015).

In an ITS BLAST search, *Astrosphaeriella roseobrunnea* showed high sequence similarity to *A. stellata* (97%). Morphologically, the two species share similar-sized ascostromata and asci. However, *A. stellata* differs from *A. roseobrunnea* in having smaller, pale brown ascospores (36–47 × 5–7 µm, $\bar{x}$ = 42 × 6.2 µm), which are surrounded by a thin mucilaginous sheath. *Astrosphaeriella neostellata* has larger ascostromata (650–850 µm high, 700–1000 µm in diameter), larger asci (170–230 µm), and hyaline to pale brown ascospores ($\bar{x}$ = 48.1 × 6.1 µm) with acute ends, surrounded by a thin sheath (Phookamsak et al. 2015).

The *tef-1a* sequence comparison of *Astrosphaeriella roseobrunnea* showed a similarity of 98.5% (943/957 bp) to *A. neostellata* (isolate CX003) with no gaps and 98.9% (786/795 bp) to *A. bambusae* (MFLUCC 13-0230), also with no gaps. Based on these morphological and molecular differences we introduce our collections as a new species.

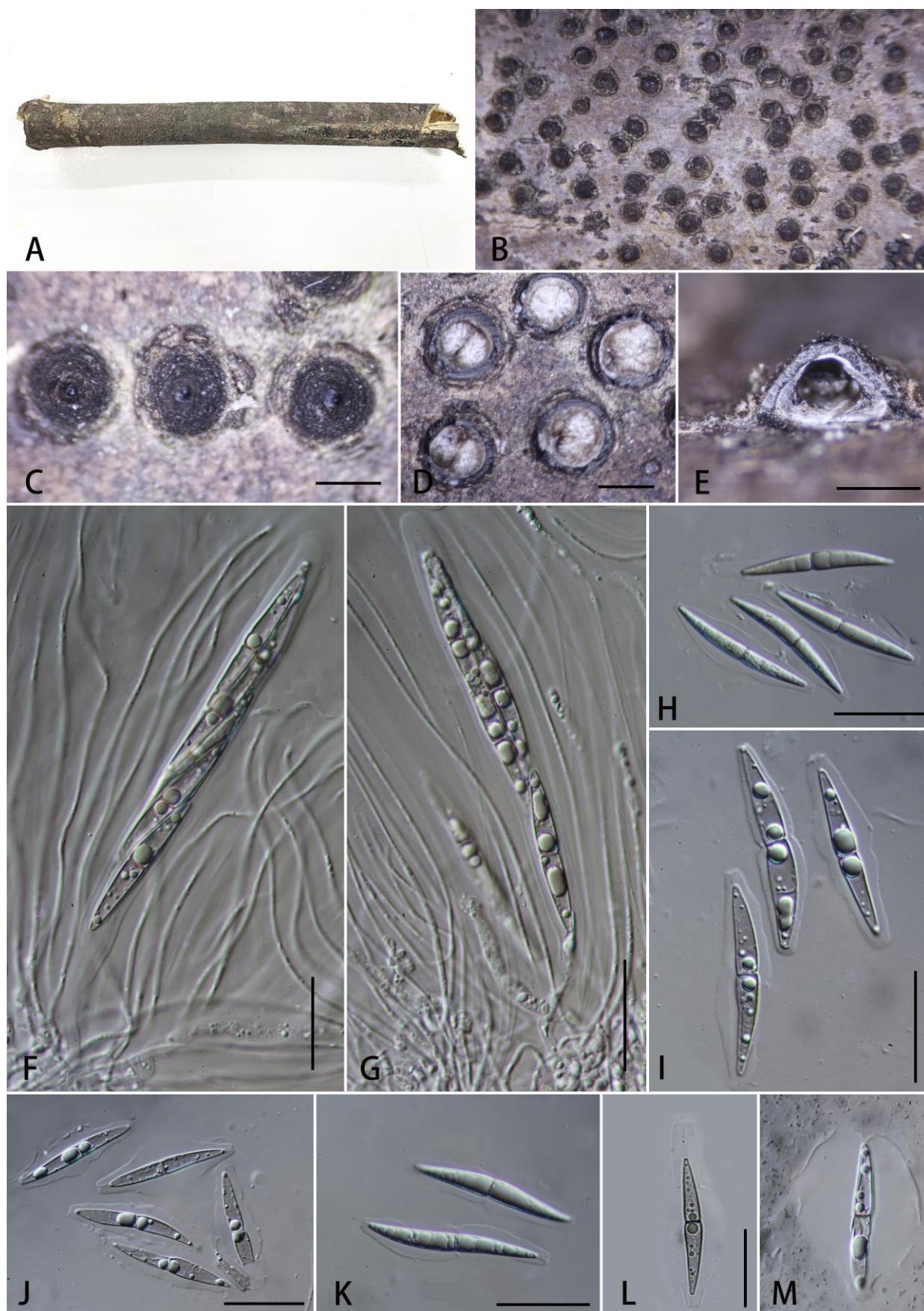


Figure 10 – *Astrosphaeriella roseobrunnea* (GMB6251, holotype). A Bamboo host. B, C Surface view of ascostromata. D Cross sections of ascostromata. E Vertical section of ascostroma. F, G Asci in distilled water. H–L Ascospores in distilled water. M Ascospores in Indian ink. Scale bars: C–E = 0.5 mm, F–M = 30 μ m.

Dictyosporiaceae Boonmee & K.D. Hyde, Fungal Diversity 80: 462 (2016).

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

Notes – Barr (1987) established the genus *Immotthia* with *I. hypoxylon* (formerly *Amphisphaeria hypoxylon*) as the type species. Later, Jaklitsch et al. (2002) analyzed the type material of *I. hypoxylon* and Australian collections of *I. atrograna* (formerly *Sphaeria atrograna*) and confirmed these taxa as conspecific. Thus, the genus is typified by *I. atrograna*. Currently, *Immotthia* comprises three recognized species (Species Fungorum, accessed April 20, 2025). The genus is characterized by globose to subglobose ascomata, often forming on blackened hypostroma, bitunicate, fissitunicate, cylindrical asci, and brown to reddish brown, ellipsoidal to fusiform, 1-septate, smooth or slightly verrucose ascospores (Hyde et al. 2017, Hongsanan et al. 2020). Species in this genus are known to be hyperparasitic on *Annulohypoxylon*, *Hypoxylon*, and *Pestalopezia* or saprobic on decaying wood (Jaklitsch et al. 2002, Hyde et al. 2017, Doilom et al. 2018, Hongsanan et al. 2020, Jiang et al. 2021). In this study, we introduce a new species of *Immotthia* based on morphological and phylogenetic analyses and provide a key to differentiate species within the genus.

Immotthia chinensis K. Habib, W.H. Li & Q.R. Li, sp. nov.

(Fig. 12)

MycoBank No: MB857217

Etymology – The epithet "*chinensis*" refers to the country of the type species.

Description – Hyperparasitic on an unknown fungus (not in Hypoxylaceae) on dead branch of an unidentified plant. **Sexual morph:** *Hypostroma* black with numerous, superficial ascomata, composed of thin layered pseudoparenchymatous cells, *textura angularis*. *Ascomata* 150–220 µm high, 150–180 µm wide, black, superficial on hypostroma, numerous, densely aggregated, globose to subglobose, or obpyriform, slightly shiny, inconspicuous ostiole, 25–40 µm wide. *Peridium* two-layered, 10–20 µm wide, equally thick, external layer composed of dark angular cells, internal layer of hyaline to subhyaline cells, flattened and wider than external cell. *Hamathecium* composed of numerous pseudoparaphyses, hyaline filiform, branched, exceeding asci in length, 1.5–2.5 µm wide. *Asci* 65–85 × 6–9 µm ($\bar{x}$ = 71 × 8 µm, n = 15), 8-spored, cylindrical, sessile, uniseriate. *Ascospores* 10–13 × 4.5–6 µm ($\bar{x}$ = 11.8 × 5.5 µm, n = 30), brown to reddish-brown, ellipsoid, obovoid to biconical, slightly asymmetric, inequilateral, one-septate, slightly constricted at septum, septum central, up to 1 µm wide, darker than spore walls, lower cell slight narrower than upper cell, upper cell 4.5–6 × 4.5–6 µm, lower cell 4.5–6 × 3–4.5 µm, ends subacutely rounded, 1–2 guttules, walls smooth, verrucose, without sheath. **Asexual morph:** undetermined.

Material examined – China, Guangxi Zhuang Autonomous Region, Daming Mountain National Nature Reserve 23°10'23" N, 108°18'45" E, altitude 1,562 m, on dead branch of an unidentified plant, August 2023, Q.R. Li, 2023DMS22, (GMB6257, holotype); *ibid.*, KUN-HKAS 145731 isotype.

Additional specimens examined – China, Yunnan Province, Dawei Mountain National Nature Reserve 28°27'33.9" N, 114°01'03.3" E. on dead wood, July 2023, Q.R. Li, 2023DWS18 (GMB6258).

Notes – Morphologically, *Immotthia chinensis* is closely related to *I. atrograna*, sharing similar asci size and morphology. However, *I. atrograna* differs from *I. chinensis* in having larger ascomata (120–270 µm in diam., 150–310 µm in height) with a wider peridium (30–50 µm thick) and larger ascospores (8–18 × 4.5–7 µm). Additionally, in *I. chinensis*, the lower cell of the ascospores is similar in length but narrower than the upper cell, whereas in *I. atrograna* (syn. *I. hypoxylon*), the upper cell is larger than the lower cell (Jaklitsch et al. 2002).

The ascomata size of *Immotthia chinensis* is similar to that of *I. bambusae*, and phylogenetically (Fig. 11), they also appear as sister species. However, *I. bambusae* has smaller asci (45–62 × 7.5–10 µm) and slightly smaller, narrower ascospores (9–11 × 2.8–4.5 µm), with the lower cell of the ascospores being longer and narrower than the upper cell. Moreover, *I. bambusae* was collected from the stromata of *Hypoxylon* associated with bamboo in Thailand, whereas the

type specimen of *I. atrograna* was collected from *Hypoxylon truncatum*, which colonized dead canes of *Rosa* in Louisiana, United States (Jiang et al. 2021).

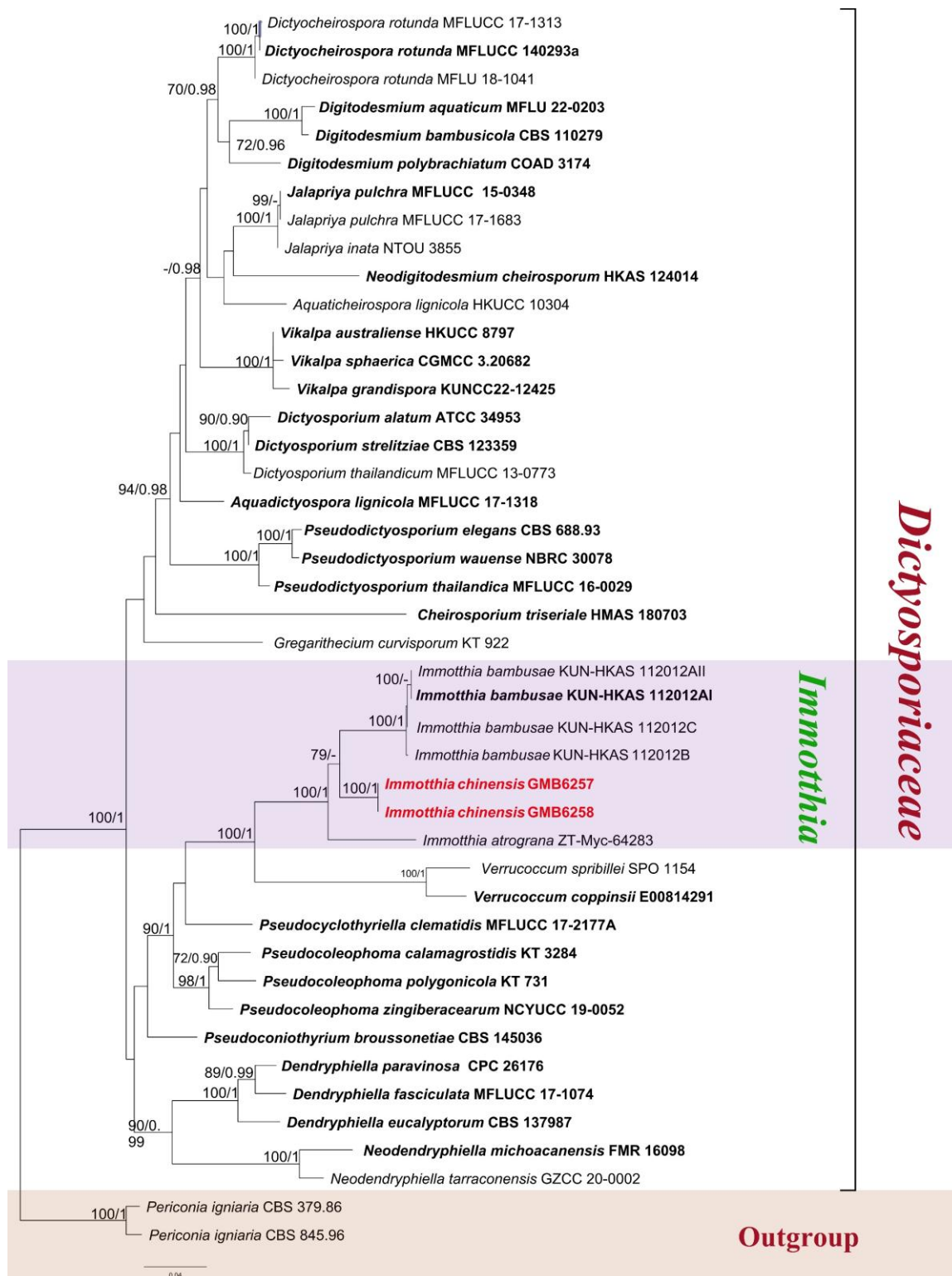


Figure 11 – RAxML tree based on a combined ITS, LSU and *tef-1α* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -12759.154777. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in red bold. Ex-type/type strains are indicated in black bold.

Key to *Immotthia* species

- 1a. Ascomata ≤ 220 μm diam. 2
- 1b. Ascomata > 220 μm diam. 3
- 2a. Hyperparasitic on *Hypoxylon* sp. on bamboo, asci $45\text{--}60(-62) \times 7.5\text{--}10$ μm , ascospores $9\text{--}11 \times 4.5\text{--}8$ μm , lower cell slightly longer than the upper. *I. bambusae*
- 2b. Hyperparasitic on an unknown fungus, not Hypoxylaceae sp., asci $65\text{--}85 \times 6\text{--}9$ μm , ascospores $10\text{--}13 \times 4.5\text{--}6$ μm , lower cell similar in length. *I. chinensis*
- 3a. Hyperparasitic on *Hypoxylon* species on *Quercus* sp., *Fraxinus* sp., *Rosa* sp., *Tilia* sp.
I. atrograna
- 3b. Hyperparasitic on *Pestalotpezia rhododendri* on fallen leaves of *Rhododendron maximum*.
I. atroseptata

Lophiostomataceae C. Luerssen, Handbuch der systematischen Botanik mit besonderer Berücksichtigung der Arzneipflanzen 1: 154 (1878)

Lophiostoma Ces. & De Not., Comment. Soc. Crittog. Ital. 1 (4): 219 (1863)

Notes – *Lophiostoma* was established by Cesati and De Notaris (1863), with *L. macrostomum* designated as the type species (Tanaka and Harada 2003). Chesters and Bell (1970) treated *Lophiotrema* as a synonym of *Lophiostoma*. However, Holm and Holm (1988) later distinguished the two genera based on differences in peridium structure and asci, a distinction further supported by Hirayama and Tanaka (2011) through both morphological and molecular analyses. *Lophiostoma* is characterized by scattered to crowded, immersed to semi-immersed ascomata, coriaceous to carbonaceous, with variable shapes, distinct pore-like ostioles, periphysate ostiolar canal, 6–8-spored asci, bitunicate, fissitunicate, clavate to almost cylindrical, pedicellate, with a prominent ocular chamber and hyaline to brown ascospores, fusiform to ellipsoid, 1- to multi-septate or muriform, and may possess terminal appendages. Currently, Species Fungorum lists 138 species under the genus *Lophiostoma* (accessed April 20, 2025). In this study, we describe two new species of the genus based on detailed morphological comparisons and phylogenetic analyses.

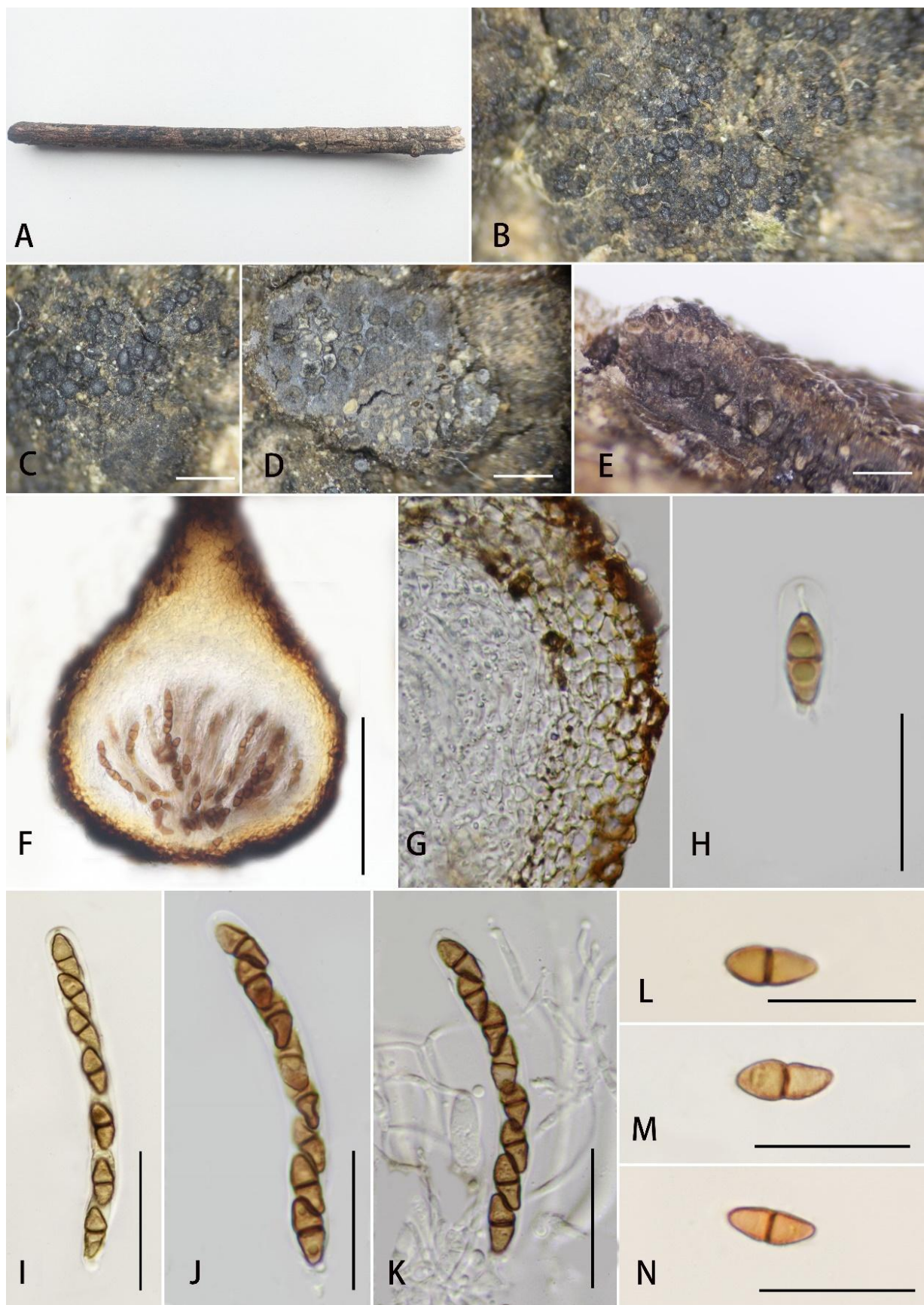
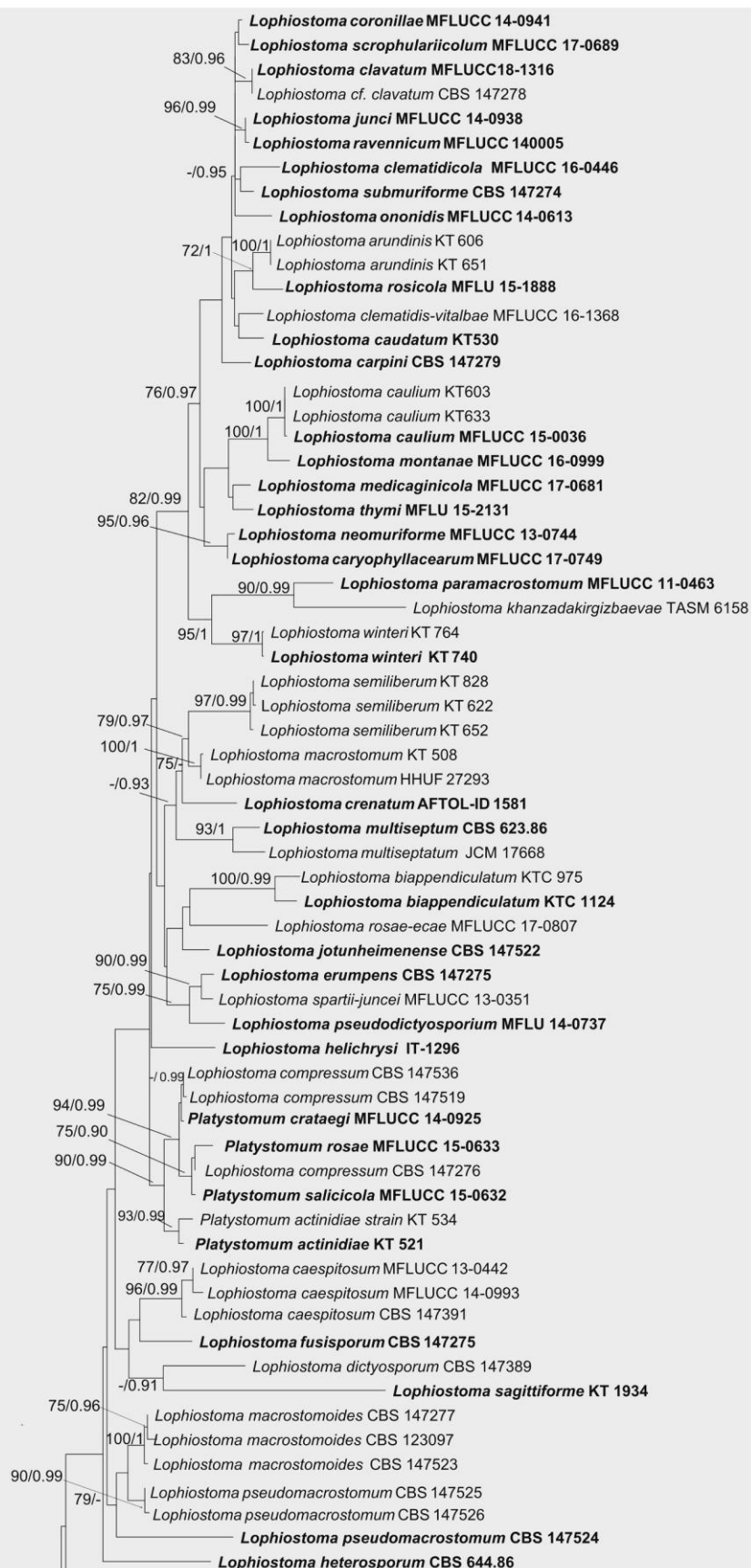


Figure 12 – *Immotthia chinensis* (GMB6257, holotype). A Host. B, C Surface view of ascomata D Cross section of ascomata. E, F Longitudinal sections of ascomata. G Peridium. H Ascus apical. I–K Asci in distilled water. L–N Ascospores. Scale bars: C–E = 0.5 mm, F = 100 μ m, I–K = 30 μ m, H, L–N = 20 μ m.

LOPHIOSTOMATACEAE

Lophiostoma Clade



Cont...

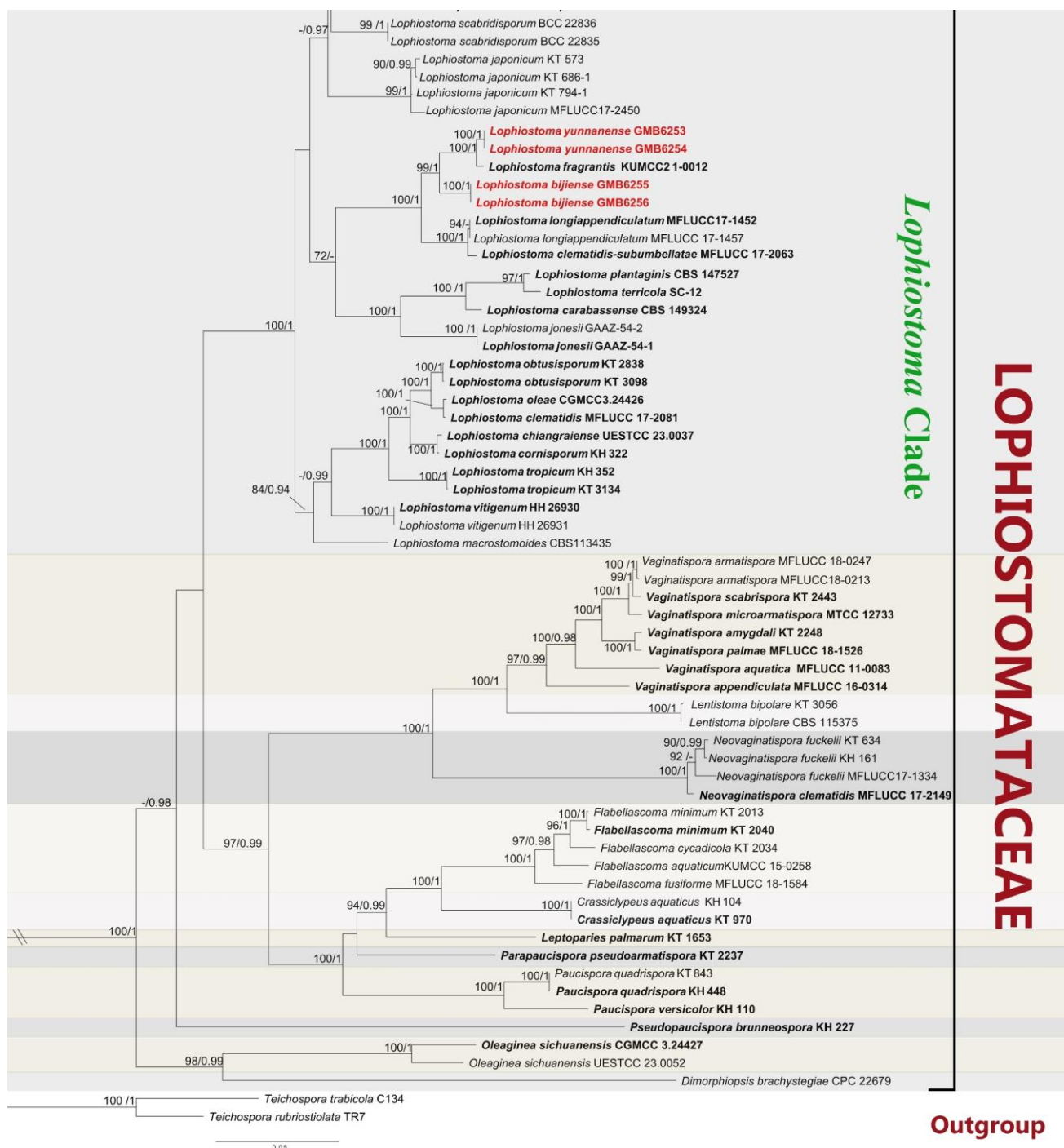


Figure 13 – RAxML tree based on a combined ITS, LSU, *rpb2* and *tef-1a* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -30540.905175. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BPP). The newly described species are marked in red bold. Ex-type/type strains are indicated in black bold.

Lophiostoma bijienae K. Habib, Y.L. Ren & Q.R. Li sp. nov.

(Fig. 14)

Mycobank No: MB857218

Etymology – The specific epithet is derived from Bijie City, where the holotype was collected.

Description – Saprobiic on dead culms of an unidentified plant. **Sexual morph:** *Ascomata* 210–320 high × 250–420 µm diam ($\bar{x}$ = 279.4 × 362 µm, n = 30), immersed to erumpent, appearing as black spots or short black bands, with an obvious ostioles, coriaceous, solitary to scattered, in

cross section globose to subglobose, pyriform, light brown to black, lacking clypeus. *Ostioles* raised, black short bands, crest-like, coriaceous, periphysate ostiolar canal. *Peridium* 28–40 μm ($\bar{x}$ = 31.8 μm , n = 30), thin at base, thick towards to ostiole, comprising several layers consisting of brown to dark brown cells of textura globulosa to angularis, becoming hyaline towards the inside. *Hamathecium* 0.8–2 μm ($\bar{x}$ = 1.3 μm , n = 30), dense, filiform, septate, branching pseudoparaphyses. *Asci* 110–175 $\times$ 11.6–15.5 μm ($\bar{x}$ = 141.6 $\times$ 13.7 μm , n = 30), 8-spored, bitunicate, cylindric-clavate, straight to slightly curved, apically rounded, with a short, furcate pedicel and ocular chamber. *Ascospores* 38–45 $\times$ 5.4–7.5 μm ($\bar{x}$ = 42.2 $\times$ 6.5 μm , n = 30), overlapping biseriate, hyaline, aseptate when young, becoming one-septate when mature, slightly constricted at the septum, fusiform, acute ends, straight to slightly curved, with 3–10 guttules when young, becoming two large guttules when mature, smooth-walled, long sheath drawn out from apices of ascospores with polar appendages, 25–42 $\times$ 5–8.5 μm ($\bar{x}$ = 36.3 $\times$ 7.2 μm , n = 20), terminating in a globose drop at their tips. **Asexual morph:** Undetermined.

Culture characteristics – Ascospores germinating on PDA within 24h, Colonies on PDA reaching 18 mm diam, after 2 weeks at room temperature, thick at medium, circular, cottony, fluffy, whitish from above; reverse yellow brown.

Material examined – China, Guizhou Province, Bijie City, Qixingguan District, Tianshengqiao Scenic Area, 27°24'38.99" N, 105°29'55.08" E, altitude 1,728 m, on dead branches of an unidentified plant, 24 May 2023, Yulin Ren, 2023TSQ6 (GMB6255, holotype; GMBC6255, ex-type); *ibid.*, KUN-HKAS 145732 isotype.

Additional specimen – China, Guizhou Province, Bijie City, Bailidujuan State Reserve 27°12'56"N, 105°54'56"E, altitude 1,642 m, on dead branches of an unidentified plant, 28 February 2023, Lili Lui, Qirui Li, BLD-53 (GMB6256)

Notes – In the ITS BLAST analysis, *Lophiostoma bijiense* showed 94% similarity to *L. fragrantis* KUMCC 21-0012 (= *Pseudocapulatispora fragrantis*), while *tef-1 α* and LSU sequences showed 96.4% and 99% similarity, respectively, to *L. longiappendiculatum* MFLUCC 17-1452 (= *Pseudocapulatispora longiappendiculata*). Phylogenetically (Fig. 13) and morphologically also *L. bijiense* is closely related to these species as it possesses hyaline, 1-septate ascospores with long sheaths drawn out from the apices of the ascospores, forming polar appendages (Mapook et al. 2020, Hyde et al. 2021).

However, *L. fragrantis* can be distinguished from *L. bijiense* by having smaller asci (58–127 $\times$ 8–15 μm vs. 110–175 $\times$ 11.6–15.5 μm) and smaller ascospores (29–36 $\times$ 4–8 μm vs. 38–45 $\times$ 5.4–7.5 μm). Additionally, the sheath surrounding the ascospores of *L. fragrantis* is wider and longer (16–46 $\times$ 8–14 μm vs. 25–42 $\times$ 5–8.5 μm) (Hyde et al. 2021).

Lophiostoma longiappendiculatum can be differentiated from *L. bijiense* by its smaller ascomata (195–265 μm high $\times$ 105–150 μm diam vs. 210–320 μm high $\times$ 250–420 μm diam), smaller asci (75–120 $\times$ 14–20 μm vs. 110–175 $\times$ 11.6–15.5 μm), and smaller ascospores (24–29 $\times$ 6–9 μm vs. 38–45 $\times$ 5.4–7.5 μm) (Mapook et al. 2020).

Lophiostoma clematidis-subumbellatae (= *Pseudocapulatispora clematidis*) also has 1-septate ascospores with long sheaths forming polar appendages but differs from *L. bijiense* in having smaller asci (68–117 $\times$ 12–22 μm vs. 110–175 $\times$ 11.6–15.5 μm), smaller and wider ascospores (22–28 $\times$ 7–12 μm vs. 38–45 $\times$ 5.4–7.5 μm), and shorter polar appendages (14–25 $\times$ 3–5 μm vs. 25–42 $\times$ 5–8.5 μm) (Phukhamsakda et al. 2020).

Based on these morphological distinctions and phylogenetic analyses, we introduce our collection as a new species.

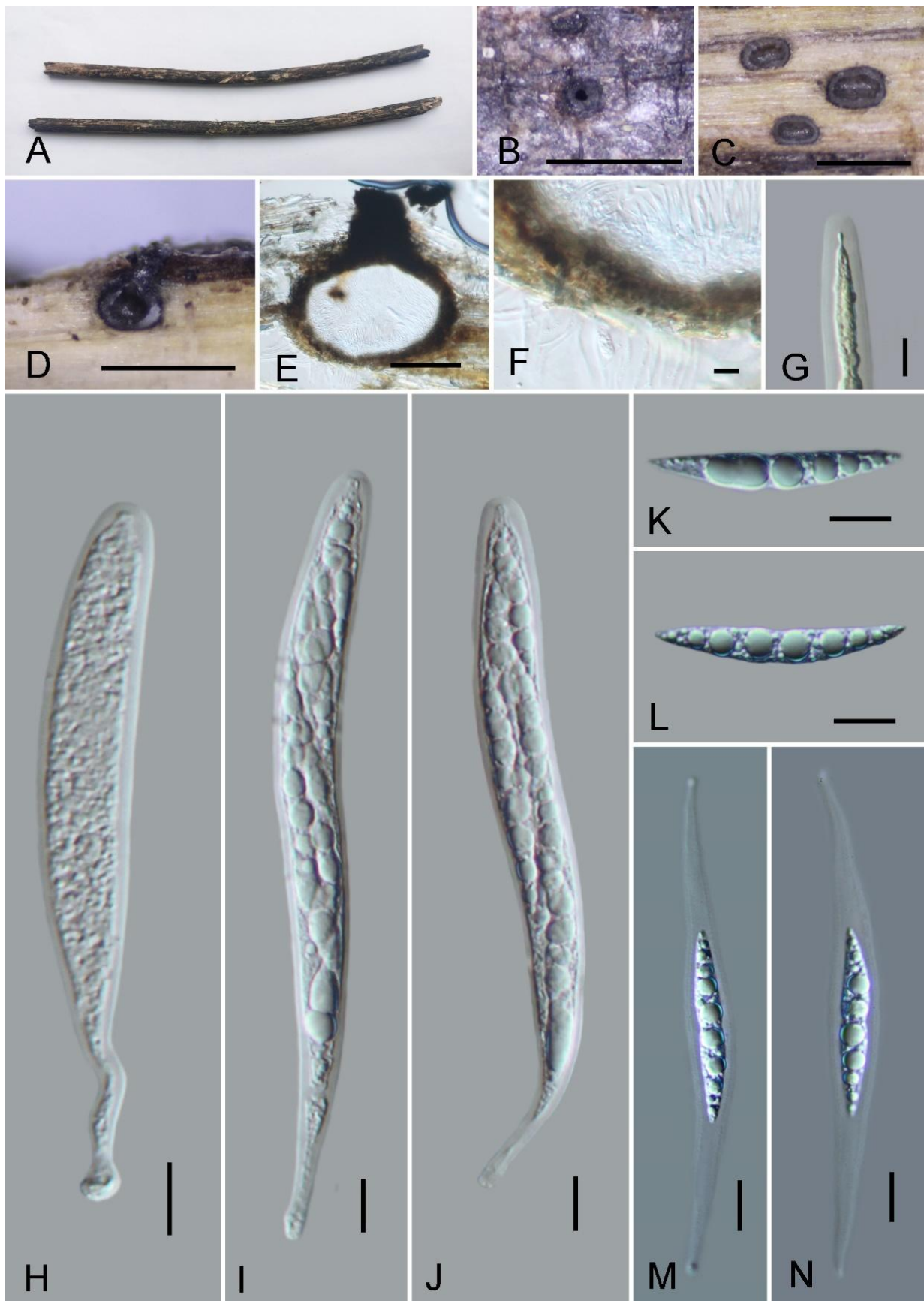


Figure 14 – *Lophiostoma bijiense* (GMB6255, holotype). A Host. B Appearance of ascomata on substrate. C Cross-section of ascoma. D, E Vertical section of ascoma. F Peridium. G Ascus short ocular chamber stained in Melzer reagent. H–J Asci. K–N Ascospores. Scale bars: B–D = 400 μ m, E–J = 20 μ m, K–N = 10 μ m.

Lophiostoma yunnanense K. Habib, C.T. Lu & Q.R. Li sp. nov.

(Fig. 15)

Mycobank No: MB857219

Etymology – The specific epithet is derived from Yunnan Province, where the holotype was collected.

Description – Saprobiic on dead branch of an unidentified plant. **Sexual morph:** *Ascomata* 500–800 μm diam $\times$ 350–550 high ($\bar{x}$ = 610 $\times$ 490.5 μm , n = 20), immersed, ostiole erumpent, appearing as black spots, with obvious ostioles, coriaceous, solitary to scattered, in cross section globose to subglobose, black, lacking clypeus. *Ostioles* 50–110 $\times$ 25–55 μm , raised, black, short, with a crest-like apex, coriaceous, periphysate ostiolar canal. *Peridium* 30–65 μm ($\bar{x}$ = 45.3 μm , n = 15), thin at base, thick towards to ostiole, comprising several layers consisting of brown to dark brown cells of *textura globulosa* to *angularis*, becoming light brown to hyaline towards the inside. *Hamathecium* 1.5–2.5 μm ($\bar{x}$ = 1.5 μm , n = 30), dense, filiform, septate, branching pseudoparaphyses. *Asci* 100–145 $\times$ 12–17 μm ($\bar{x}$ = 131.6 $\times$ 14.3 μm , n = 25), 8-spored, bitunicate, cylindric-clavate, apically rounded, with small ocular chamber, short furcate pedicel. *Ascospores* 28–36 $\times$ 5–7.8 μm ($\bar{x}$ = 32 $\times$ 6.9 μm , n = 30), overlapping biseriate, hyaline, aseptate when young, becoming one-septate when mature, slightly constricted at the septum, fusiform, obtuse to acute ends, straight to slightly curved, with multi guttules when young, becoming two large guttules when mature, smooth-walled, long sheath drawn out from apices of ascospores with polar appendages, 15–30 $\times$ 5–7 μm ($\bar{x}$ = 21.3 $\times$ 6.2 μm , n = 20), terminating in a globose drop at their tips. **Asexual morph:** Undetermined.

Culture characteristics – Ascospores germinating on PDA within 24h, Colonies on PDA reaching 16 mm diam, after 2 weeks at room temperature, thick at medium, thin toward edges circular, cottony, whitish from above; reverse yellow brown.

Material examined – China, Yunnan Province, Zhaotong city, Yongshan county, Wumengshang National Nature Reserve, 104°00'05.54" E, 28°19'29.79" N, altitude: 1281 m, on dead branch of an unidentified plant, April 2024, C.T. Lu, 2024WMS66 (GMB6253, holotype; GMBC6253 ex-type); *ibid.*, KUN-HKAS 145733 isotype.

Additional specimens examined – China, Yunnan Province, Honghe, Daweishan National Nature Reserve, 103°43'47.42" E, 22°56'47.56" N, altitude: 1,371 m, on dead branch of an unidentified plant, July 2024, X. Zhou DWS_2024-05 (GMB6254).

Notes – Phylogenetically (Fig. 13), *Lophiostoma yunnanense* forms a well-supported clade in a sister relationship with *Lophiostoma fragrantis*. In the ITS BLAST analysis, *Lophiostoma yunnanense* showed 97.2%, 94.4%, and 93.7% similarity to the morphologically similar *L. fragrantis* (KUMCC 21-0012), *L. longiappendiculatum* (MFLUCC 17-1452), and *L. clematidis-subumbellatae* (MFLUCC 17-2063), respectively. All these species possess hyaline, 1-septate ascospores with long sheaths drawn out from the apices of the ascospores, forming polar appendages. Morphologically, *L. yunnanense* can be differentiated from these species by its larger ascomata (350–550 μm high $\times$ 500–800 μm diam) compared to *L. fragrantis* (220–377 μm high $\times$ 162–325 μm diam), *L. longiappendiculatum* (195–265 μm high $\times$ 105–150 μm diam), and *L. clematidis-subumbellatae* (197–386 μm high $\times$ 160–252 μm diam) (Phukhamsakda et al. 2020, Hyde et al. 2021).

Moreover, *Lophiostoma fragrantis* can be differentiated from *L. yunnanense* by its much thinner peridium (7–16 μm wide vs. 30–65 μm), longer ostiole (74–195 $\times$ 17–66 μm vs. 50–110 $\times$ 25–55 μm), smaller asci ($\bar{x}$ = 99 $\times$ 12 μm vs. 131.6 $\times$ 14.3 μm), and ascospores with longer and wider polar appendages (16–46 $\times$ 8–14 μm vs. 15–30 $\times$ 5–7 μm) (Hyde et al. 2021). *Lophiostoma longiappendiculatum* has thinner peridium (15–25 μm wide), smaller asci ($\bar{x}$ = 100 $\times$ 15.5 μm), and smaller ascospores (24–29 $\times$ 6–9 μm) (Mapook et al. 2020). *Lophiostoma clematidis-subumbellatae* differs in having smaller asci (68–117 $\times$ 12–22 μm), smaller and wider ascospores (22–28 $\times$ 7–12 μm), and smaller polar appendages (14–25 $\times$ 3–5 μm) (Phukhamsakda et al. 2020). Hence, we introduce our collection as a new species, *Lophiostoma yunnanense*, based on molecular and morphological differences.



Figure 15 – *Lophiostoma yunnanense* (GMB6253, holotype). A Host. B Appearance of ascomata on substrate. C Cross section of ascoma. D, E Vertical section of ascomata. F Peridium. G–I Asci. J Paraphyses. K Ascus short ocular chamber (stained in Melzer reagent). L–O Ascospores. Scale bars: B–F = 200 µm, G–K = 20 µm, L–O = 10 µm.

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

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

Hypocreales Lindau, Die Natürlichen Pflanzenfamilien nebst ihren Gattungen und wichtigeren Arten 1 (1): 343 (1897)

Stachybotryaceae L. Lombard & Crous, Persoonia 32: 283 (2014)

Memnoniella Höhn., Zentralbl. Bakteriologie. 2. Abt. 60 (1/6): 16 (1923)

Notes – *Memnoniella* with *M. eChinata* as the type species, consists of saprobic microfungi commonly found in both outdoor and indoor environments (Wang et al. 2015). Species of *Memnoniella* are characterized by macronematous, unbranched conidiophores, phialidic conidiogenous cells with conspicuous collarettes, and unicellular, aseptate, smooth to verrucose conidia, which are typically arranged in dry chains. *Memnoniella* was initially separated from *Stachybotrys* based on conidial disposition, dry chains in *Memnoniella* and slimy masses in *Stachybotrys* (Bisby 1945, Ellis 1971, Jong and Davis 1976). However, Smith (1962) argued that conidial differences were insufficient to justify the separation of *Memnoniella* and *Stachybotrys*, and thus synonymized the former with the latter.

This view was supported by Wang et al. (2015), who synonymized *Memnoniella* with *Stachybotrys* based on morphology and phylogenetic evidence. Later, Lombard et al. (2016) resurrected *Memnoniella* as a distinct genus following multi-locus phylogenetic analyses (*cmdA*, ITS, *rpb2*, *tef-1α*, *tub2*) that grouped its species in a clade separate from *Stachybotrys*. As of April 20, 2025, Species Fungorum lists 21 species under this genus (www.speciesfungorum.org). In this study, we describe a new species, *Memnoniella chrysanthemi*, found on the dead stem of wild *Chrysanthemum indicum*.

Memnoniella chrysanthemi Q.F. Zhang, K. Habib & Q.R. Li sp. nov.

(Fig. 17)

MycoBank No: MB857188

Etymology – The species epithet refers to the host *Chrysanthemum indicum*.

Description – **Sexual morph:** Undetermined. **Asexual morph:** Hyphomycetous. *Conidiophores* macronematous, mononematous, 130–175 µm long, 10–18 µm wide at the base ($\bar{x}$ = 148.2 × 13.1 µm, n = 30), tapering to 3.8–7.5 µm near the apex, bearing 2–5 conidiogenous cells, erect, simple, shiny, straight or flexuous, unbranched, smooth, thick-walled, septate, bearing at its apex a crown of phialides (3–6) stipe hyaline, dark brown to blackish at the apex. *Conidiogenous cells* phialidic, discrete to contiguous, determinate, clustered at the apex of conidiophores, clavate to subcylindrical, smooth, hyaline, 11–17.5 × 4.2–8.5 µm. *Conidia* aggregated, unicellular, black and glistening heads, acrogenous, simple, globose, tuberculate, dark brown to blackish, 12–18 µm diam. ($\bar{x}$ = 14.3 µm, n = 30).

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 stem of wild *Chrysanthemum indicum*, August 2023, Qinfang Zhang, 2023JWS30 (GMB6205 holotype); *ibid.*, KUN-HKAS 145747 isotype.

Additional specimen examined – China, Guangxi Zhuang Autonomous Region, Liuzhou City, Jiuwanshan National Nature Reserve, 25°12'25" N, 108°40'32" E, altitude: 1,320 m, on stem of *Chrysanthemum indicum*, August 2023, Qinfang Zhang, Lu Changtao, 2023JWS115 (GMB6206).

Notes – In the ITS sequence BLASTn analysis, *Memnoniella chrysanthemi* showed a high similarity of 97.2% to *M. pseudonilagirica* (CBS 136405, ex-type). Morphologically, *M. chrysanthemi* closely resembles *M. nilagirica* and *M. pseudonilagirica*. Phylogenetic analysis (Fig. 16) based on ITS, LSU, *rpb2*, *tef-1α* and *tub2* sequences dataset further supports its close relationship with *M. nilagirica* and *M. pseudonilagirica*.

However, it differs from *M. pseudonilagirica* in its host and substrate. *Memnoniella chrysanthemi* was found growing on the stem of *Chrysanthemum indicum*, whereas *M. pseudonilagirica* has been reported on dead leaves of *Ceiba pentandra*. In addition, *M. pseudonilagirica* has larger conidiophores (150–300 × 9–15 µm) compared to *M. chrysanthemi*.

(130–175 μm long, 10–18 μm wide), larger and wider conidiogenous cells (13–20 $\times$ 6–11 μm vs. 11–17.5 $\times$ 4.2–8.5 μm), and larger conidia (14–23 $\times$ 12–22 μm , $\bar{x}$ = 20 $\times$ 19 μm , vs. 12–18 μm , $\bar{x}$ = 14.3 μm in diameter) (Lombard et al. 2016).

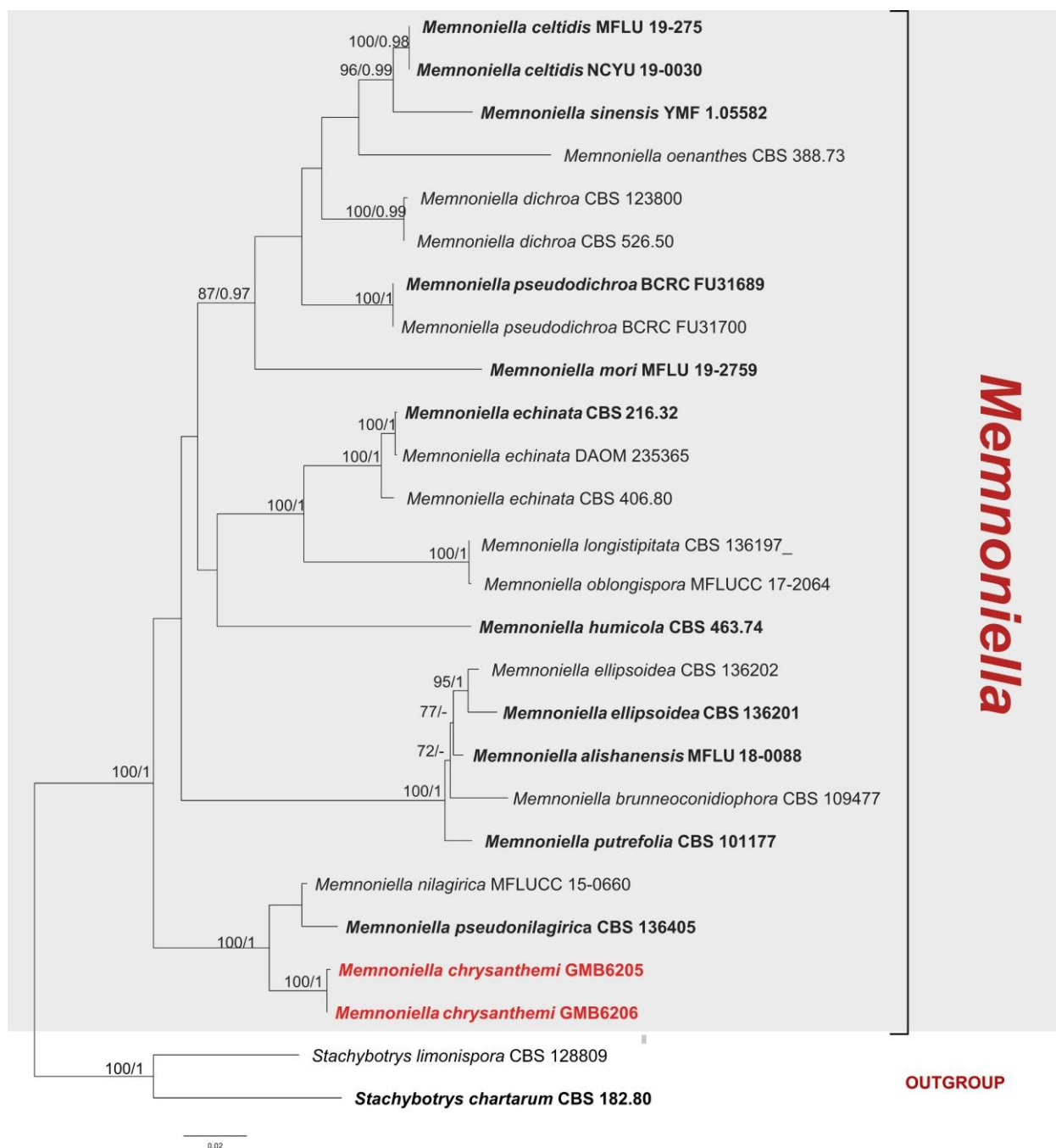


Figure 16 – RAxML tree based on a combined ITS, LSU, *rpb2*, *tefl- α* and *tub2* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -10041.988552. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in red in bold. Ex-type/type strains are indicated in black bold.

Memnoniella nilagirica differs in having longer and branched conidiophores (185–350 μm long, 9–22 μm wide vs. 130–175 μm long, 10–18 μm wide), larger and wider conidiogenous cells (13–20 $\times$ 3.5–11.5 μm vs. 11–17.5 $\times$ 4.2–8.5 μm), and larger conidia (18–23.2 μm , $\bar{x}$ = 20.6 μm vs. 12–18 μm , $\bar{x}$ = 14.3 μm) (Subramanian 1957, Wang et al. 2015, Lin et al. 2016).

Memnoniella chrysanthemi showed close similarity to *Stachybotrys levisporus* in the *tef-1a* BLASTn analysis, which has also globose conidia, however *S. levisporus* can be easily distinguished by its much shorter conidiophores (37–81 µm long vs. 130–175 µm long), smaller conidiogenous cells (6–8 × 3–5 µm vs. 11–17.5 × 4.2–8.5 µm), and smaller, smooth conidia (4–6 × 4–6 µm vs. 12–18 µm) (Wang et al. 2015).

Several other species within *Stachybotrys* produce globose conidia. However, *M. chrysanthemi* is distinguished by its larger, tuberculate conidia (12–18 µm diam.), which are significantly larger than those of *S. stilboideus* (4–5.5 µm, also developing synnemata) (Ellis 1976), *S. crassa* (16–18 µm, on horse dung) (Wang et al. 2015), *S. globosa* (4.5–8 µm) (Misra and Srivastava 1982), *S. jiangxiensis* (6–9 µm) (Wu and Zhang 2010), *S. mexicanus* (9–12.5 µm, colorless) (Wang et al. 2015), *S. microspora* (5–6 µm) (Jong and Davis 1976), *S. ruwenzoriensis* (6–8 µm) (Matsushima 1985), *S. sphaerospora* (11–12 µm) (Morgan-Jones and Sinclair 1980), and *S. subreniformis* (6–9.5 × 4.5–7.5 µm) (Li and Jiang 2011). Based on these differences and phylogeny, we introduce our collection as a new species of *Memnoniella*.

During the revision of this article, five new species of *Memnoniella* were published, *M. Chiangmaiensis* (conidia reniform to oval, 9–11.5 × 4.5–7 µm), *M. cnidiicola* (ellipsoidal, 9–14 × 5–8 µm), *M. guttulatispora* (ellipsoidal, 9–13 × 5–7 µm), *M. reniformis* (reniform or comma-shaped, 9.5–12 × 5–6 µm), and *M. reynoutriae* (ellipsoidal, 12–16 × 6.5–9 µm) (Du et al. 2025, Sun et al. 2025). However, none of these five produce globose conidia, unlike *M. chrysanthemi* (conidia globose, 12–18 µm in diam.), so they can be readily distinguished by conidial morphology and size.

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

Chaetosphaeriales Huhndorf et al. Mycological Research 108 (12): 378 (2004)

Linocarpaceae Konta & K.D. Hyde, Mycosphere 8 (10): 1962 (2017)

Neolinocarpon K.D. Hyde, Botanical Journal of the Linnean Society 110: 104 (1992)

Notes – The genus was established by Hyde (1992a) to accommodate linocarpon-like species, with *N. globosicarpum* as the type species. Species of the genus are characterized by deeply immersed, oval to globose ascomata formed beneath a slightly raised or flattened clypeus, shiny central papilla, 8-spored, unitunicate asci with a reflective apical ring, and filiform, fasciculate ascospores containing refringent bands, with or without appendages (Hyde 1992b, Hyde et al. 1998, Vitoria et al. 2013, Konta et al. 2017). Most *Neolinocarpon* species are associated with Arecaceae, with the exception of *N. penniseti* and *N. phayaoense*, which occur on hosts from Poaceae and Euphorbiaceae, respectively (Hyde 1992b, Hyde et al. 1998, Hyde and Alias 1999, Bhilabutra et al. 2006, Vitoria et al. 2013, Senwanna et al. 2018). As of 20th April 2025, Species Fungorum lists 13 species under this genus (www.speciesfungorum.org). In this study, we describe a new species, *Neolinocarpon huaxiense*, found on dead bamboo culms, and provide an updated key to the genus.

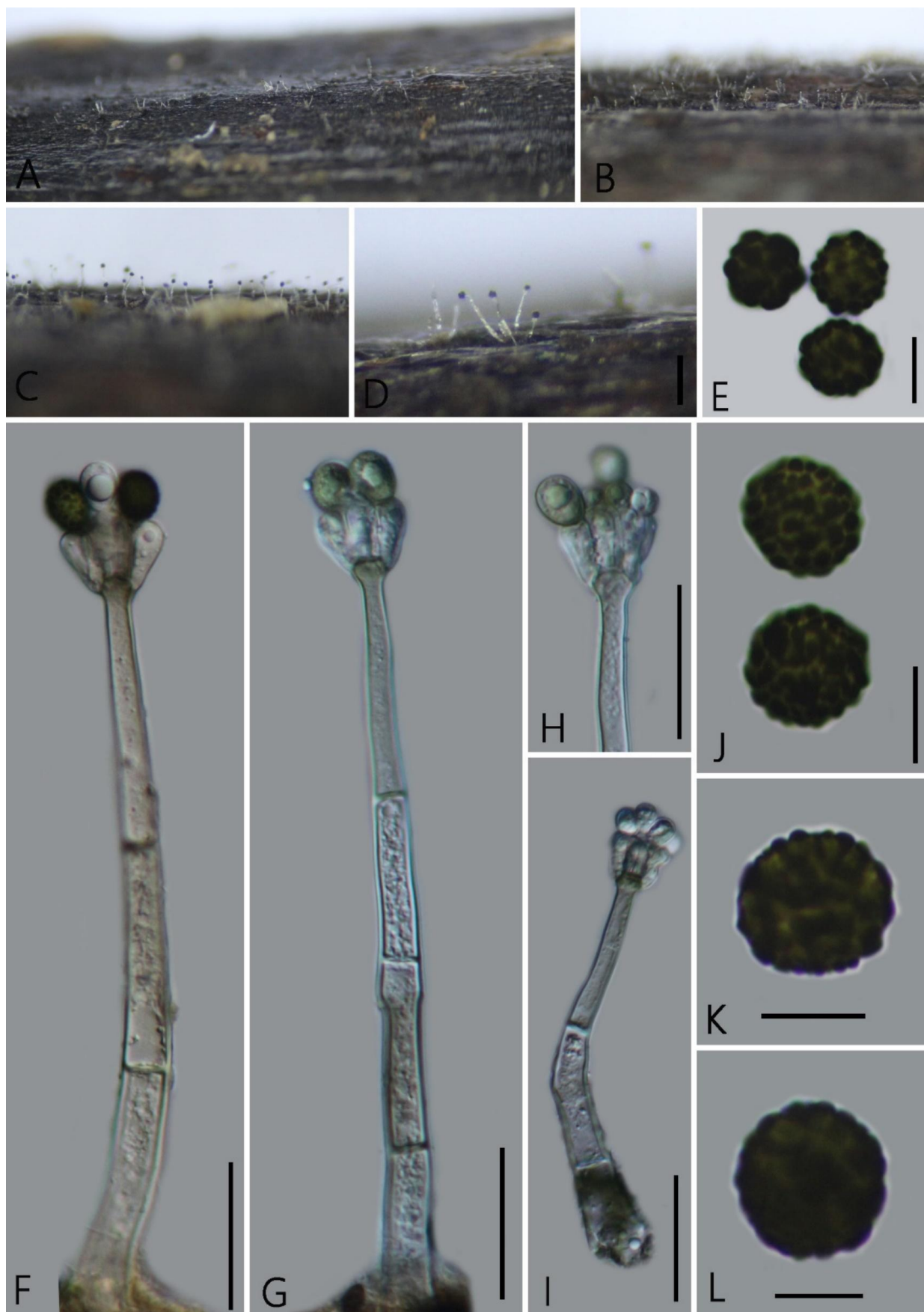


Figure 17 – *Memnoniella chrysanthemi* (GMB6205, holotype). A. Host stem. B–D. Conidiophores on the host surface. F–I Conidiophores and Conidiogenous cells. E, J–L. Conidia. Scale bars: D = 200 μ m, F–I = 30 μ m, E, J–L = 15 μ m.

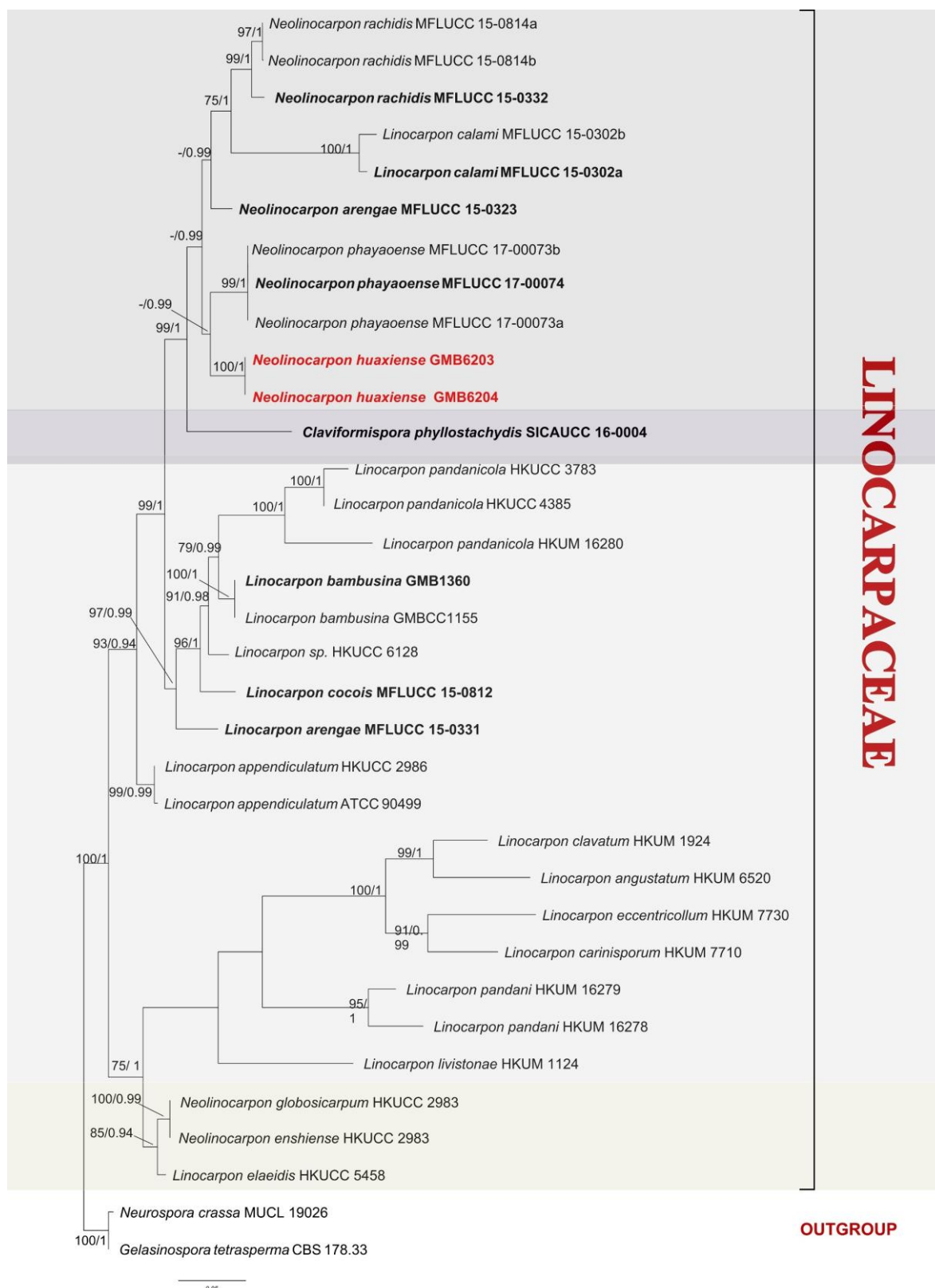


Figure 18 – RAxML tree based on a combined ITS, LSU, *rpb2* and *tef1-α* sequences dataset. The final likelihood value is -11848.525265. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in red in bold. Ex-type/type strains are indicated in black bold.

Neolinocarpon huaxiense K. Habib, Y.L. Ren & Q.R. Li, sp. nov.

(Fig. 19)

MycoBank No: MB857189

Etymology – The specific epithet is derived from Huaxi district, where the holotype was collected.

Description – Saprobiic on dead culms of bamboo. **Sexual morph:** *Ascomata* 570–815 × 380–500 µm ($\bar{x}$ = 700.5 × 450.7 µm, n = 15), immersed in the substrate, perithecial, solitary, superficial, globose to subglobose, black, ostiole visible as black dot, slightly raised, lacking clypeus. *Ostioles* papillate, central, black. *Peridium* 45–53 µm ($\bar{x}$ = 47.3 µm, n = 10), outer cells merging with the host epidermal cells, composed of dark brown to black cells of *textura angularis*. *Hamathecium* 2–5.2 µm wide ($\bar{x}$ = 3.5), numerous, hyaline, hypha-like, long-cylindrical, unbranched, septate, longer than asci. *Asci* 115–130 × 10.5–14.3 µm ($\bar{x}$ = 124 × 12.2 µm, n = 30), 8-spored, unitunicate, cylindrical, short-pedicellate, with a J-, wedge-shaped, subapical ring. *Ascospores* 86–98 × 2–3 µm ($\bar{x}$ = 92.3 × 2.5 µm, n = 30), filiform, straight or curved, hyaline, aseptate, containing numerous refringent septum-like bands up to 50, ends rounded, lack polar mucilaginous appendage, smooth-walled. **Asexual morph:** Undetermined.

Culture characteristics – Ascospores germinating on MEA within 2 days. Colonies on MEA reaching 60 mm diameter after 7 weeks, colonies circular, dense, edges entire, velvety, from above white, below white yellowish to light brown.

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, June 2023, Yulin Ren, 2023SLHT22 (GMB6203 holotype; GMBC6203 ex-type); *ibid.*, KUN-HKAS 145748 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, July 2023, Yulin Ren, SLHT08 (GMB6204).

Notes – BLASTn analysis of the partial 28S rRNA sequence, *Neolinocarpon huaxiense* shows 94.05% similarity to *N. phayaoense* (MFLUCC 17-00073a). However, in the ITS BLAST search, it showed 84% similarity to *N. arengae* (MFLUCC 15-0812), as ITS sequences for *N. phayaoense* are not available in GenBank. Phylogenetic analysis (Fig. 18) based on ITS, LSU, *rpb2*, and *tef-1a* sequences revealed *N. huaxiense* as closely related to *N. phayaoense*, forming a sister species relationship.

Morphologically, *N. huaxiense* resembles *N. phayaoense* in having immersed ascomata with an ostiole, filiform ascospores, and lacking mucilaginous appendages on the ascospores. However, *N. phayaoense* can be distinguished from *N. huaxiense* by its host *Hevea brasiliensis* in Euphorbiaceae (vs. bamboo), smaller ascomata with 1–3 locules (250–550 µm in diameter, 120–300 µm high vs. 570–815 µm wide, 380–500 µm high), longer asci (108–180 µm, $\bar{x}$ = 143 µm vs. 115–130 µm, $\bar{x}$ = 124 µm), and slight smaller and wider ascospores (77–92 × 2–5 µm, $\bar{x}$ = 85 × 4 µm vs. 86–98 × 2–3 µm, $\bar{x}$ = 92.3 × 2.5 µm) (Senwanna et al. 2018).

In terms of ascospore size, *Neolinocarpon huaxiense* is similar to *N. eutypoides* [73–95 (106) × 1.5–2.5 µm] and *N. inconspicuum* (76–98 × 2–3 µm). *Neolinocarpon eutypoides* differs by having smaller ascomata (204–312 µm in diameter), narrower asci (108–138 × 6–8.5 µm), and ascospores with mucilaginous appendages, reported across a broad range of hosts within Arecaceae. *Neolinocarpon inconspicuum* can be distinguished by its host *Archontophoenix alexandrae*, smaller ascomata (200–255 µm in diameter, 365–410 µm high), and longer asci (106–156 × 7.5–12 µm) (Hyde et al. 1998, Konta et al. 2017).

Key to *Neolinocarpon* species

- 1a. Ascospores lack mucilaginous appendage..... 2
- 1b. Ascospores with mucilaginous appendage 3
- 2a. On dead leaflet of *Arenga pinnata*, asci 168–214 × 15–21 µm, ascospores 114–134 × 3–4 µm
..... *N. arengae*
- 2b. On dead rattan of Arecaceae spp, asci 125–164 × 11–15 µm, ascospores 81–126 × 2.5–3.5 µm
..... *N. australiense*

2c. On decaying intertidal fronds of <i>Nypa fruticans</i> , asci 136–170 × 11–12 µm, ascospores 70–119.3 × 2.0–2.8 µm.....	<i>N. globosicarpum</i>
2d. On dead rachis of <i>Arenga pinnata</i> , asci 157–205 × 9–19 µm, ascospores 123–140 × 2–4 µm	<i>N. rachidis</i>
3a. Ascospores <100 µm long	4
3b. Ascospores >100 µm long	5
4a. Asci 115–138 × 10.5–13 µm, ascospores 68–85 × 2.5–3.5 µm,.....	<i>N. calami</i>
4b. Asci 74–108 × 8–13 µm, ascospores 42–64 × 2–3.5 µm	<i>N. enshiense</i>
4c. Asci 108–138 × 6–8.5 µm, ascospores 73–95 (106) × 1.5–2.5 µm	<i>N. eutypoides</i>
5a. Ascospores <3 µm wide.....	6
5b. Ascospores >3 µm wide	7
5c. On dead stem of <i>Pennisetum purpureum</i> (Poaceae).....	<i>N. penniseti</i>
6a. On dead rachis, ascomata 200–255 µm diam., asci 106–156 µm long, ascospores 76–98 × 2–3 µm.....	<i>N. inconspicuum</i>
6b. On dead petiole, ascospores 114–138 × 2–2.5 µm	<i>N. nonappendiculatum</i>
6c. On dead culm of bamboo, ascomata 570–815 µm diam., asci 115–130 µm long, ascospores 86–98 × 2–3 µm.....	<i>N. huaxiense</i>
7a. On branch of <i>Hevea brasiliensis</i> (Euphorbiaceae), ascospores 77–92 × 2–5 µm.....	<i>N. phayaoense</i>
7b. On Arecaceae spp.	8
8a. Asci 137.5–227.5 × 7.5–14 µm, ascospores 52.5–105 × 3–5 µm	<i>N. attaleae</i>
8b. Asci 100–164 × 8–10 µm, ascospores 92–117 × 2–3.8 µm	<i>N. nypicola</i>

Xylariomycetidae O.E. Erikss. & Winka, Myconet 1: 12 (1997)

Amphisphaeriales D. Hawksw. & O.E. Erikss., Systema Ascomycetum 5: 177 (1986)

Apiosporaceae K.D. Hyde, et al. Sydowia 50(1): 23 (1998)

Apiospora Sacc., Conspectus generum pyrenomycetum italicorum systemate carpologico dispositum: 9 (1875)

Notes – *Apiospora* is a cosmopolitan genus established by Saccardo (1875), with *Apiospora montagnei* as the type species. It is recognized for its ecological diversity and global distribution across tropical, subtropical, Mediterranean, temperate, and cold regions (Pintos et al. 2019, Pintos and Alvarado 2021). The genus is commonly reported from various substrates, including plants, soil, air, and marine environments (Pintos and Alvarado 2021, Liao et al. 2023). *Apiospora* species are characterized as saprobes and endophytes, particularly on hosts within Poaceae. Morphologically, the genus is characterized by basauxic conidiophores producing globose to obovoid conidia, rounded in face view, lenticular inside view, and marked by a longitudinal germ slit (Dai et al. 2016, Feng et al. 2021, Pintos and Alvarado 2021, Liao et al. 2023). The sexual morph is characterized by multi-locular perithecial stromata, clavate to broadly cylindrical asci, and hyaline ascospores with gelatinous sheath (Dai et al. 2016, Dai et al. 2017, Pintos and Alvarado 2021). According to Species Fungorum (accessed April 20, 2025), *Apiospora* currently comprises 130 recognized epithets (www.speciesfungorum.org).

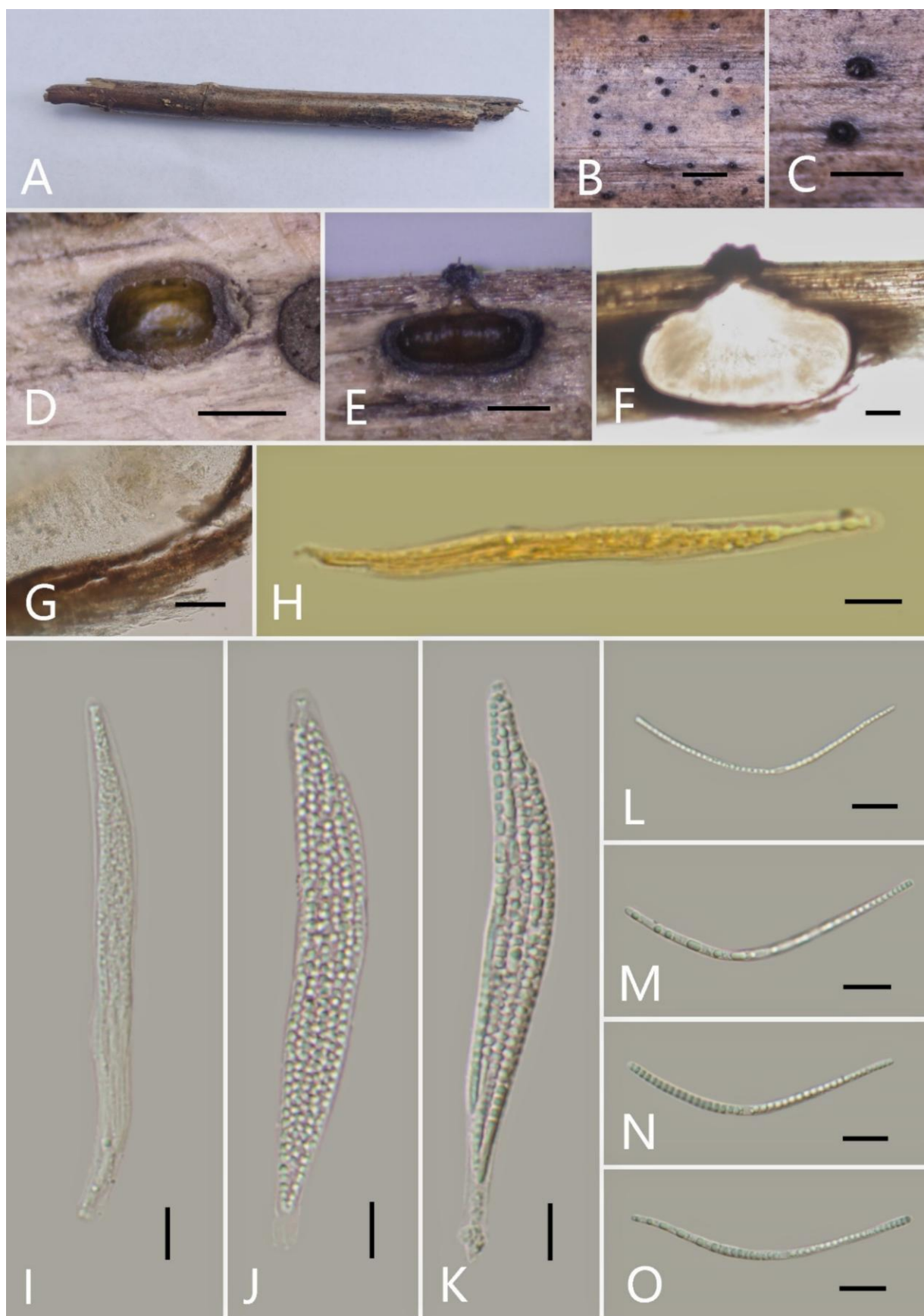
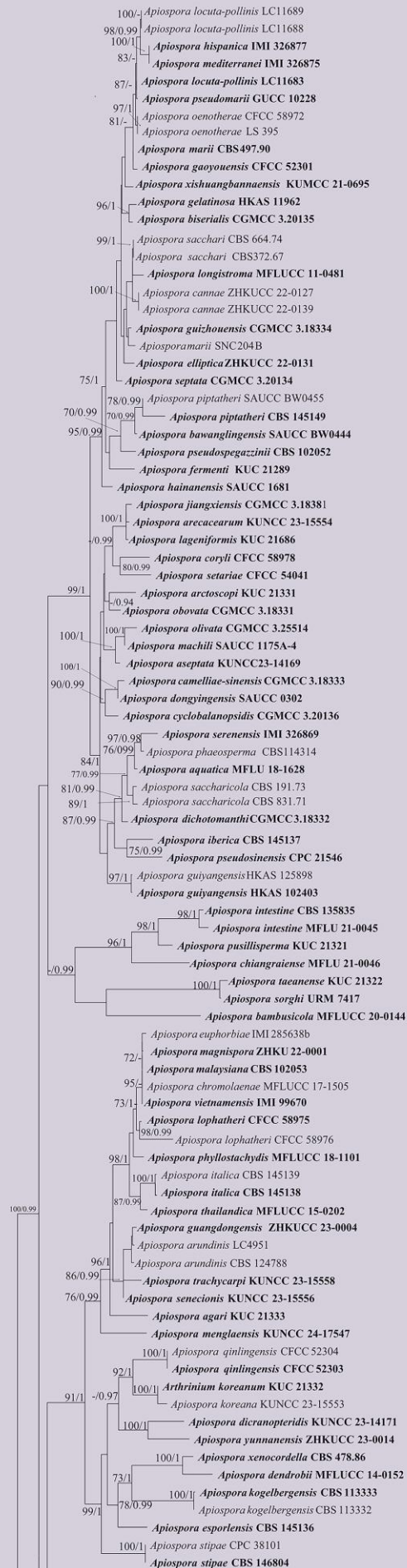


Figure 19 – *Neolinocarpon huaxiense* (GMB6203, holotype). A bamboo host. B, C Close up of ascomata. D Cross section of ascoma. E, F Vertical sections of ascomata. G Peridium. H Asci in Melzer reagent with a J- apical ring. I–K Asci in distilled water. L–O Ascospores. Scale bars: B = 1 mm, C–E = 0.5 mm, F = 100 μm, G = 50 μm, H–O = 10 μm.



Apiospora

Cont...

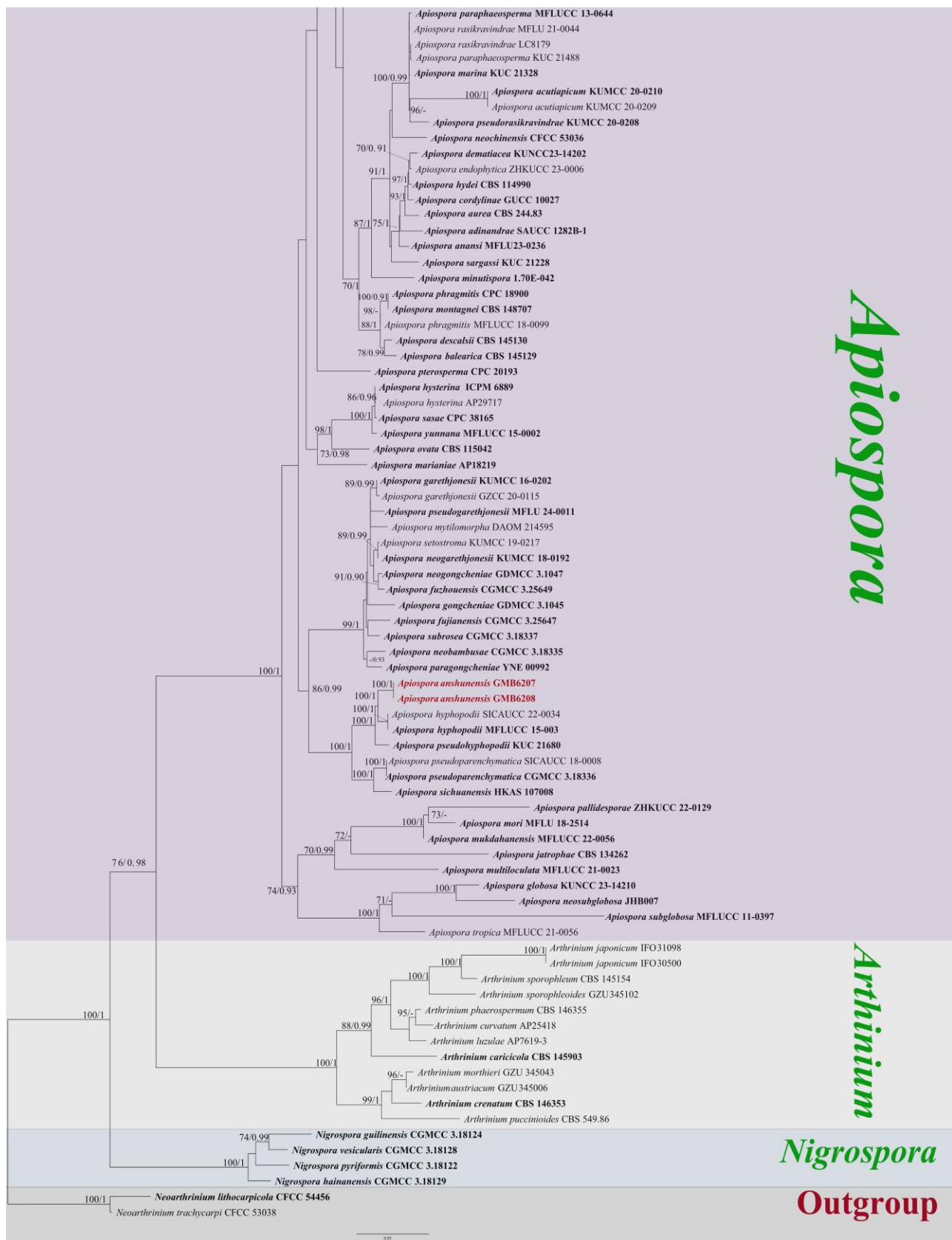


Figure 20 – RAxML tree based on a combined ITS, LSU, *tef1-α* and *tub2* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -26527.082545. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in red in bold. Ex-type/type strains are indicated in black bold.

Apiospora anshunensis K. Habib, W.H. Li & Q.R. Li sp. nov.

(Fig. 21)

MycoBank No: MB857190

Etymology – The specific epithet is derived from Anshun City, where the holotype was collected.

Description – Saprobiic on dead culms of bamboo. **Asexual morph.** *Mycelium* branched, septate, brown. *Conidiomata* 0.8–1.8 × 0.3–0.6 mm (n = 50), resembling linear stromata, pycnidial, on host parallel, longitudinal axis of the stem, surrounded by a black circle, separate to confluent, subepidermal, opening after the dehiscence of the host epidermis with a slit-like opening, inside filled with minute beads like black conidial mass, delimited by brown to black pycnidial wall, 15–30 µm wide, composed of reddish-brown to dark brown pseudoparenchymatous cells of *textura angularis*. *Conidiophore mother cells* 4–14 × 3–6 µm (n = 15), arising from the pale brown to hyaline pseudoparenchymatous tissue, lageniform to ampuliform, hyaline, producing a single conidiophore, *Conidiophores* cylindrical, straight or flexuous, arising from conidiophore mother cells, hyaline to mid brown, smooth, septate, rarely with granular pigments, 2–4 µm wide. *Conidia* 20–32 µm diam. ($\bar{x}$ = 27.3 µm, n = 50), globose to subglobose, ovate, subcylindrical or irregular polygonal, thick-walled, smooth, brown to dark brown, without a gelatinous sheath or appendages.

Material examined – China, Guizhou Province, Anshun City, Pingba District, Gaofeng Town, 106°24'23.23" E, 26°17'34.47" N, altitude: 1,261 m, on dead culm of bamboo, August 2024, W.H. Li & Q.R. Li, R20 (GMB6207, holotype); *ibid.*, KUN-HKAS 145749 isotype.

Additional specimen – China, Yunnan Province, Jinghong City, Xishuangbanna Nature Reserve, 100°33'56.14" E, 22°11'07.20" N, altitude: 1,106 m, on dead bamboo, August 2024, W.H. Li & Q.R. Li, R54 (GMB6208).

Notes – BLASTn analyses of the ITS and LSU regions of *Apiospora anshunensis* showed the highest similarity with *A. pseudohyphopodii*. Both species are associated with bamboo as their host. *Apiospora pseudohyphopodii* can be distinguished by its sporodochial fruiting bodies and its larger, obovoid to clavate conidia (25–44 × 12–22 µm vs. 20–32 µm diam.) (Kwon et al. 2022).

In the phylogram (Fig. 20), based on the ITS, LSU, *tefl-α*, and *tub2* sequences dataset, *Apiospora anshunensis* forms a well-supported clade in a sister relationship with *A. hyphopodia*. *Apiospora hyphopodia* can be differentiated from *A. anshunensis* by its much smaller conidia (5–10 × 4–8 µm $\bar{x}$ = 6.5 × 5.6 µm) (Kwon et al. 2022), compared to the larger conidia of *A. anshunensis* (20–32 µm diam., $\bar{x}$ = 27.3 µm).

Morphologically, *Apiospora anshunensis* is similar to *A. sichuanensis*, as both species produce parallel conidiomata. However, *A. sichuanensis* differs from *A. anshunensis* in having smaller conidiomata (400–1000 × 275–600 µm) and thinner conidia (10–35 × 5–14 µm). Additionally, *A. sichuanensis* lacks the black ring surrounding the pycnidia that is present in *A. anshunensis* (Pintos and Alvarado 2021). Another similar species, *A. pseudoparenchymatica*, produces globose to subglobose conidia but differs in having sporodochial fruiting bodies and smaller conidia (13.5–27.0 × 12.0–23.5 µm) (Pintos and Alvarado 2021). Based on these morphological differences and phylogeny, we introduce our collection as a new species.

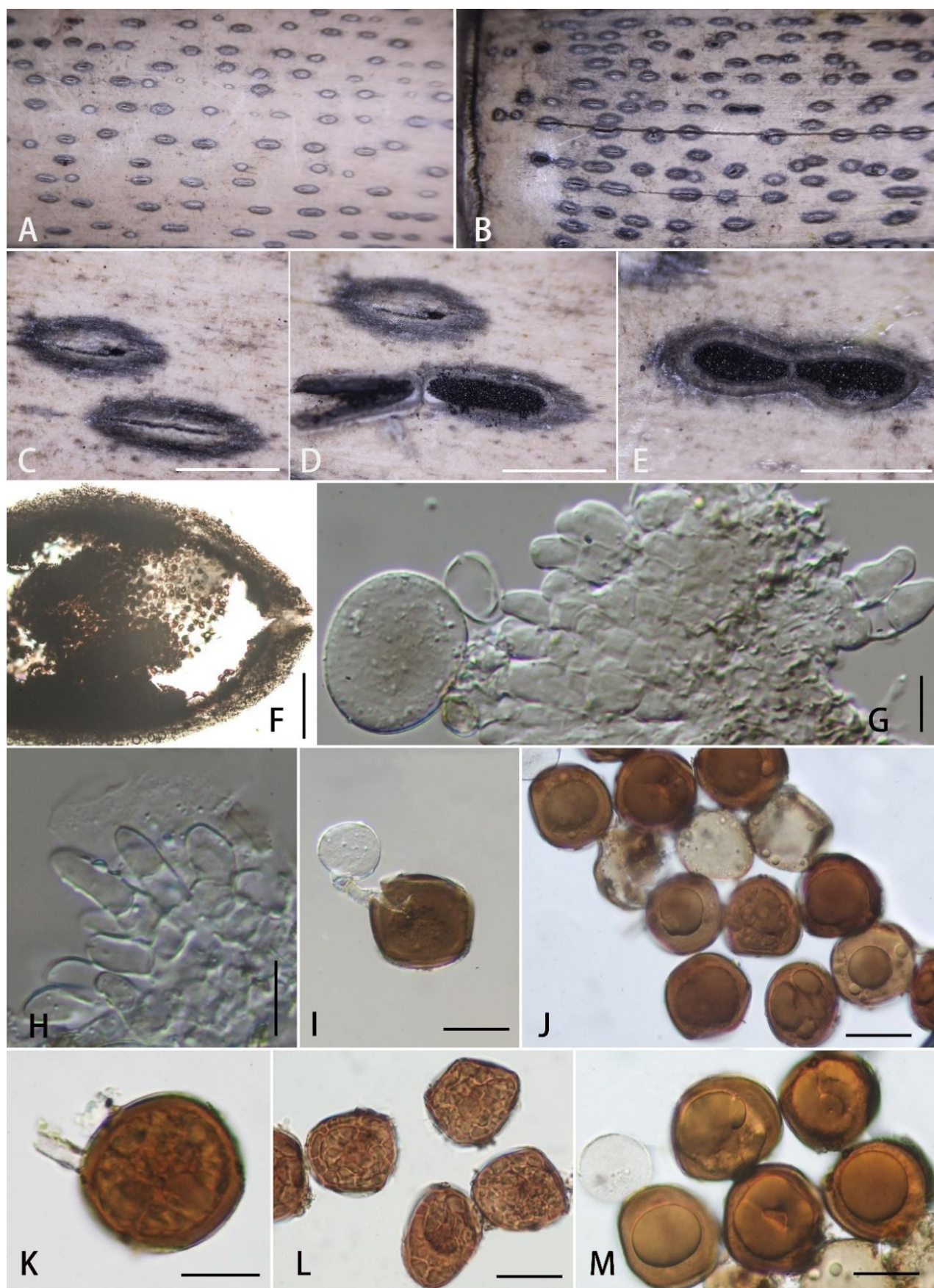
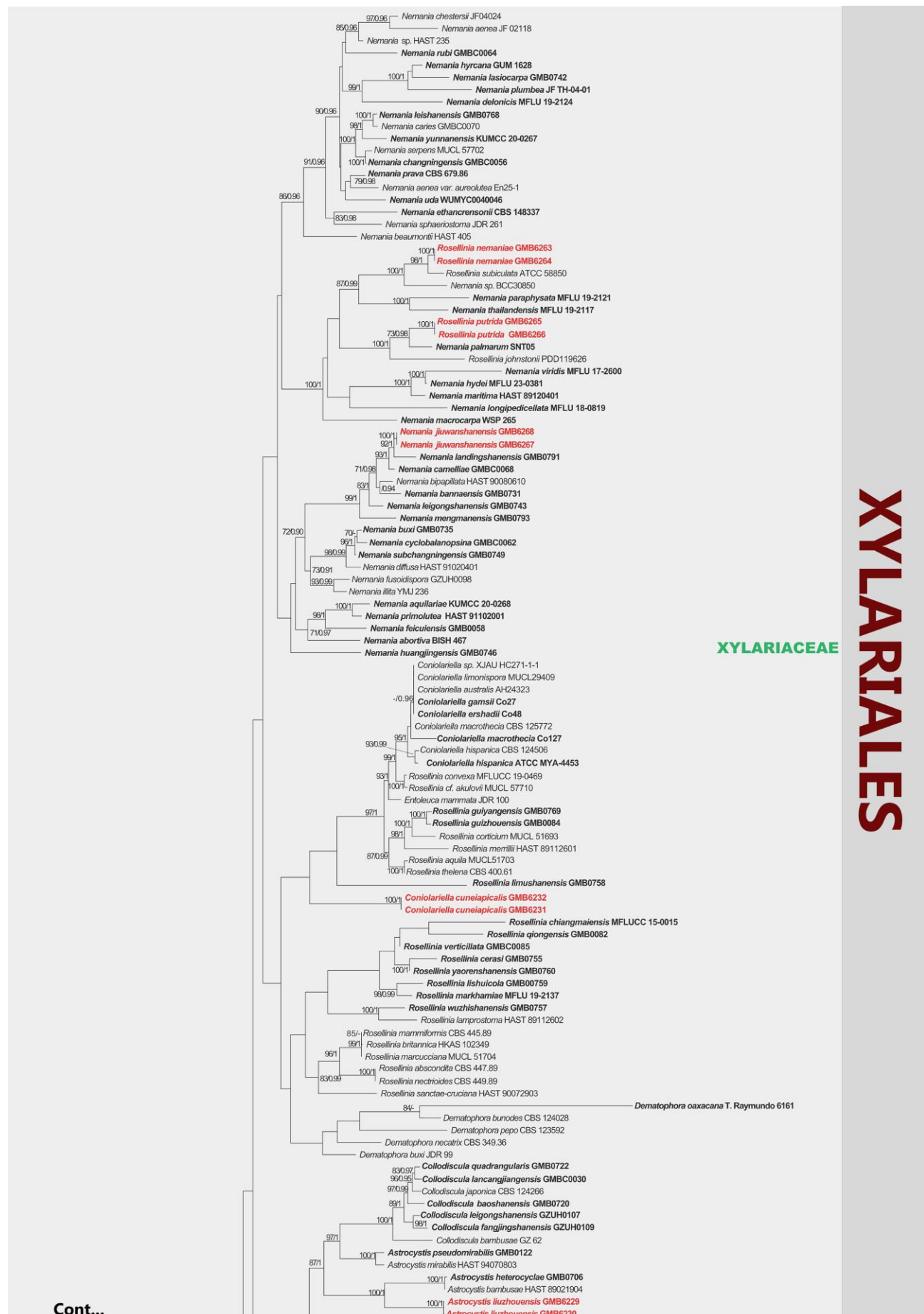
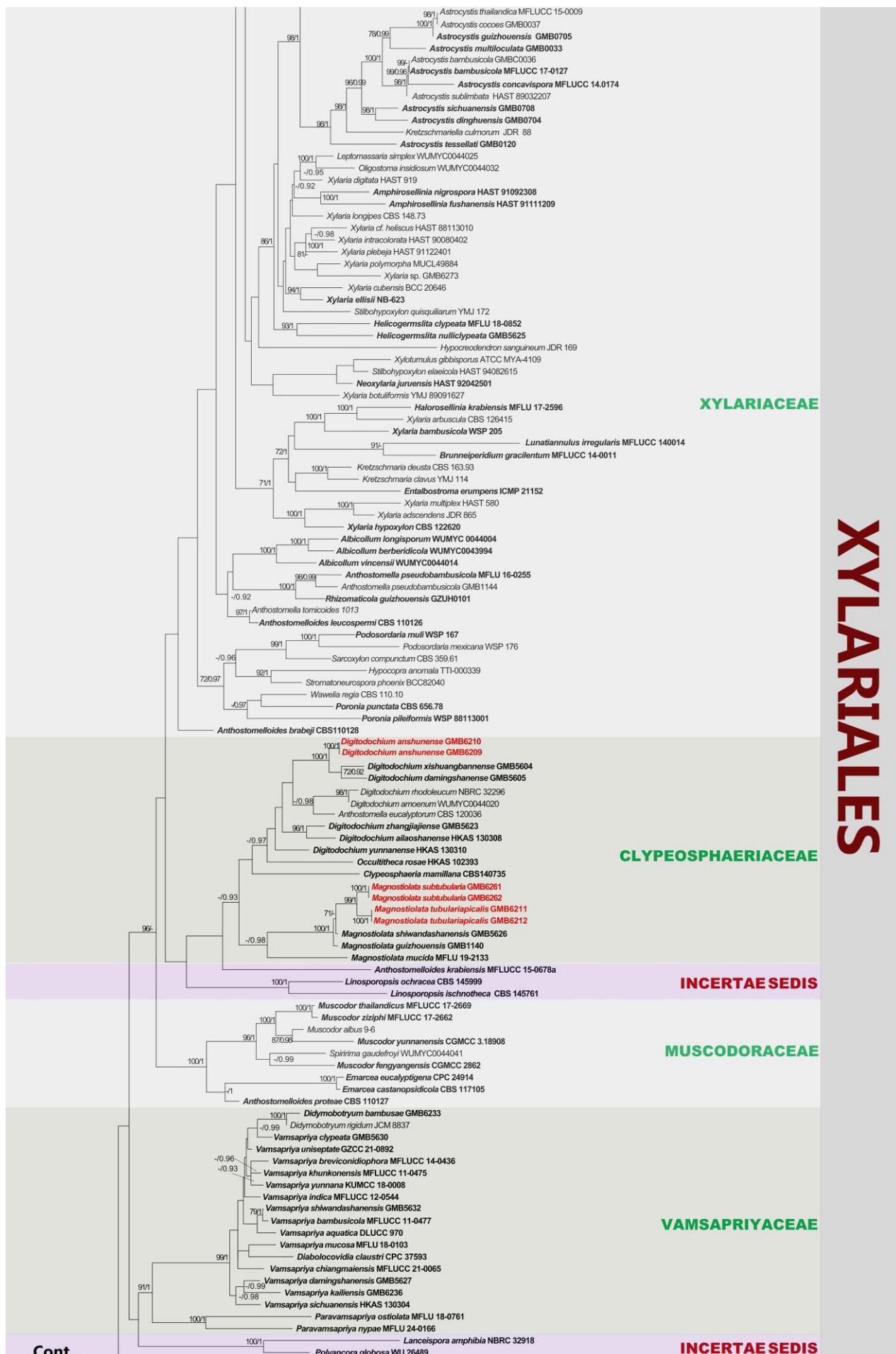
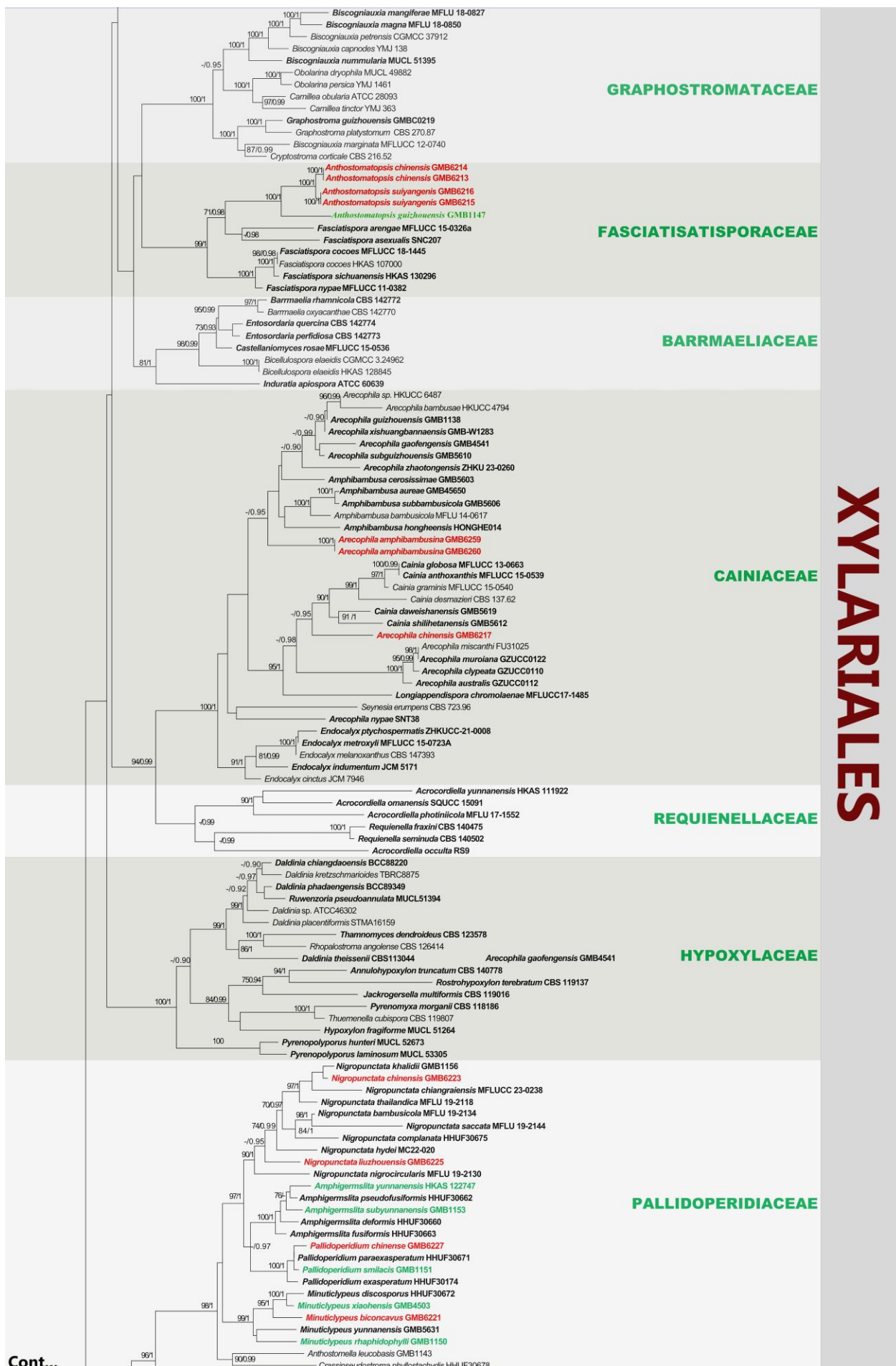


Figure 21 – *Apiospora anshunensis* (GMB6207, holotype). A–C Conidiomata. D–F Cross section of Conidiomata (inside filled with black conidial mass). G, H Conidiophore mother cells. I–M Conidia. Scale bars: C–E = 1 mm, F = 200 µm, G, H = 10 µm, I–M = 20 µm.







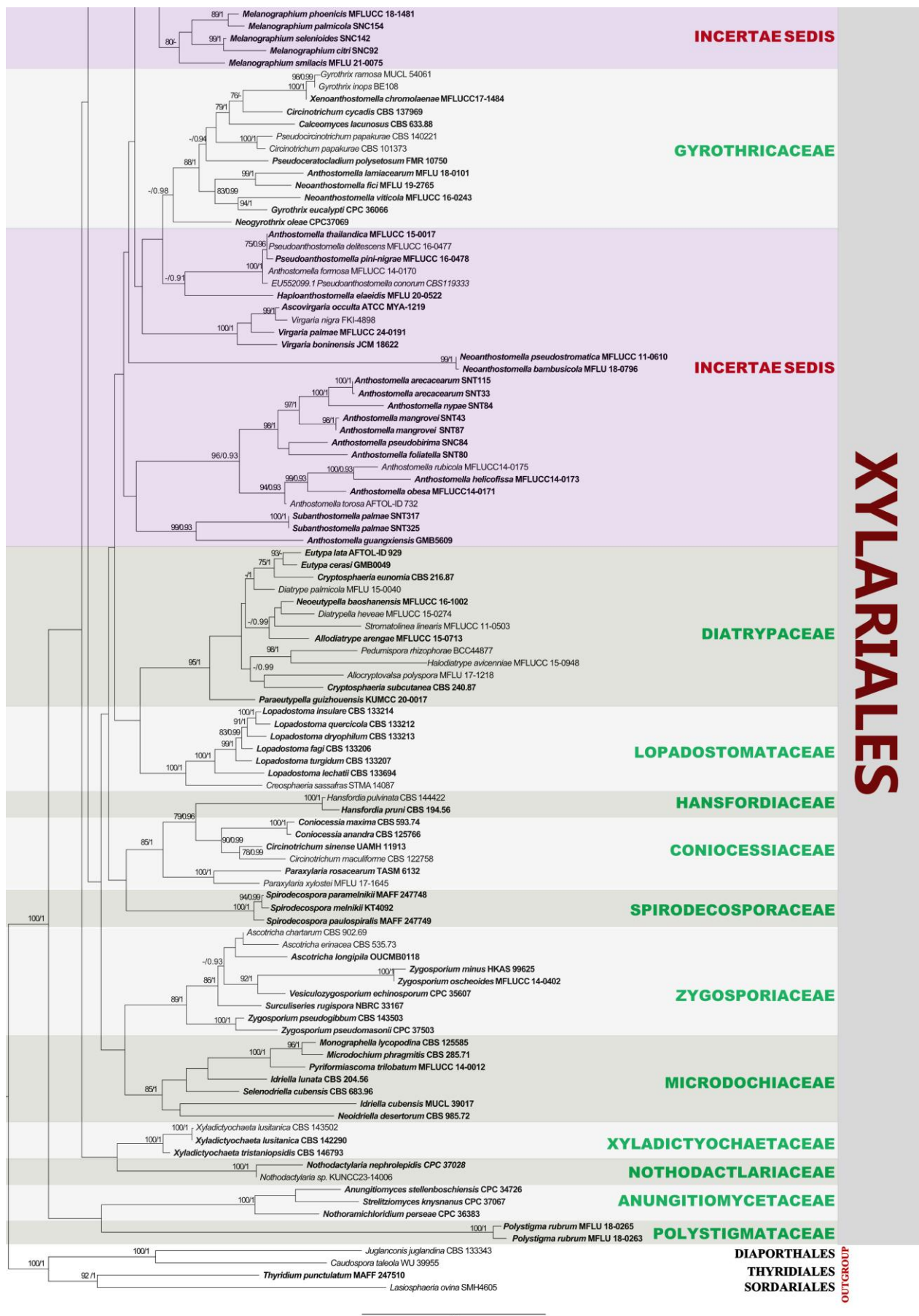


Figure 22 – Phylogram generated from maximum likelihood analysis based on combined ITS, LSU, *rpb2* and *tub2* sequences dataset. The best-scoring ML tree had an optimization likelihood

value of -128078.019408. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in bold red, and the new combinations are marked in bold green. Ex-type/type strains are indicated in black bold.

Cainiaceae J.C. Krug, Sydowia 30: 123 (1978)

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

Notes – *Arecophila*, typified by *A. gulubiicola*, was introduced by Hyde (1996) and is characterized by immersed, subglobose to lenticular ascomata, a poorly developed or absent clypeus, and asci with a wedge-shaped apical ring that J+ in Melzer reagent and 2-celled, brown ascospores with wall striations and are surrounded by a mucilaginous sheath (Hyde 1996, Kang et al. 1999, Umali et al. 1999). Originally, *Arecophila* was placed in Amphisphaeriaceae (Hyde 1996) due to its unitunicate, cylindrical asci with a J+ apical ring and brown, 2-celled ascospores. Kang et al. (1999) later reviewed the genus and transferred it to *Cainiaceae*, and reported its occurrence on monocotyledons. Molecular analyses, including LSU and SSU loci sequences, grouped *Arecophila* with *Cainia* within Xylariales (Smith et al. 2003). The placement of *Arecophila* in *Cainiaceae* has since been corroborated by studies based on LSU and multi-locus phylogeny (Jeewon et al. 2003, Senanayake et al. 2015, Hyde et al. 2020, Wijayawardene et al. 2020). As of April 20, 2025, Species Fungorum lists 24 species in the genus. In this study, we describe two new species of *Arecophila* and provide a key to *Arecophila* species associated with bamboo and other hosts in China.

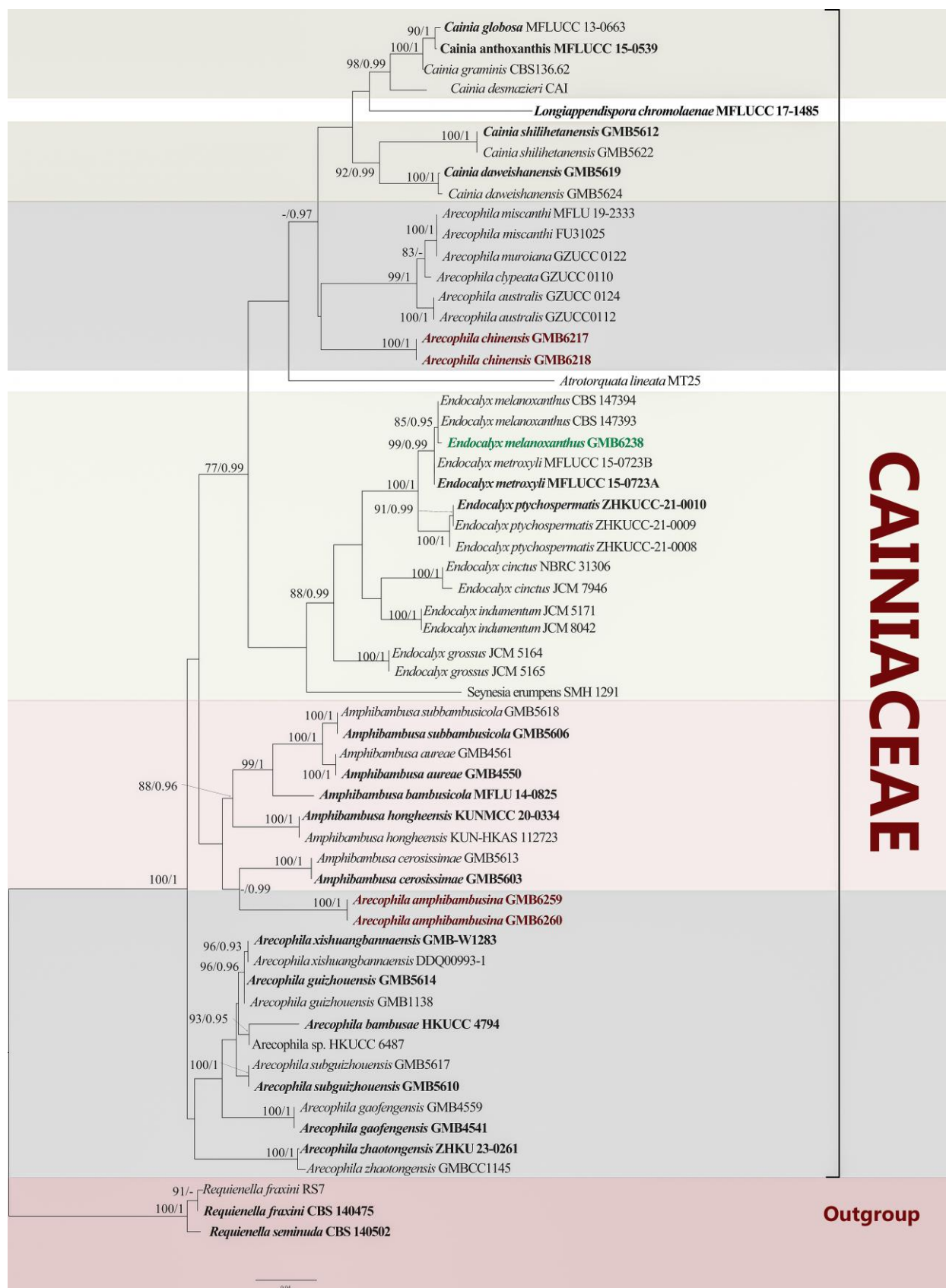


Figure 23 – RAxML tree based on a combined ITS and LSU sequences dataset. The best-scoring ML tree had an optimization likelihood value of -6662.199394. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in red in bold. Ex-type/type strains are indicated in black bold.

Arecophila amphibambusina K. Habib, Y.L. Ren & Q.R. Li sp. nov.

(Fig. 24)

MycoBank No: MB857304

Etymology – The epithet is based on its phylogenetic clustering in the *Amphibambusa* clade.

Description – Saprobic on dead culms of bamboo. **Sexual morph:** *Ascomata* 500–900 μm wide, 500–850 μm high ($\bar{x} = 790 \times 720 \mu\text{m}$, $n = 20$), immersed, solitary, scattered, globose to subglobose, black, lacking clypeus. *Ostioles* flush with surface or slightly papillate, central, black. *Peridium* 30–50 μm ($\bar{x} = 38.3 \mu\text{m}$) thick, comprised of two layers, thick-walled, dense, outer layer dark brown, inner hyaline, cells of *textura angularis*. *Paraphyses* 3–6 μm ($\bar{x} = 4.8 \mu\text{m}$, $n = 30$), hyaline, numerous, unbranched, septate. *Asci* 165–200 $\times$ 8.5–12 μm ($\bar{x} = 180.4 \times 10.4 \mu\text{m}$, $n = 30$), 8-spored, unitunicate, long-cylindrical, short-pedicellate, straight or slightly curved, apically rounded, with a trapezoidal, J+, apical ring, 3–4.6 wide $\times$ 1.5–3 μm high ($\bar{x} = 3.9 \times 2.2 \mu\text{m}$, $n = 30$), bluing in Melzer reagent. *Ascospores* 18–27.5 $\times$ 5.5–7.6 μm ($\bar{x} = 23.8 \times 6.4 \mu\text{m}$, $n = 30$), overlapping, uniseriate, brown to dark brown, hyaline when immature, fusiform, 1-septate at the center, slightly constricted at the septum, verrucose wall, tapering towards both ends, with longitudinal striation along the entire length of the ascospore, surrounded with a 4–10 μm thick mucilaginous sheath, thin toward the sides. **Asexual morph:** Undetermined.

Culture characteristics – Ascospores germinating on PDA within 24 h. Colonies reach 3 mm diam., in 3 weeks, circular, cottony, thin at edges, white from above, reverse whitish yellow.

Material examined – China, Guizhou Province, Anshun City, Xixiu District, Liuguan Township, Xiaohai Village, 26°16'1.02" N, 106°13'23.10" E, altitude: 1236 m, on dead culm of bamboo, August 2023, Xin Zhou, 2023XSBNZ9 (GMB6259 holotype; GMBC6259 ex-type); *ibid.*, KUN-HKAS 145727 isotype.

Additional specimen examined – China, Guizhou Province, Guiyang City, Xifeng County, Gaofeng Village 26°33'97.54" N, 106°34'93.13" E, altitude: 1148 m, on dead culm of bamboo, 10 July 2024, W.Y. Zeng, XGG20, (GMB6260, GMBC6259)

Notes – In the phylogram (Fig. 23), *Arecophila amphibambusina* clusters within the *Amphibambusa* clade. However, its morphological characteristics do not support its placement in *Amphibambusa*. Unlike *Amphibambusa*, which has hyaline ascospores with pointed ends, *Arecophila amphibambusina* is characterized by brown to dark brown ascospores with rounded ends, aligning with *Arecophila* (Liu et al. 2015). Moreover, phylogenetically, *Arecophila* is polyphyletic, as shown in Figs. 22 and 23, and corroborated by Li et al. (2022).

Morphologically, *Arecophila amphibambusina* resembles *A. zhaotongensis* but the latter differs in having larger asci (190–240 $\times$ 10.5–14 μm , $\bar{x} = 215 \times 11.6 \mu\text{m}$ vs. 165–200 $\times$ 8.5–12 μm , $\bar{x} = 180.4 \times 10.4 \mu\text{m}$) and larger ascospores (21–30 $\times$ 6–8 μm vs. 18–27.5 $\times$ 5.5–7.6 μm). Additionally, *A. zhaotongensis* possesses a well-developed clypeus, whereas no clypeus was observed in the holotype and paratype of *A. amphibambusina* (Han et al. 2024). Phylogenetically (Fig. 22, 23), *A. amphibambusina* clusters distantly from *A. zhaotongensi*. Refer key for differences from other morphologically close species.

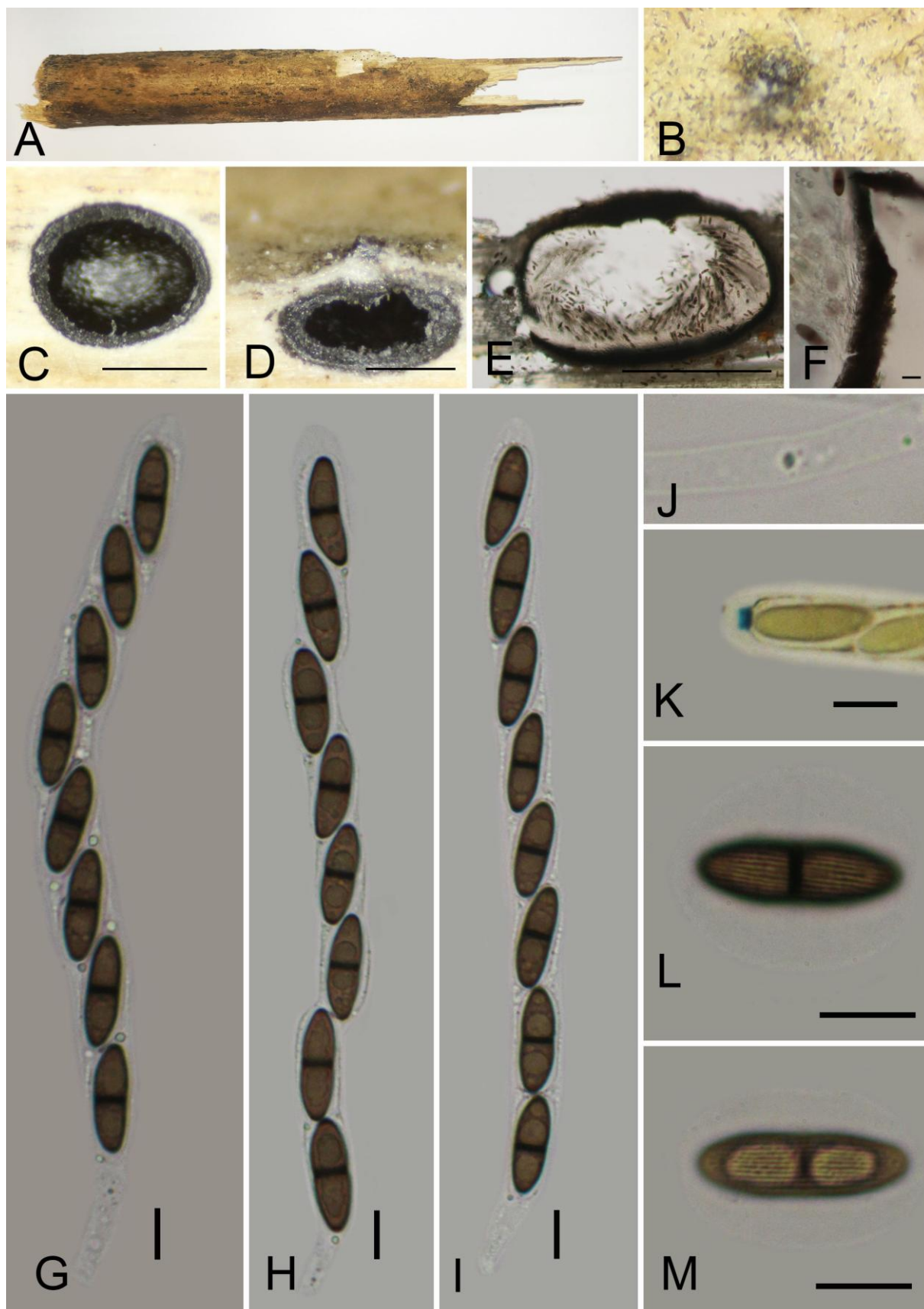


Figure 24 – *Arecophila amphibambusina* (GMB6259, holotype) A Bamboo host. B Ostioles appearance at the host surface. C Cross section of ascoma. D–E Vertical sections of ascomata. F Peridium. G–I Asci in distilled water. J Paraphysis. K Amyloid apical ring (stained in Melzer reagent). L, M Ascospores. Scale bars: B–E = 0.5 mm, F–P = 15 μm.

Arecophila chinensis K. Habib, Y.L. Ren & Q.R. Li sp. nov.

(Fig. 25)

MycoBank No: MB857191

Etymology – The epithet *chinensis* refers to the country of the species, China.

Description – Saprobic on dead culms of bamboo. **Sexual morph:** *Ascomata* 973–1338 × 746–966 µm ($\bar{x}$ = 1199 × 867.1 µm, n = 20), immersed, solitary, scattered, sometimes gregarious, globose to subglobose, dark brown to black, lacking clypeus or underdeveloped. *Ostioles* flush with surface or slightly papillate, central, black; *Peridium* 40–60 µm ($\bar{x}$ = 49 µm) thick, comprised of two layers, thick-walled, dense, outer layer dark brown, inner hyaline, cells of *textura angularis*. *Paraphyses* 3–5 µm ($\bar{x}$ = 4.2 µm, n = 30), hyaline, numerous, long-cylindrical, unbranched, septate. *Asci* 215–240 × 8.9–11 µm ($\bar{x}$ = 229.6 × 10.1 µm, n = 30), 8-spored, unitunicate, long-cylindrical, short-pedicellate, straight or slightly curved, apically rounded, with a wedge-shaped, J+, apical ring, 3.3–3.8 × 1.9–2.6 µm ($\bar{x}$ = 3.6 × 2.2 µm, n = 30), bluing in Melzer reagent. *Ascospores* 16–19 × 5.5–7.2 µm ($\bar{x}$ = 18.2 × 6.6 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, lacking mucilaginous sheath. **Asexual morph:** Undetermined.

Materials 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, November 2023, Y.L. Ren, Q.R. Li, 2023JWS90 (GMB6217, holotype); *ibid.*, KUN-HKAS 145750 isotype.

Additional materials 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, November 2023, Y.L. Ren, Q.R. Li, J31 (GMB6218).

Notes – In a BLASTn search, the β -tubulin (*tub2*) sequence of *A. chinensis* shows 80.87% similarity to *A. clypeata* (GZUCC0110), the ITS sequence shows 88.19% similarity to *A. miscanthi* (MFLU 19-2333), and the LSU sequence shows 96% similarity to *Cainia graminis* (CBS 136.62). In the phylogram (Fig. 22, 23), *A. chinensis* forms a distinct clade, but with weak statistical support and an unstable position between *Cainia* and *Arecophila*. The morphological characteristics of *Arecophila chinensis* support its placement within the genus *Arecophila* due to its ostiolate ascomata, unitunicate cylindrical asci with an apical ring, and ascospores with several longitudinal ridges (resembling germ slits) and lack germ slit. However, it differs from all the species in the genus by lacking a mucilaginous sheath around the ascospores, a trait common to *Arecophila* species.

Species of the genus *Cainia* are characterized by ascospores with several longitudinal germ slits, which does not support the placement of *Arecophila chinensis* within *Cainia*. Genus *Seynesia* produces ascospores that are smooth-walled and surrounded by mucilaginous sheaths drawn out at the poles with germ slits, differing from *Arecophila chinensis* (Hyde 1995). *Amphibambusa* possesses hyaline ascospores pointed at both ends differing from *Arecophila chinensis* (Liu et al. 2015).

In terms of ascospore size, *Arecophila chinensis* is comparable to *A. gulubiicola* and *A. foveata*. *Arecophila gulubiicola* differs by being reported on *Gulubia costata* and having smaller ascomata (290–400 × 140–190 µm), asci (107–145 × 11–13.5 µm), and ascospores (14.5–18.5 × 6–9 µm) with a minutely verrucose wall and a thick mucilaginous sheath. *Arecophila foveata*, reported on *Nolina* sp., also differs in having smaller ascomata (300–400 × 400–500 µm), smaller asci (130–150 × 14–15 µm), and ascospores (16–20 × 8–10 µm) surrounded by a mucilaginous sheath, with a wall that is striate, foveate, and warted (Li et al. 2022). Hence, we introduce our collection as a new species within *Arecophila* based on morphology and phylogeny.

Key to *Arecophila* species reported in China and on bamboo

- 1a. Host bamboo 2
- 1b. Host other than bamboo 4
- 1c. On bamboo, ascospores <19 µm, without a mucilaginous sheath *A. chinensis*

- 2a. Asci $132.5\text{--}140 \times 7.5\text{--}8 \mu\text{m}$, ascospores $19\text{--}22.5 \times 5.5\text{--}7 \mu\text{m}$*A. bambusae*
 2b. Asci $125\text{--}165 \times 10\text{--}12 \mu\text{m}$, ascospores $20\text{--}25 \times 6\text{--}7.5 \mu\text{m}$ *A. muroiana*
 2c. Asci $132.5\text{--}157.5 \times 7.5\text{--}9 \mu\text{m}$, ascospores $29\text{--}31 \times 5\text{--}5.5 \mu\text{m}$ *A. coronata*
 2d. Asci $>180 \mu\text{m}$ 3
 3a. Ascomata $400 \times 360 \mu\text{m}$, asci $180\text{--}220 \mu\text{m}$ in length, ascospores $20\text{--}26 \times 6\text{--}8 \mu\text{m}$ *A. notabilis*
 3b. Ascomata $586 \times 389 \mu\text{m}$, asci $180\text{--}270 \mu\text{m}$ in length, ascospores $23\text{--}27 \times 8.5\text{--}9.5 \mu\text{m}$
 *A. xishuangbannaensis*
 3c. Ascomata $710 \times 500 \mu\text{m}$, asci $190\text{--}240 \mu\text{m}$ in length, ascospores $21\text{--}30 \times 6\text{--}8 \mu\text{m}$
 *A. zhaotongensis*
 3d. Ascomata $790 \times 740 \mu\text{m}$, asci $165\text{--}200 \mu\text{m}$ in length, ascospores $18\text{--}27.5 \times 5.5\text{--}7.6 \mu\text{m}$
 *A. amphibambusina*
 4a. Host *Phragmites australis*, asci $140\text{--}230 \times 15.5\text{--}24 \mu\text{m}$, ascospores $22.5\text{--}29 \times 8\text{--}11 \mu\text{m}$
*A. australis*
 4b. Host *Miscanthus sinensis*, asci $147\text{--}189 \times 10\text{--}13 \mu\text{m}$, ascospores $20\text{--}24 \times 6\text{--}8 \mu\text{m}$.. *A. miscanthi*
 4c. Host unknown gramineous plant, asci $180\text{--}245 \times 10.5\text{--}14.5 \mu\text{m}$, ascospores $18.5\text{--}22.5 \times 6.5\text{--}9 \mu\text{m}$ *A. clypeata*

Endocalyx melanoxanthus (Berk. & Broome) Petch, Ann. Bot., Lond. 22: 390 (1908) (Fig. 26)
 MycoBank No: MB417141.

Description – saprobic on dead branch of palm tree. **Sexual morph:** Undetermined.
Asexual morph: *Conidiomata* up to 0.7 mm diam, up to 1 mm high, scattered, annulus-like, black, circular, surrounded by yellow glistening mass, immersed when immature to raised cupulate when mature. *Conidiophores* $1.5\text{--}2.3 \mu\text{m}$ wide, septate, hyaline, micronematous, smooth. anastomosing. *Conidiogenous cells* $1\text{--}1.7 \mu\text{m}$ long, unicellular, hyaline, knob-like. *Conidia* $11\text{--}18 \times 8\text{--}14 \mu\text{m}$ ($\bar{x} = 13.7 \times 12.1 \mu\text{m}$, $n = 30$), 1-celled, oval, ellipsoid-globose to round, smooth-walled, brown to dark brown, non-guttulate, with a longitudinal, straight germ slit.

Material examined – China, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, $28^{\circ}18'56.24''$ N, $107^{\circ}06'49.04''$ E, altitude: 1,538 m, on dead branch of palm tree, August 2024, Li Wenhao, LXLY95 (GMB6238).

Notes – The sequence analysis of our collection GMB6238, showed a 100% similarity with *Endocalyx melanoxanthus*. Morphological comparisons confirm its identity with *Endocalyx melanoxanthus* as described by Vitoria et al. (2011). It is differentiated from *E. grossus* by the presence of smooth conidia, whereas the latter is characterized by verrucose conidia.

We found no differences between *Endocalyx melanoxanthus* and *E. metroxyli*. Konta et al. (2021) distinguished *E. metroxyli* from *E. melanoxanthus* based on the absence of cupulate or cylindrical conidiomata. However, both features were observed in our collection. We hypothesize that the lack of these structures in the material examined by Konta et al. (2021) may be due to the fungal specimens being at an immature developmental stage. This study reports *Endocalyx melanoxanthus* as a new record for southwestern China.

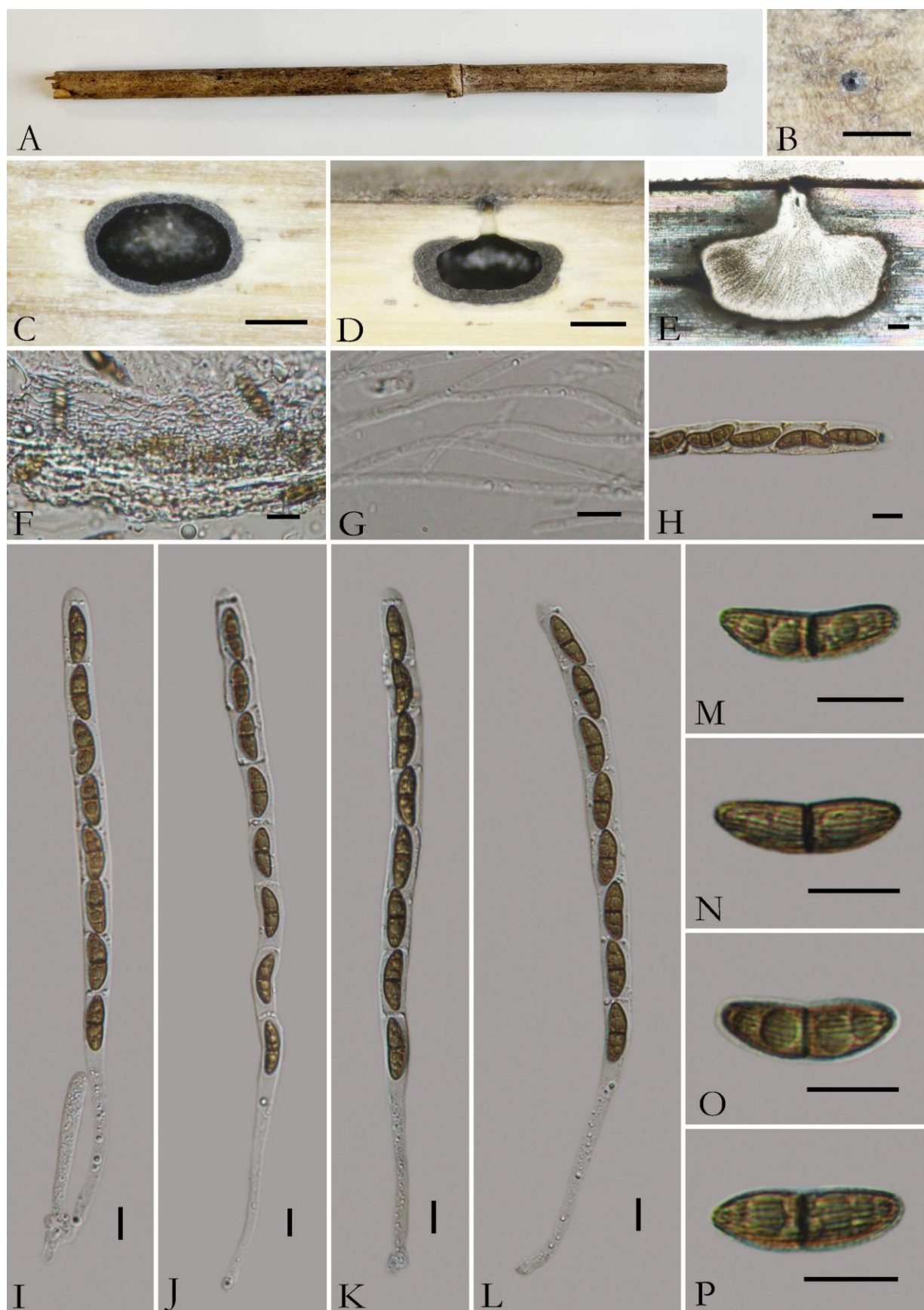


Figure 25 – *Arecophila chinensis* (GMB6217, holotype) A Bamboo host. B Ostioles appearance at the host surface. C Cross section of ascoma. D, E Vertical sections of ascomata. F Peridium. G Paraphyses. H Amyloid apical rings (stained in Melzer reagent). I–L Asci in distilled water. M–P Ascospores. Scale bars: B–D = 0.5 mm, E = 100 µm, F–P = 10 µm.

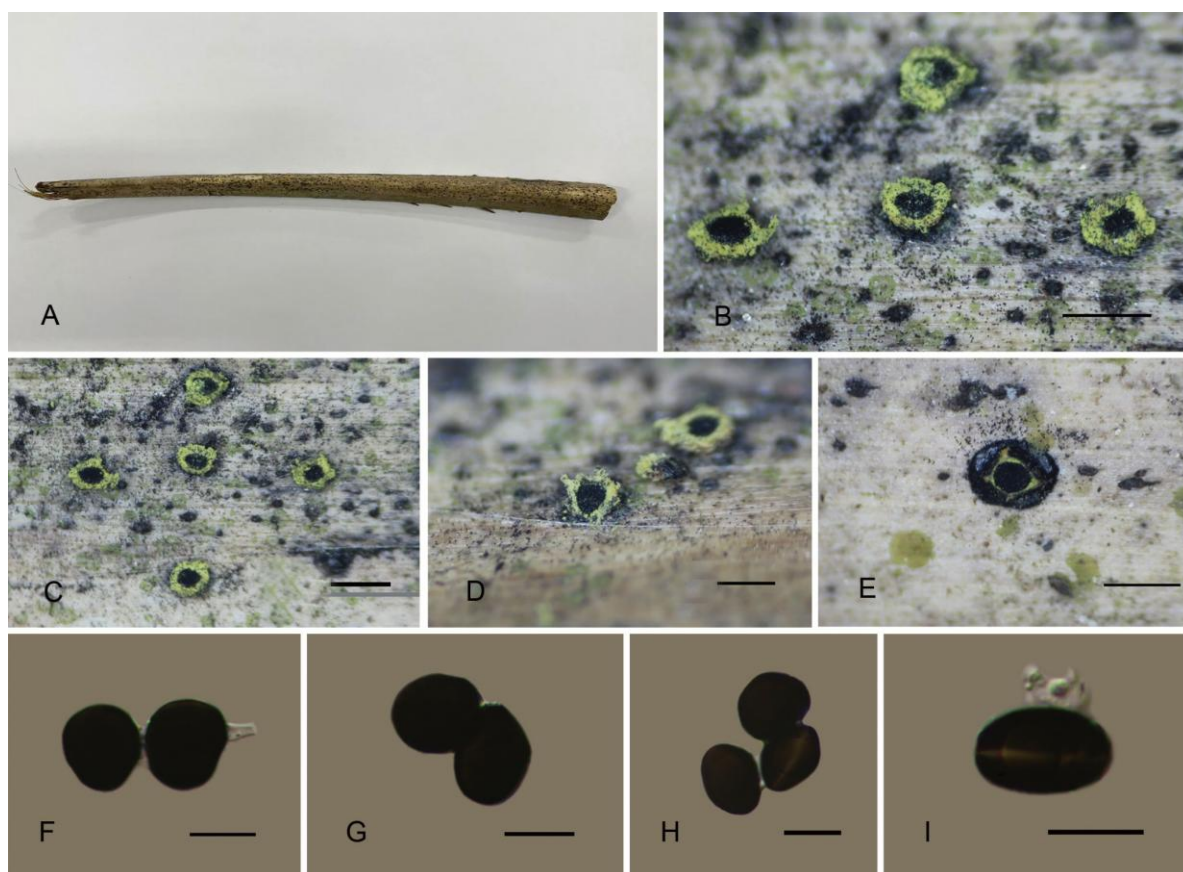


Figure 26 – *Endocalyx melanoxanthus* (GMB6238). A Host. B–E Conidiomata on host surface. F–I Conidia. Scale bars: B–E = 1 mm F–I = 12 μ m.

Clypeosphaeriaceae G. Winter, Rabenhorst Kryptogamen-Flora, Pilze - Ascomyceten 1(2): 554 (1886)

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

Notes – Tubaki and Kubono (1989) introduced *Digitodochium* to accommodate *D. rhodoleucum*, based on the staurosporous anamorph, found on corticated twigs of *Fagus crenata* in Japan. Voglmayr et al. (2022) later provided a detailed description of its teleomorph and characterized the genus with lopadostoma-like pseudostromata covered by a white disc and ascospores with a lateral poroid germination site. More recently, Liu et al. (2025) amended the generic description to include anthostomella-like traits, supported by molecular and phylogenetic analyses. In this study, we describe a new species of the genus that phylogenetically clusters within the *Digitodochium* clade.

Digitodochium anshunense K. Habib, Y.L. Ren & Q.R. Li, sp. nov. (Fig. 27)

Mycobank No: MB857192

Etymology – The specific epithet is derived from Anshun city, where the holotype was collected.

Description – Saprobic on dead branch of bamboo. **Sexual morph:** *Ascomata* 570–825 μ m wide $\times$ 450–675 μ m high ($\bar{x}$ = 703.9 $\times$ 576.7 μ m), solitary, scattered, immersed under the host epidermis, black, coriaceous, ostiole at the center, visible as black dots, lacking clypeus. *Peridium* 55–75 μ m ($\bar{x}$ = 64.3 μ m, 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* 2–3 μ m ($\bar{x}$ = 2.7 μ m, n = 20) wide, longer than asci, numerous, filamentous, sinuous, septate, constricted at the septa, guttulate, embedded in a gelatinous matrix. *Asci* 120–185 $\times$ 6.5–9 μ m ($\bar{x}$ = 160.1 $\times$ 7.8 μ m, n = 30), 8-spored, unitunicate, cylindrical, pedicellate, apically rounded with a J+, apical ring, blue in Melzer reagent, 2.4–3 $\times$

3.1–4.0 μm ($\bar{x} = 2.7 \times 3.5 \mu\text{m}$, $n = 30$), inverted hat-shaped or tubular. *Ascospores* 16–18.8 $\times$ 5.5–8 μm ($\bar{x} = 17.8 \times 6.2 \mu\text{m}$, $n = 30$), brown, two-celled, a hyaline basal dwarf cell 1.9–2.4 $\times$ 1.8–2.4 μm , and a larger brown cell, 15–17.6 $\times$ 5.5–8 μm , uniseriate, aseptate, equilaterally oblong ellipsoidal to fusiform, surrounded by a thin inconspicuous mucilaginous sheath; lacking germ slit.

Asexual morph: Undetermined.

Material examined – China, Guizhou Province, Anshun City, Pingba District, Gaofeng Town, 106° 24'23.23" E, 26° 17'34.47" N, altitude: 1,261 m, on dead culm of bamboo, October 2023, Yulin Ren, 2023GFZ7 (GMB6209, holotype); *ibid.*, KUN-HKAS 145751 isotype.

Additional specimens examined – China, Guizhou Province, Anshun City, Longgong Scenic Area, 105°52'53.17" E, 26°06'38.58" N, altitude: 1,218 m, on dead culm of bamboo, April 2023, Q.R. Li, 2022LG29 (GMB6210).

Notes – BLASTn analysis of the LSU sequence of *Digitodochium anshunense* showed high similarity (97.1%) to *Anthostomella eucalyptorum* (CBS 120036). However, the BLASTn results for the ITS sequence of *Digitodochium anshunense* did not retrieve any close hits, showing 90% similarity to the same reference strain. Morphologically, both species are similar in having ascospores with a basal dwarf cell and lack a germ slit. However, *A. eucalyptorum* can be differentiated from *D. anshunense* by its occurrence on the leaves of *Eucalyptus* spp. (vs. bamboo for *D. anshunense*), smaller ascomata up to 200 μm diam. (vs. 570–825 μm wide), smaller asci 60–85 $\times$ 5–6 μm (vs. 120–185 $\times$ 6.5–9 μm), and smaller ascospores with a larger brown cell (7–10 $\times$ 4–5.5 μm) and lack a mucilaginous sheath (vs. larger brown cells 15–17.6 $\times$ 5.5–8 μm , surrounded by a thin, inconspicuous mucilaginous sheath) (Crous et al. 2006).

Morphologically, *Digitodochium anshunense* is also similar to *Anthostomella clypeoides* in having ascospores with a basal dwarf cell, lacking a germ slit and surrounded by a thin mucilaginous sheath. However, *A. clypeoides* differs from *D. anshunense* in being reported on *Rubus* and *Epilobium* spp., having smaller asci 65–81 $\times$ 6–8 μm , and smaller (10–14.5 μm) inequilateral ellipsoid ascospores with one side flattened (Francis 1975, Lu and Hyde 2000).

Based on the key comparisons provided by Lu and Hyde (2000), *Digitodochium anshunense* is morphologically similar to *Anthostomella appendiculosa*, *A. triangularis*, and *A. colligata*, but it can be differentiated from these species by its host, as well as the size and morphology of its ascospores and asci. *Anthostomella appendiculosa* has been reported on *Rubus* spp. and possesses larger ascospores (28–36 $\times$ 8–10 μm) with a germ slit and a cordate-shaped dwarf cell. *Anthostomella triangularis*, reported on *Pinus* spp., produces limoniform to triangular smaller ascospores 9.5–11.5 $\times$ 5–5.5 μm . *Anthostomella colligata*, found on *Raphia* spp. (*Palmae*), has larger ascospores (17.5–26 $\times$ 9–11.5 μm) that are surrounded by a thicker mucilaginous sheath (Lu and Hyde 2000).

Species of *Occultitheca* also possess two-celled ascospores of similar size to that of *Digitodochium anshunense*. *Occultitheca* species are differentiated from anthostomella-like species by a larger distance between the uppermost ascospore and the ascus apex (Rogers and Ju 2003). We believe this is not a significant distinguishing character for differentiating the two genera, as species such as *Anthostomella formosa*, *A. clypeoides*, and *A. saltensis* exhibit a similar distance between the uppermost ascospore and the ascus apex as seen in *Occultitheca* species (Daranagama et al. 2015, Lu and Hyde 2000).

Occultitheca rosae has similar ascospore dimensions (16.5–20 $\times$ 6.5–8 μm), covered with a thin mucilaginous sheath. However, it differs from *D. anshunense* by being reported on *Rosa* spp., having smaller ascomata 360–385 $\times$ 350–420 μm (vs. 570–825 $\times$ 450–675 μm), smaller asci 90–140 $\times$ 11–13 μm , and ascospores with a straight germ slit extending along the entire spore length (Samarakoon et al. 2022). *Occultitheca costaricensis* can be distinguished from *D. anshunense* by its aggregated ascomata (2–12 in a cluster), ellipsoid-inequilateral ascospores with a straight germ slit, and a larger basal hyaline cell (1.5–4.5 $\times$ 1.5–4 μm) (Rogers and Ju 2003).

In comparison to *Digitodochium* species, *D. anshunense* closely resembles *D. damingshanense* and *D. xishuangbannense*. In the phylogram (Fig. 22), based on ITS, LSU, *rpb2* and *tub2* sequence data also closely related to these species. *Digitodochium damingshanense* can be

differentiated by its smaller ascomata (422–543 μm high $\times$ 576–663 μm diam), larger asci (177–208 $\times$ 8.4–13.1 μm), and larger ascospores (17.5–23.3 $\times$ 5.1–6.5 μm , $\bar{x}$ = 20.5 $\times$ 6.0 μm) surrounded by a conspicuous mucilaginous sheath (Liu et al. 2025). *Digitodochium xishuangbannense* shares a similar ascospore size with *D. anshunense* but differs in having smaller ascomata (480–575 $\times$ 478–524 μm), a smaller, wedge-shaped apical ring (2.0–3.3 $\times$ 1.8–2.6 μm) and ascospores lack a sheath (Liu et al. 2025). Based on these morphological distinctions and supporting phylogenetic evidence, we introduce our collection as a new species.

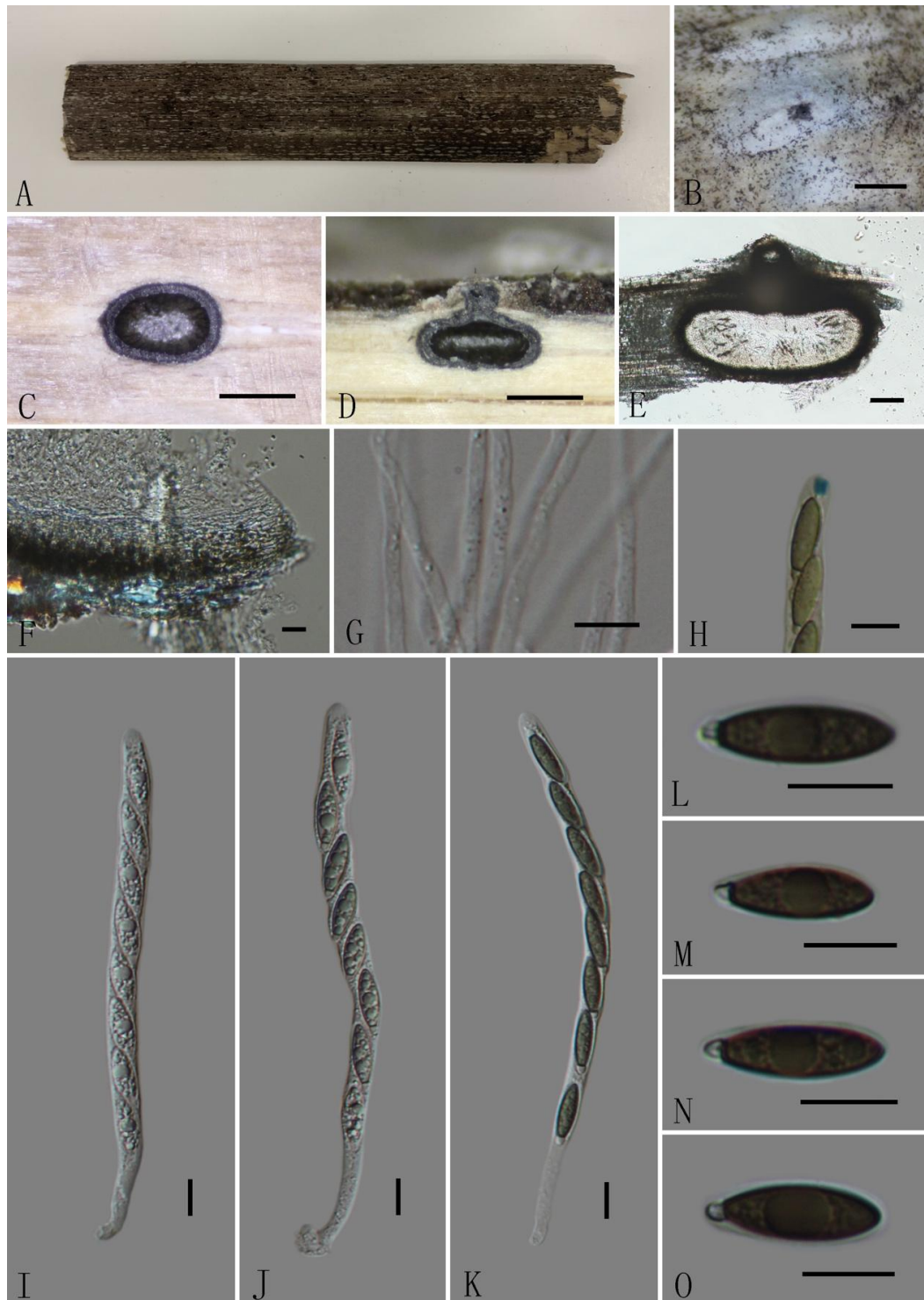


Figure 27 – *Digitodochium anshunense* (GMB6209, holotype). A Bamboo host, B Surface view of ascoma. C Cross section of ascoma. D, E Vertical sections of ascomata. F Peridium. G Paraphyses.

H Apical ring (stained in Melzer reagent). I–K Asci in distilled water. L–O Ascospores. Scale bars: B–D = 0.5 mm, E = 100 μ m, F–O = 12 μ m.

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

Notes – *Magnostiolata* was introduced by Samarakoon et al. (2022) to accommodate *Anthostomella*-like taxa distinguished by funnel-shaped ostiolar canals filled with amorphous cells and ascospores enveloped in a wing-shaped mucilaginous sheath. Later, Liu et al. (2025) expanded the genus by proposing a new combination and describing a new species. In this study, we introduce another new species of *Magnostiolata*, which phylogenetically clusters within the *Magnostiolata* clade with strong support.

Magnostiolata tubulariapicalis K. Habib, Z.Q. Yao & Q.R. Li sp. nov.

(Fig. 28)

Mycobank No: MB857193

Etymology – The epithet refers to the tubular shape of apical ring

Description: Saprobiic on dead culm of bamboo, visible as black dot. **Sexual morph:** *Ascomata* perithecial, 300–400 μ m wide, 280–350 μ m high, not deeply immersed, solitary, globose to subglobose, with a rounded base, clypeus lack, ostioles inconspicuous. *Ostioles* centric, conical, black. *Peridium* 15–20 μ m thick (n = 20), blackish brown, comprising two layers, outer layer brown, thick-walled *textura angularis* cells, inner layer thin hyaline. *Paraphyses* septate, rarely branched, 3–4.2 μ m wide, larger than asci. *Asci* 130–162 $\times$ 8–11 μ m ($\bar{x}$ = 141.2 $\times$ 10.2 μ m, n = 20), short stipitate, 13–26 μ m long (n = 20), 8-spored, cylindrical, uniseriate, with amyloid apical apparatus 3–4.5 μ m high, 2–2.8 μ m wide, J+, tubular or bipartite shaped. *Ascospores* 14–18 $\times$ 5–7.2 μ m, ($\bar{x}$ = 16.5 $\times$ 6.5 μ m, n = 30), one-celled, equilateral ellipsoidal fusoid, rounded ends, olivaceous to brown, with straight full-length conspicuous germ slit, multi guttulate, filled with minute oil drops, smooth, surrounded by a 2.5–3.7 μ m thick mucilaginous sheath. **Asexual morph:** Not observed.

Culture characteristics – Ascospores germinated on PDA within 24 hours at 25 °C. colonies reached 4 cm diam., after 2 weeks, white, cottony, thinning towards the edge, edge irregular, white from above, slightly light yellow from reverse.

Material examined – China, Sichuan Province, Leshan City, Muchuan County, Muchuan Bamboo Sea, 28°26'17.27" N, 104°5'18.64" E, altitude: 1342 m, on the dead culms of *Phyllostachys heterocycla*, August 2024, Yao Zuquan, 2024MC3 (GMB6211 holotype; GMBC6211 ex-type); *ibid.*, KUN-HKAS 145752 isotype.

Additional specimen examined – China, Yunnan Province, Xishuangbanna Scenic Spot, 22°16'04.58" N, 100°54'20.45" E, altitude: 1053 m, on dead culm of bamboo, March 2023, Li Qirui, 2023XSBNZ12B (GMB6212, GMBC6212).

Notes – In the BLASTn analysis of ITS sequence, *Magnostiolata tubulariapicalis* showed the highest similarity of 93.2% to *M. guizhouensis* (GMB1140). For LSU and *rpb2* sequences, the top BLAST result indicated a similarity of 92% and 85%, respectively, to *Digitodochium amoenum* (WU:MYC:0044023). Additionally, the LSU sequence demonstrated 95% similarity to *Anthostomella eucalyptorum* (CBS 120036), though with low query coverage (74%).

During this study, we sequenced the LSU sequence of *Magnostiolata guizhouensis* (GMB1140) and compared it with *M. tubulariapicalis*. The comparison showed a similarity of 95.8% (1135/1185 bp), with a gap of 1.8% (21/1185 bp). Morphologically, *M. tubulariapicalis* resembles *M. guizhouensis* in having similarly shaped ascospores. However, *M. tubulariapicalis* can be distinguished by its smaller ascomata (300–400 μ m wide vs. 518–594 μ m wide), thinner peridium (15–20 μ m vs. 28–36 μ m), significantly smaller asci (130–162 $\times$ 8–11 μ m vs. 176–215 $\times$ 11.8–14.2 μ m) with a tubular shape apical ring (vs. wedge-shape) and smaller ascospores (14–18 $\times$ 5–7.2 μ m vs. 22.3–25.2 $\times$ 7.5–8.5 μ m) (Li et al. 2024a).

The two other species within the genus can be easily distinguished. *Magnostiolata shiwandashanensis* is characterized by its larger asci (166–198 $\times$ 10.2–14.6 μ m vs. 130–162 $\times$ 8–11 μ m) and larger ascospores (17.5–22.4 $\times$ 6–7.9 μ m vs 14–18 $\times$ 5–7.2 μ m), which lack a sheath (Liu

et al. 2025). *Magnostiolata mucida* possesses a discoid, inverted hat-shaped apical ring, and its ascospores are surrounded by a wing-shaped mucilaginous sheath (Samarakoon et al. 2022).

In comparison to *Anthostomella* species (Lu and Hyde 2000), *Magnostiolata tubulariapicalis* keys out closely to *A. nypae*, *A. bromeliacearum*, *A. bruneiensis*, *A. palmarum*, and *A. consanguinea*. *Anthostomella nypae*, found on *Nypa* and *Pandanus* species, has smaller asci (87.5–125 × 6.5–7.5 µm) with a wedge-shaped apical ring and narrower, inequilateral ascospores (4.5–5.5 µm) surrounded by a very thin sheath. *Anthostomella bromeliacearum* has a smaller apical ring (2–2.5 µm wide, 1.5–2.5 µm high), narrower ascospores (4–5 µm) with tapering ends and lacks a mucilaginous sheath. *Anthostomella bruneiensis* has much longer ascospores (20.5–26.5 µm) that are beaked at the poles and surrounded by a thin mucilaginous sheath. *Anthostomella palmarum*, reported on *Cocos* species, has larger inequilateral ascospores (20–25 × 7–10 µm) that lack a sheath. *Anthostomella consanguinea*, reported on palm species, has smaller asci (112.5–142.5 × 10–12.5 µm), broader ascospores (5–10 µm), and a shorter germ slit (5–9 µm) (Lu and Hyde 2000). Based on these morphological and molecular differences, we introduce our collection as a new species.

Magnostiolata subtubularia K. Habib, Z.Q. Yao & Q.R. Li sp. nov. (Fig. 29)

Mycobank No: MB857305

Etymology – The epithet refers to the morphologically similar *Magnostiolata tubulariapicalis*.

Description – Saprobiic on dead culm of bamboo, visible as black dot. **Sexual morph:** *Ascomata* perithecial, 240–320 µm wide, 180–250 µm high, ($\bar{x}$ = 270 × 195 µm, n = 10), not deeply immersed, solitary, globose to subglobose, with a rounded base, clypeus minute, ostiole inconspicuous. *Ostioles* centric. *Peridium* 20–35 µm thick, black, comprising two layers, outer layer brown, thick-walled *textura angularis* cells, inner layer thin hyaline of flattened cell. *Paraphyses* septate, rarely branched, 3–4.4 µm wide, larger than asci. *Asci* 85–135 × 7–13.5 µm ($\bar{x}$ = 102.6 × 9.2 µm, n = 20), short stipitate, 15–25 µm long, 8-spored, cylindrical, uniseriate, with amyloid apical apparatus 3–4.5 µm high, 2–2.8 µm wide, J+, tubular shaped. *Ascospores* 11–15 × 4–7 µm, ($\bar{x}$ = 13.1 × 5.5 µm, n = 30), one-celled, equilateral ellipsoidal fusoid, rounded ends, olivaceous to brown, with straight full length conspicuous germ slit at center, multi guttulate, filled with minute oil drops, smooth, surrounded by a 2.5–3.7 µm thick mucilaginous sheath. **Asexual morph:** Not observed.

Culture characteristics – Ascospores germinated on PDA within 48 hours at 25 °C. colonies reached 4.5 cm diam., after 4 weeks, white, cottony, dense at center, thinning towards the edge, white from above, yellow brown from reverse.

Material examined – China, Guizhou Province, Anshun City, Pingba District, Gaofeng Town, 106° 24'23.23" E, 26° 17'34.47" N, altitude: 1,261 m, on dead culm of bamboo, October 2023, Yulin Ren, DWS11 (GMB6261, holotype; GMBC6261 ex-type); *ibid.*, KUN-HKAS 145722 isotype.

Additional specimens examined – China, Guizhou Province, Guiyang City, Xifeng County, Gaofeng Village 26°33'97.54" N, 106°34'93.13" E, altitude: 1148 m, on dead culm of bamboo, July 2024, X. Zhou and W.Y. Zeng, 2024GXG21, (GMB6262)

Notes – Phylogenetically (Fig. 22), *Magnostiolata subtubularia* is closely related to *M. tubulariapicalis*, morphologically similar in tubular-shaped apical ring and ascospore with a straight germ slit. However, *M. tubulariapicalis* differs from *M. subtubularia* in having larger ascomata, 300–400 µm wide and 280–350 µm high (compared to 240–320 µm wide and 180–250 µm high in *M. subtubularia*), significantly larger asci, 130–162 µm in length (vs. 85–135 µm) and larger olivaceous to brown ascospores, 14–18 × 5–7.2 µm (vs. 11–15 × 4–7 µm, light brown to brown). These morphological differences are further supported by molecular data. The ITS sequence shows 95.9% similarity between the two species, with a nucleotide difference of 22 base pairs and 3 gaps (0.6%) and LSU sequence shows 98.8% similarity, with a nucleotide difference of 11 base pairs and 4 gaps (0.4%).

The other species of the genus can be distinguished by apical ring shape and size of ascospore and asci. *Magnostiolata guizhouensis* has a wedge-shaped apical ring, larger asci ($176\text{--}215 \times 11.8\text{--}14.2 \mu\text{m}$), and larger ascospores ($22.3\text{--}25.2 \times 7.5\text{--}8.5 \mu\text{m}$). *Magnostiolata shiwandashanensis* also has larger asci ($166\text{--}198 \times 10.2\text{--}14.6 \mu\text{m}$) and larger ascospores ($17.5\text{--}22.4 \times 6\text{--}7.9 \mu\text{m}$) (Liu et al. 2025). *Magnostiolata mucida* has a discoid, inverted hat-shaped apical ring, with ascospores surrounded by a wing-shaped mucilaginous sheath (Samarakoon et al. 2022). Based on these morphological and molecular differences, we introduce *Magnostiolata subtubularia* as a new species

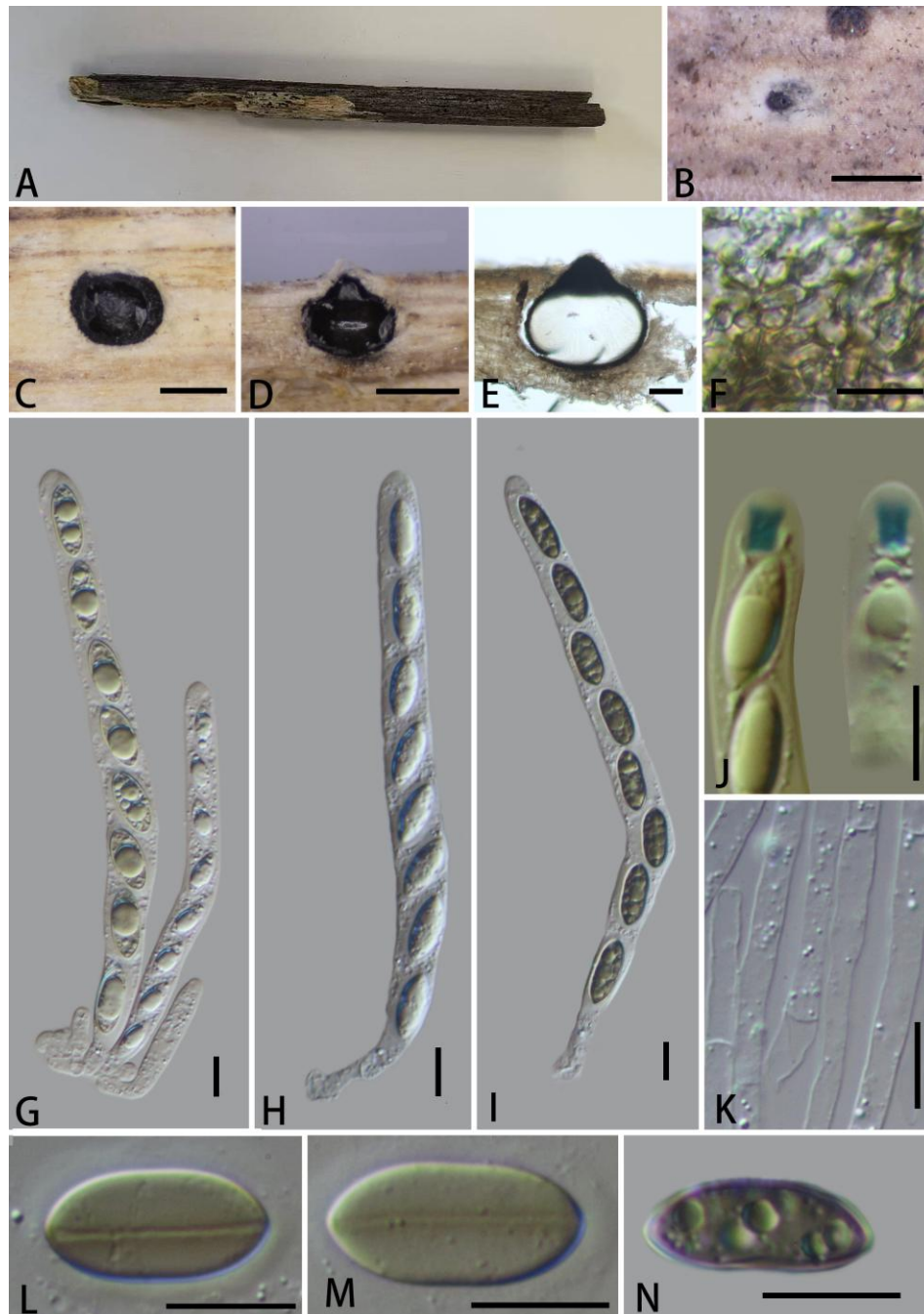


Figure 28 – *Magnostiolata tubulariapicalis* (GMB6211, holotype). A Bamboo host, B Surface view of ascoma. C Cross section of ascoma. D, E Vertical sections of ascomata. F Peridium. G–I Asci in distilled water. J Apical ring (stained in Melzer reagent). K Paraphyses. L–N Ascospores. Scale bars: B–D = 0.3 mm, E = 100 μm , F = 20 μm , G–K = 15 μm , L–N = 12 μm .

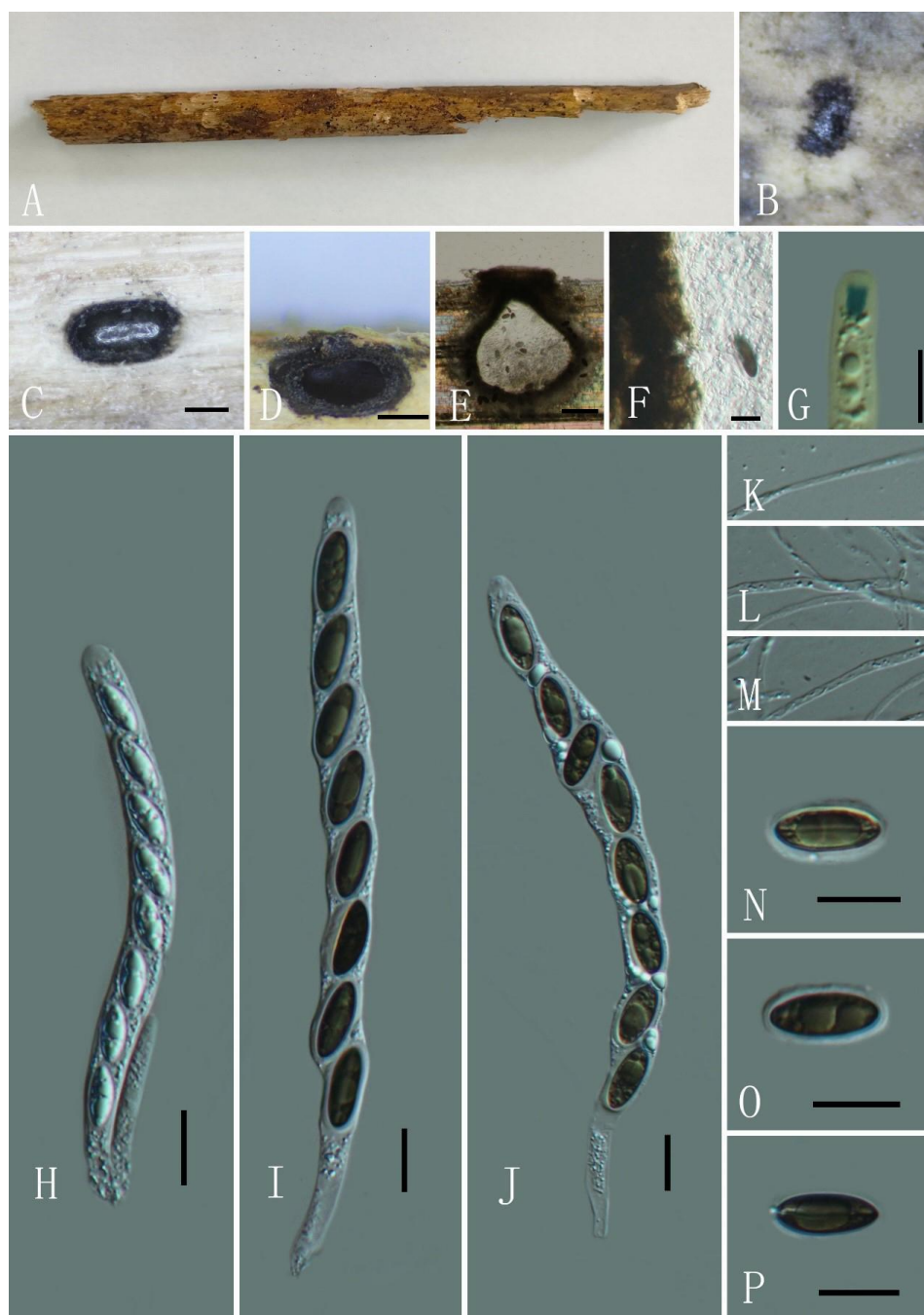


Figure 29 – *Magnostiolata subtubulariapicalis* (GMB6261, holotype). A Bamboo host, B Surface view of ascoma. C Cross section of ascoma. D, E Vertical sections of ascomata. F Peridium. G Apical ring (stained in Melzer reagent). H–I Asci in distilled water. K–M Paraphyses. N–P Ascospores. Scale bars: C–E = 100 µm, F–P = 10 µm.

Diatrypaceae Nitschke, *Pyrenomycetes Germanici* 1: 62 (1867)

Allodiatrype Konta & K.D. Hyde, *Mycosphere* 11 (1): 247 (2020)

Notes – Konta et al. (2020) established *Allodiatrype* to accommodate three species, *Allodiatrype arengae* (type species), *A. elaeidicola*, and *A. elaeidis*. The genus is characterized by scattered to gregarious stromata with a well-developed interior, aggregated, globose to sub-globose, ostiolate ascomata, unitunicate, J-, 8-spored asci, and allantoid, hyaline to subhyaline, unicellular ascospores with small fat globules at their ends (Konta et al. 2020). As of April 20, 2025, Species Fungorum lists nine species within the genus. In this study, we report a new species of *Allodiatrype* based on detailed morphological comparisons and phylogenetic analysis using ITS and *tub2* sequence datasets.

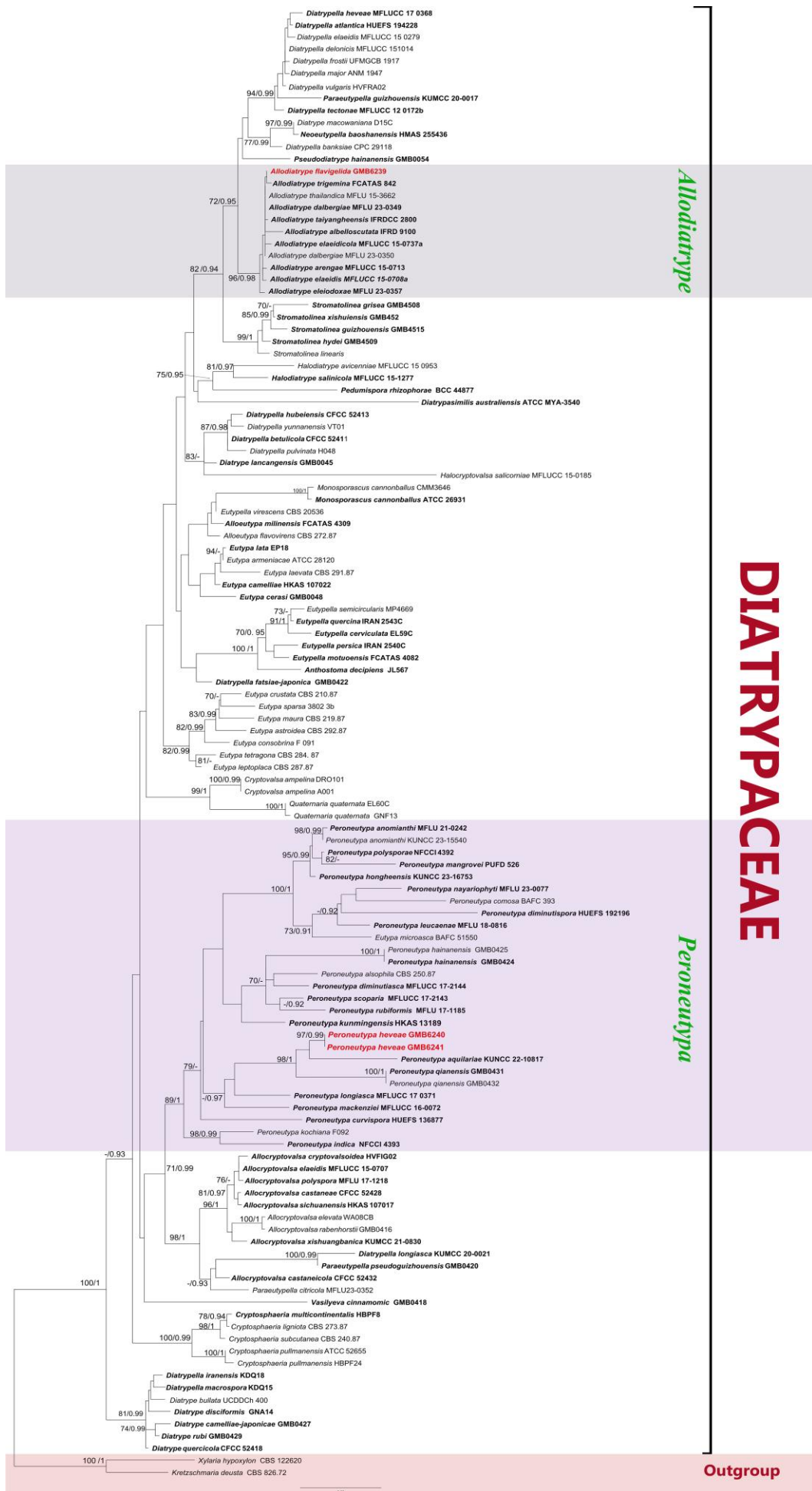


Figure 30 – RAxML tree based on a combined ITS and *tub2* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -10215.013599. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in red bold. Ex-type/strain are indicated in black bold.

Allodiatrype flavigelida K. Habib, W.H. Li & Q.R. Li sp. nov. (Fig. 31)

MycoBank No: MB857194

Etymology – The epithet refers to the bright yellow interior of the stromata.

Description – Saprobic on twig of an unidentified plant. **Sexual morph:** *Stromata* 2–5 mm across, interior well-developed, solitary to gregarious, erumpent, black, without black stromatic zone, surface uneven, rounded to irregular in shape, multi-loculate (4–25), ostiole conspicuous appearing as black spots, sometimes surrounded by a ring-like structure, interior bright yellowish with brown spots, loosely packed. *Ascomata* perithecial, 400–650 µm high, 300–600 µm diam. (excluding necks), immersed in the stroma, globose to subglobose, ostioles individual, with a short neck. *Ostiolar canal* 100–220 µm high, 80–140 µm diam., cylindrical, widened at the apex. *Peridium* 20–50 µm wide, composed of two layers, outer part brown to dark brown, thick-walled cells, arranged in *textura angularis*, inner layer hyaline, thin-walled flattened cells. *Paraphyses* hyaline rarely septate, constricted at septa, 2–5 µm wide. *Asci* 100–160 × 8–15.5 µm ($\bar{x}$ = 141 × 12.4 µm, n = 30), 8-spored, unitunicate, clavate, with long stalks 80–130 µm long, apically truncate, with J-apical ring, spore-bearing part 20–45 µm long, distance between apex and spore 8–21 µm long. *Ascospores* 10–13.1 × 2.5–3.4 µm ($\bar{x}$ = 11.4 × 2.8 µm, n = 40), overlapping, subhyaline, elongate-allantoid, aseptate, straight to slightly curved, smooth-walled, with minute oil drops at the ends. **Asexual morph:** Undetermined.

Culture characteristics – Ascospores germinated on MEA within 48 hours. Colonies on MEA, white, dense at center, thinning towards the edge, margin diffuse, reverse yellow to brown.

Material examined – China, Guizhou Province, Anshun City, Pingba District, Gaofeng Town, 106° 24'23.23" E, 26° 17'34.47" N, altitude: 1,261 m, on dead branch of an unknown tree, May 2024, W.H. Li, WAG-21 GMB6239, holotype; GMBC6239 ex-type; *ibid.*, KUN-HKAS 145753 isotype.

Notes – In the phylogram (Fig. 30), based on combined ITS and *tub2* data, *Allodiatrype flavigelida* appeared as a sister species to *A. trigemina*, which is morphologically distinct. *Allodiatrype trigemina* is distinguished by smaller ascomata (0.81–3.23 mm long × 0.61–1.72 mm wide), with or without a black stromatic zone, 1–10 ascomata per stroma, Y-shaped, trigeminal-shaped, or cruciate-shaped ostioles, much smaller amyloid asci (62–96 × 4–7 µm), and smaller ascospores (5.5–9.2 × 1.5–2.5 µm, $\bar{x}$ = 7.6 × 2.1 µm), arranged at the ascus tip (Peng et al. 2021). In contrast, *Allodiatrype flavigelida* has larger ascomata (2–5 mm across) with 4–25 ascomata per stroma, umbilicate ostioles appearing as black spots with a ring-like structure, larger asci (100–160 × 8–15.5 µm) with a J- apical ring, and significantly larger ascospores (10–13.1 × 2.5–3.4 µm, $\bar{x}$ = 11.4 × 2.8 µm).

In the ITS BLASTn analysis, *Allodiatrype flavigelida* showed the highest similarity to *A. eleiodoxae*. However, *A. eleiodoxae* is morphologically distinct with smaller stromata (1.1–1.8 × 1–2.7 mm), containing 2–5 ascomata per stroma, smaller ascomata (195–450 × 170–405 µm), shorter ostiolar necks (100–150 µm), smaller and thinner asci (65–118 × 5.7–9 µm), and smaller ascospores (7–10 × 2.2–3.3 µm, $\bar{x}$ = 9 × 2.8 µm) (Afshari et al. 2023). Phylogenetically (Fig. 30), *A. eleiodoxae* clusters distantly at the base of the *Allodiatrype* clade.

The type species, *Allodiatrype arengae*, and other palm-associated species *A. elaeidicola*, *A. elaeidis*, and *A. thailandica*, differ ecologically from *A. flavigelida*, which inhabits dead dicot tree branches (Konta et al. 2020). Moreover, *A. arengae* is distinguished by smaller stromata (690–940 µm long × 370–935 µm wide), with 1–5 ascomata per stroma, smaller ascomata (250–400 × 240–400 µm), shorter ostiolar canals (100–170 µm), and smaller ascospores (6–12 × 2–3 µm, $\bar{x}$ = 10 × 2 µm) (Konta et al. 2020, Afshari et al. 2023).

Allodiatrype elaeidicola has smaller stromata (1.2–2.8 mm long $\times$ 0.96–1.66 mm wide) with a black stromatic zone and a dark orange interior, smaller asci with a short stalk (32–76 μ m long) and smaller ascospores (8–11 $\times$ 1.5–3 μ m, $\bar{x}$ = 9 $\times$ 2 μ m) (Konta et al. 2020).

Allodiatrype elaeidis is characterized by smaller stromata (470–860 μ m long $\times$ 440–710 μ m wide) with a black stromatic zone and white to light-yellow interior, smaller ascomata (250–350 μ m high $\times$ 230–300 μ m diam), shorter ostiolar canals (100–130 μ m), shorter asci (28–94 μ m long), and smaller ascospores (6–11 $\times$ 1.5–3 μ m, $\bar{x}$ = 9 $\times$ 2 μ m) (Konta et al. 2020).

Allodiatrype thailandica has smaller stromata (1–1.2 mm wide), with 4 ascomata per stroma, and much smaller ascospores (3.8–6.9 $\times$ 1–1.4 μ m). *Allodiatrype dalbergiae* has shorter and thinner asci (19–40 $\times$ 6–10 μ m for the spore-bearing part, 16–70 μ m for the stalk) and smaller ascospores (6–11.8 μ m in length) (Konta et al. 2020).

Allodiatrype flavigelida is readily distinguished from all other species within the genus by its notably larger stromata (2–5 mm long), larger asci (100–160 $\times$ 8–15.5 μ m), and significantly larger ascospores (10–13.1 $\times$ 2.5–3.4 μ m, $\bar{x}$ = 11.4 $\times$ 2.8 μ m). A comprehensive differentiation table highlighting these, and other morphological distinctions is provided in Afshari et al. (2023).

In the ITS BLASTn analysis, the sequence of *A. flavigelida* demonstrated high similarity (above 99%) but with query coverage below 98% to all *Allodiatrype* species, with the highest similarity (99.8%) to the holotypes of *A. eleiodoxae* (MFLU 23-0357) and *A. trigemina* (FCATAS 842). This analysis demonstrates two important perspectives. First, the high similarity in ITS sequences reflects the highly conserved nature of the ITS region within the genus *Allodiatrype*, limiting its utility in differentiating closely related species. Second, it raises the possibility that these species represent a single taxon exhibiting morphological plasticity. However, the latter is unlikely given the clear and consistent morphological distinctions observed among species.

Key morphological differences include the coloration of stromatal interior tissues, the number of ascomata per stroma, the size of ascomata and asci (bearing J+ or J– apical rings), and the dimensions of ascospores. For example, *A. thailandica* has the smallest ascospores (3.8–6.9 $\times$ 1–1.4 μ m), while the largest ascospores are observed in the newly described species *A. flavigelida* (10–13.1 $\times$ 2.5–3.4 μ m, $\bar{x}$ = 11.4 $\times$ 2.8 μ m). Most other species have average ascospore dimensions of approximately 9 $\times$ 2 μ m (Konta et al. 2020, Afshari et al. 2023).

Additionally, the BLASTn analysis of the *tub2* sequence provides more significant molecular variation, *A. flavigelida* showed the highest similarity (98.2%) with *A. elaeidicola*. *Allodiatrype eleiodoxae*, which showed the highest ITS sequence similarity (99.7%) to *A. flavigelida*, phylogenetically appeared in the basal of *Allodiatrype* clade, distantly related to *A. flavigelida*. This indicates that *tub2* is a more reliable molecular marker for species differentiation within the genus and highlights the importance of combining molecular data with detailed morphological studies to accurately delineate species in *Allodiatrype*.

***Peroneutypa* Berl., Icones Fungorum 3 (3-4): 80 (1902)**

Peroneutypa was introduced by Berlese (1902) to accommodate *P. bellula*, *P. corniculata*, and *P. heteracantha*, but did not designate a type species. Later, Rappaz (1987) proposed *P. bellula* as the type species and considered the genus as a synonym of *Eutypella*. Based on both morphological characteristics and molecular phylogenetic evidence, *Peroneutypa* was resurrected by Carmarán et al. (2006), and transferred several species from *Eutypella* and *Echinomyces* to *Peroneutypa* due to similarities in ascal shape and phylogenetic position. Recent molecular studies have confirmed that *Peroneutypa* is a monophyletic group within the Diatrypaceae. The genus is characterized by valsooid ascostromata, perithecia with long necks, octosporous, clavate, sessile to subsessile asci, and hyaline or yellowish allantoid ascospores. Species Fungorum lists 43 species within the genus as of April 20, 2025 (www.speciesfungorum.org). In the present study, we describe a new species of the genus based on a thorough morphological comparison and phylogenetic analysis.

***Peroneutypa heveae* K. Habib, W.H. Li & Q.R. Li sp. nov.**

(Fig. 32)

MycoBank No: MB857195

Etymology – The specific epithet *heveae* refers to the host plant *Hevea* sp.

Description – Saprobic on dead twig of *Hevea* sp. **Sexual morph:** *Ascostromata* colonies up to 1.2 cm long, gregarious, immersed, becoming raised to erumpent through host tissue by a long ostiolar canal, black, irregular in shape, arranged in longitudinal configuration, with white tissues between the ostioles, multi-loculate 10–50 locules. *Ascomata* 350–680 µm high, 500–1000 µm diam. (excluding necks), perithecial, with long neck, aggregated, immersed in substrate, globose to subglobose, black. *Ostiolar canal* 40–70 µm wide, with long necks, 1–2 mm length, cylindrical, straight, black. *Peridium* 30–60 µm wide, composed of two layers, outer layer thick-walled, dark brown to pale brown cells of *textura angularis*, and inner layer thin-walled, hyaline cells of *textura prismatica*. *Paraphyses* present, much longer than asci, aseptate, unbranched 1.8–3 µm wide. *Asci* 15–23 × 6–12 µm ($\bar{x}$ = 19 × 8.8 µm, n = 30), 8-spored, unitunicate, clavate to cylindrical, thin-walled, non-pedicellate, apically rounded to truncate with indistinct J-apical ring. *Ascospores* 6–9.8 × 1.5–2.5 µm ($\bar{x}$ = 8.5 × 2 µm, n = 30), overlapping 2–3-seriate, hyaline, allantoid, aseptate, curved, smooth-walled, with a small guttulae at the ends. **Asexual morph:** Undetermined.

Culture characteristics – Ascospores germinated on PDA within 48h. Colonies on PDA reaching 4 cm diam., after one week, mycelium white, circular, edges entire, thin. After few weeks, mycelium becomes white to pale from above and yellow to light brown from below.

Material examined – China, Hunan Province, Zhangjiajie City, Badagongshan National Nature Reserve, 29°39'54" N 109°49'08" E, altitude: 1,452 m, on dead twig of *Hevea* sp., September 2024, W.H. Li, 2024WBZ3. (GMB6240, holotype; GMBC6240 ex-type); *ibid.*, KUN-HKAS 145734 isotype.

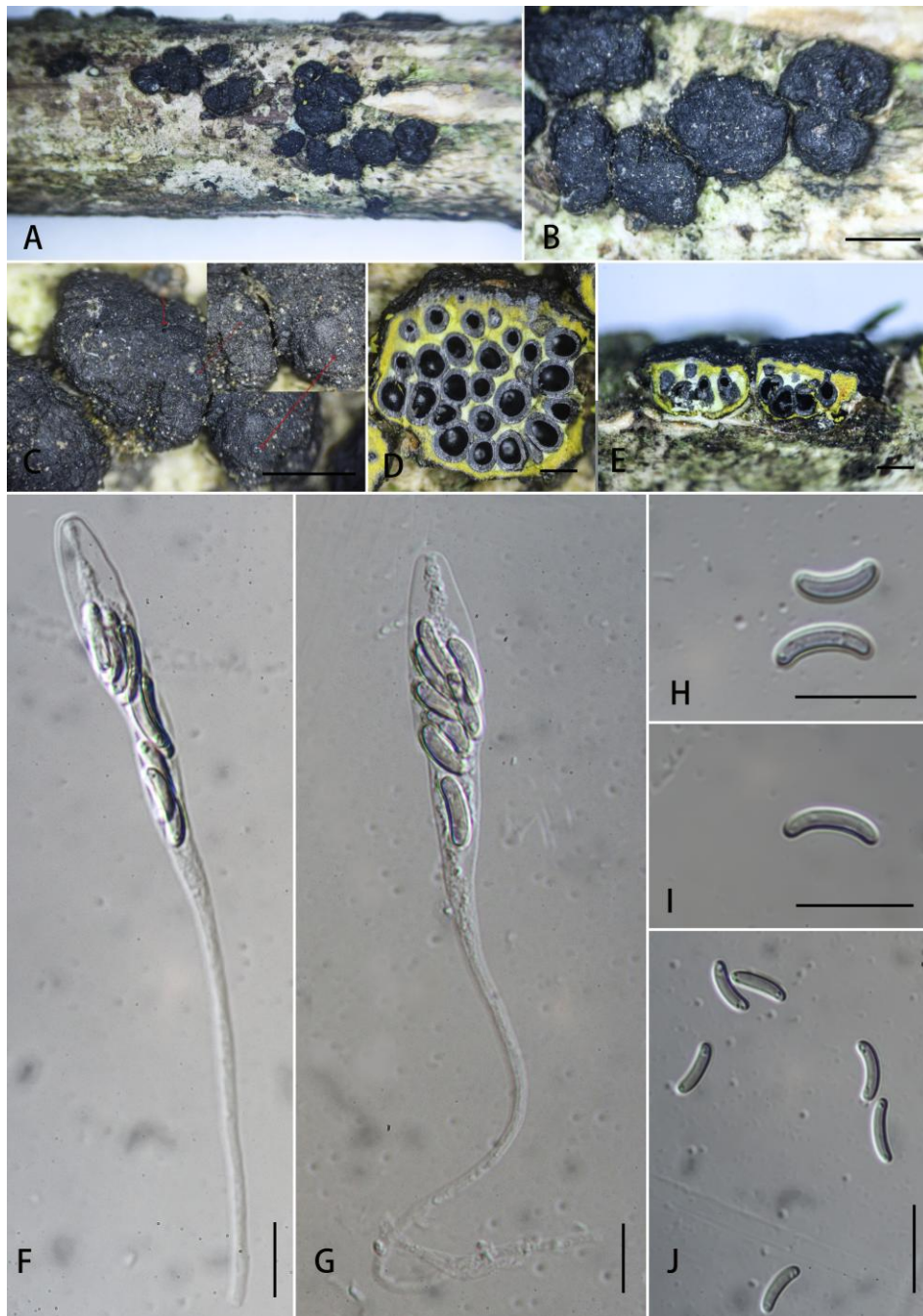


Figure 31 – *Allodiatrype flavigelida* GMB6239, holotype). A–B Appearance of stromata on the host substrate. C ostioles (arrow). D Cross sections stromata showing multi-locules. E Vertical section of stromata. F, G Asci in distilled water. H–J Ascospores. Scale bar: B, C = 3 mm, D–E = 0.5 mm, F, G = 10 μ m, H–J = 15 μ m.

Additional specimen examined – China, Guizhou Province, Anshun City, Pingba District, Gaofeng Town, 26° 17'34.47" N 106° 24'23.23" E, altitude: 1,261 m, on dead branch of unknown tree, May 2024, W.H. Li, WAG-98 (GMB6241; GMBC6241).

Notes – *Peroneutypa heveae* can be distinguished from all known species of *Peroneutypa* by its white entostromatic tissue between the ostiolar neck and its relatively long ascospores (6–9.8 μ m $\times$ 1.5–2.5 μ m, $\bar{x}$ = 8.5 $\times$ 2 μ m).

Compared to *P. cyphelioides*, which also possesses longer ostiolar necks (1–2 mm), can be distinguished from *P. heveae* by its poorly developed interior ascostromata containing 1–10 locules, smaller ascomata (300 μ m diam.), the absence of paraphyses, and smaller asci (15 $\times$ 4–5

μm vs. $15\text{--}23 \times 6\text{--}12 \mu\text{m}$) as well as smaller ascospores ($4 \times 1 \mu\text{m}$ vs. $6\text{--}9.8 \times 1.5\text{--}2.5 \mu\text{m}$) (Rehm 1914, Du et al. 2022).

Peroneutypa cylindrica resembles *P. heveae* in having long ostiolar necks (1–2 mm) and similar-sized ascomata, but differs in having ascostromata with 8–10 locules, the absence of paraphyses, smaller asci ($10\text{--}20 \times 4\text{--}5 \mu\text{m}$), which are pedicellate, and smaller ascospores ($4\text{--}5 \times 2 \mu\text{m}$) (Du et al. 2022).

Phylogenetically (Fig. 30), *P. heveae* is closely related to *P. aquilariae*, but the latter is distinguished by its ascostromata containing 1–6 locules, smaller ascomata (300–570 μm diam.), shorter ostiolar necks (200–300 μm), absent of paraphyses, smaller asci ($15\text{--}20 \times 5\text{--}7 \mu\text{m}$), and shorter ascospores (5–7.5 μm) (Du et al. 2022).

Peroneutypa mackenziei resembles *P. heveae* in having multi-loculate ascostromata and paraphyses. However, *Peroneutypa mackenziei* differs in possessing smaller ascomata (375–555 μm high, 260–450 μm diameter), shorter ostiolar periphysate canals (105–420 μm high), and smaller asci ($14.5\text{--}21.5 \times 3.5\text{--}5 \mu\text{m}$) (Shang et al. 2017).

Peroneutypa longiasca, reported on *Hevea* species and phylogenetically close to *P. heveae*, can be distinguished by its smaller ascomata (180–450 μm high, 170–390 μm diameter), shorter ostiolar necks (190–440 μm), short to long pedicellate asci, absence of paraphyses, and smaller ascospores (3–7 μm , $\bar{x} = 5.8 \mu\text{m}$) (Senwanna et al. 2017).

Based on these morphological differences and phylogeny, we introduce our collection as a new species.

Fasciatisporaceae S.N. Zhang, K.D. Hyde & J.K. Liu, Fungal Diversity 100: 227 (2020)

Anthostomatopsis K. Habib & Q.R. Li gen. nov.

Mycobank No: MB857196

Etymology – The epithet refers to the close resemblance to the genus *Anthostomella*.

Type species – *Anthostomatopsis chinensis*

Notes – Several morpho-molecular studies have introduced anthostomella-like taxa as new genera to resolve the polyphyletic nature of *Anthostomella* (Daranagama et al. 2015, 2016, Konta et al. 2021, Samarakoon et al. 2022, Sugita et al. 2024). Lu and Hyde (2000) emphasized that the position and morphology of ascomata, presence or absence and shape of the J+/J– apical ring, and ascospore morphology play a key role in identifying *Anthostomella* species. However, the type species has not yet been formally designated (proposed *A. limitata* and *A. tomicoides*) and sequenced to provide a phylogenetic affinity (Voglmayr et al. 2018).

Anthostomella exhibits significant morphological variation, including differences in the presence or absence of ascal apical rings and their shapes (flat, wedge-shaped, cylindrical, or inverted hat-shaped), the type of germ slit (straight, sigmoid, half or full length, or spiral), the presence or absence of germ slits, appendages, or mucilaginous sheaths, size and number of cells in the ascospores (one-celled or two-celled), and the shape of ascospores (ellipsoid, fusiform, cylindrical, or lamniform (Lu and Hyde 2000). These distinctive traits suggest that the genus may comprise multiple smaller genera.

However, the limited availability of molecular data for many *Anthostomella* species has hindered efforts to fully resolve its taxonomy. Recent advances in molecular techniques and phylogenetic analyses have begun to clarify taxonomic boundaries, leading to the establishment of several related genera, such as *Alloanthostomella*, *Anthostomelloides*, *Haploanthostomella*, *Neoanthostomella*, *Nigropunctata*, *Pseudoanthostomella*, *Virgaria*, and *Xenoanthostomella*.

Based on morphology, *Anthostomatopsis* does not fit with either *A. limitata* or *A. tomicoides*. *Anthostomatopsis* has deeply immersed ascomata with a thick clypeus, cylindrical, short pedicellate asci with J+/J– flat apical ring, and equilateral ellipsoidal to broad fusiform aseptate ascospores without a germ slit surrounded by a thick mucilaginous sheath. *Anthostomella limitata* is characterized by inequilateral ellipsoidal ascospores with a spiral germ slit, whereas *A. tomicoides* features a wedge-shaped ascal apical apparatus and inequilateral, two-celled ascospores with a straight germ slit (Lu and Hyde 2000), which differentiate these from *Anthostomatopsis*.

Phylogenetically (Fig. 22), *Anthostomatopsis* forms a well-supported clade distinct from *Fasciatispora*, which is morphologically dissimilar. These distinctions, along with phylogenetic analyses, support the recognition of *Anthostomatopsis* as a new genus, contributing to clarifying the taxonomic complexities and resolving the polyphyletic nature of *Anthostomella*.



Figure 32 – *Peroneutypa heveae* (GMB6240, holotype). A–B Appearance of ascostromata on the host substrate. C–E Ascostromata erupt through host tissue by long ostiolar canal. F Cross section of an ascostroma showing multi-locules. G White entostromatic tissue between ascomata ostiolar neck, H Vertical section of ascomata. I Asci in Melzer reagent without apical ring. J Asci in distilled water. K ostiolar canal cells. L Peridium. M, N Ascospores. O non-pedicellate asci attached to a gelatinous matrix. P Paraphyses. Scale bar: B = 0.4 mm, C–H = 1 mm, I, J, M–P = 20 μ m.

Anthostomatopsis chinensis K. Habib & Q.R. Li sp. nov.
Mycobank No: MB857197

(Fig. 33)

Etymology – The epithet "*chinensis*" refers to China, the country where the type species discovered

Description – Saprobiic on dead culm of bamboo, visible as black pustule. **Sexual morph:** *Ascomata* 300–500 µm wide, 200–450 µm high, perithecial, immersed in host tissue beneath the clypeus, solitary, rarely two in contact, globose to subglobose, depressed, with a rounded to flattened base, ostioles protruding outside, distinct. *Ostioles* 50–100 µm wide, 100–170 µm high, centric, dome shaped, neck conical to cylindrical, black. *Peridium* 20–40 µm thick (n = 20), pseudoparenchymatous, cells *texture angularis*, orange brown, inner side hyaline, cell slight flattened. *Paraphyses* 2–4 µm wide, numerous, filled with oil drops, larger than asci. *Asci* 90–140 × 7–10 µm, 8-spored, short stipitate, 20–25 µm long (n = 30), cylindrical, containing eight uniseriate ascospores, and an inamyloid apical apparatus. *Ascospores* 13–20 × 4.2–7 µm, ($\bar{x}$ = 16.8 × 5.9 µm, n = 50), one-celled, equilateral ellipsoidal to broad fusiform, brown, lack germ slit, guttulate to filled with minute oil drops, smooth, surrounded by a 2.5–6.5 µm thick mucilaginous sheath. **Asexual morph:** Not observed.

Culture characteristics – Slow growing, colonies on PDA reaching 14 mm diam., after 6 weeks at 28 °C, cottony, fluffy, thick, circular, dense, margin entire, milky white; reverse yellow-brown.

Material examined – China, Yunnan Province, Jinghong City, Xishuangbanna Nature Reserve, 22°11'07.20" N, 100°33'56.14" E, altitude: 1,106 m, on dead culm of bamboo, August 2024, W.H. Li & Q.R. Li, XJX70 (GMB6213, holotype; GMBC6213, ex-type); *ibid.*, KUN-HKAS 145735 isotype.

Additional specimen examined – China, Yunnan Province, Jinghong City, Xishuangbanna Nature Reserve, 22°11'07.20" N, 100°33'56.14" E, altitude: 1,106 m, on dead bamboo, August 2024, W.H. Li & Q.R. Li, XJX75 (GMB6214, GMBC6214).

Notes – BLASTn searches for the ITS, *rpb2*, and *tub2* sequences of *Anthostomatopsis chinensis* revealed similarities to *Fasciatispora cocoes*, with 89%, 82%, and 80% similarity, respectively. However, *Fasciatispora* species are morphologically distinct, characterized by ascospores with a central pallid band (Hyde 1991).

Morphologically similar species within *Amphigermslita*, *Crassipseudostroma*, *Minuticlypeus*, and *Pallidoperidium* genera of Pallidoperidiaceae, share characteristics including globose, deeply immersed ascomata in host tissue, cylindrical to conical ostiolar necks, unitunicate, cylindrical asci, and unicellular, brown ascospores (Sugita et al. 2024). However, *Anthostomatopsis chinensis* differs by lacking a germ slit and having an inamyloid apical apparatus and are phylogenetically distantly clustered.

In key comparisons with *Anthostomella* species (Lu and Hyde 2000), *Anthostomatopsis chinensis* keys out closer to *A. palmae* and *A. oblongata*. *Anthostomella palmae* and *A. oblongata* both possess germ slits. Furthermore, *A. oblongata* has oblong-ellipsoidal, olivaceous ascospores surrounded by a thin mucilaginous sheath, 0.5–1.5 µm thick, and has been reported on unidentified wood. *Anthostomella palmae* reported on *Phoenix* sp. (*Palmae*) is characterized by smaller, wider asci (85–112.5 × 11.5–15 µm) and ascospores similarly surrounded by a thin mucilaginous sheath (0.5–1.5 µm thick).

Neoanthostomella species are similar in having blackened, circular to elliptical stromata that appear as pustules on the host surface, globose to subglobose, dark brown ascomata, and dark brown ascospores with a mucilaginous sheath and lacking a germ slit. However, *Neoanthostomella* species possess few to many ascomata per stroma and are phylogenetically distinct (Dai et al. 2017).

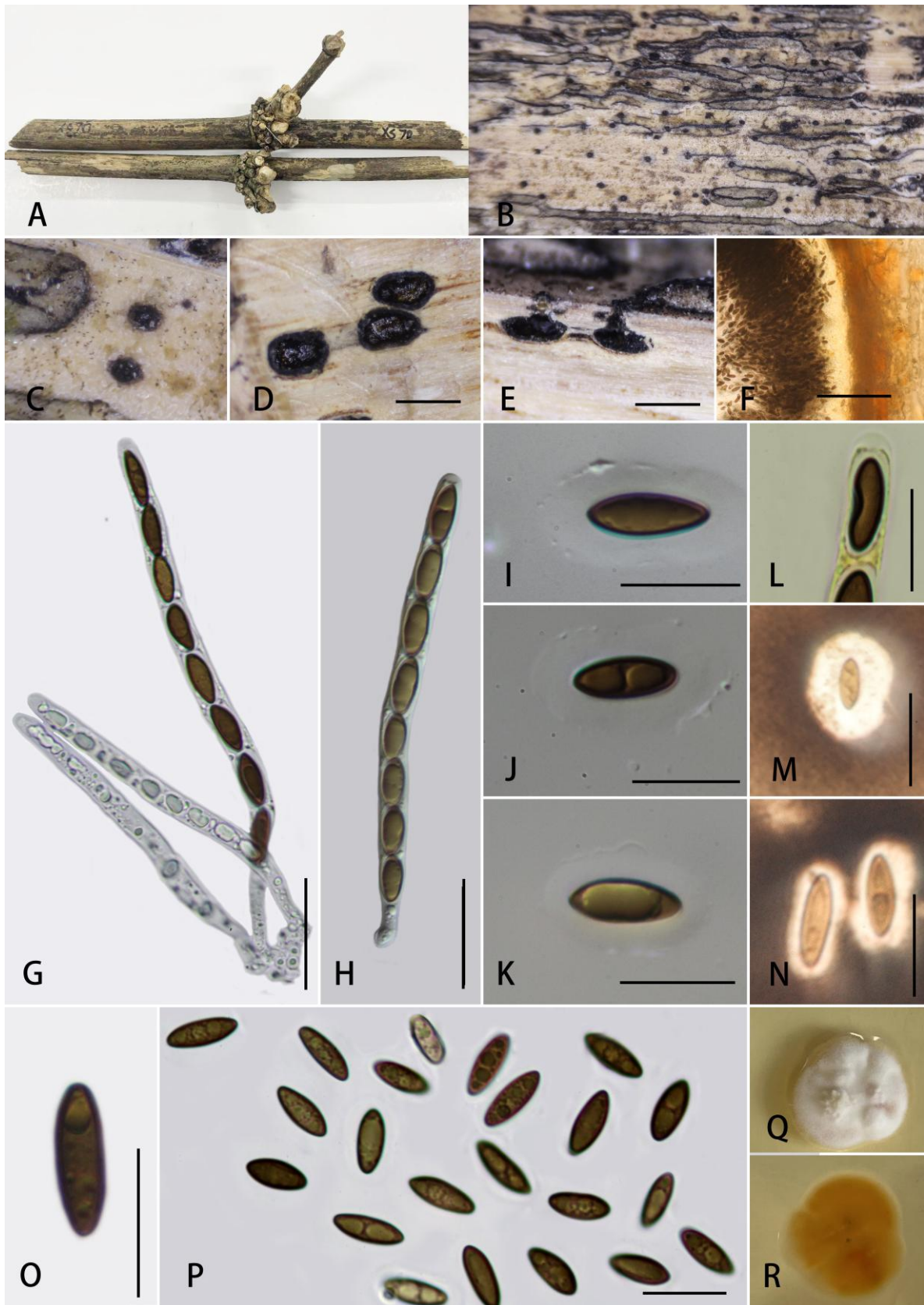


Figure 33 – *Anthostomatopsis chinensis* (GMB6213, holotype). A Bamboo host. B, C Surface view of ascomata. D Cross section of ascomata. E Longitudinal section of ascomata. F Peridium. G, H Asci in distilled water. I–K Ascospores surrounded a thick mucilaginous sheath. L Ascus inamyloid apical apparatus (in Melzer reagent). M, N Ascospores in Indian ink. O, P Ascospores. Q, R Culture in PDA (Q above; R back view). Scale bars: D, E = 0.5 mm, F–H = 30 μ m, I–P = 20 μ m.

Anthostomatopsis guizhouensis (Habib & Li) K. Habib & Q.R. Li comb. nov.

MycoBank No: MB858469

Basionym: *Fasciatispora guizhouensis* K. Habib & Q.R. Li, Mycosphere 16: 48 (2025)

Holotype: China, Guizhou Province, Xishui City, Xishui National Nature Reserve, 28°24'58.37"N, 106°11'14.14"E, altitude: 872 m, on dead bamboo, 4 November 2022, Youpeng Wu, 2022CQG11 (GMB1147 holotype; no culture was obtained); *ibid.*, KUN-HKAS 136288 isotype.

Description – Refer to Liu et al. (2025).

Notes – *Anthostomatopsis guizhouensis* was recently described as a new species within the genus *Fasciatispora* (Liu et al. 2025). The authors classified it in *Fasciatispora* based on molecular phylogenetic data. However, its morphological characteristics do not support its placement in *Fasciatispora*, as its ascospores lack a central pallid band. In our phylogenetic analysis (Fig. 22), *A. guizhouensis* forms a well-supported (100BS/1PP) sister clade with *Anthostomatopsis* species, and its morphological characteristics also align with this genus. Based on these findings, we transfer *F. guizhouensis* from *Fasciatispora* to *Anthostomatopsis*.

Anthostomatopsis suiyangensis K. Habib, W.H. Li & Q.R. Li sp. nov.

(Fig. 34)

MycoBank No: MB857198

Etymology – The specific epithet is derived from Suiyang County, where the holotype was collected.

Description – Saprobiic on dead culm of bamboo, visible as black pustule. **Sexual morph:** *Ascomata* 400–750 µm wide, 300–450 µm high, perithecial, immersed in host tissue beneath the clypeus, solitary, rarely two in contact, globose to subglobose, depressed, with a rounded to flattened base, ostioles protruding outside, distinct. *Ostioles* centric, dome-shaped, neck conical to cylindrical, black, 50–100 µm wide, 100–170 µm high. *Peridium* 20–35 µm thick (n = 20), pseudoparenchymatous, cells *texture angularis*, orange brown, inner side hyaline, cell slight flattened. *Paraphyses* numerous, filled with oil drops, 2–4 µm wide, larger than asci. *Asci* 100–150 × 6–8 µm ($\bar{x}$ = 133 × 7 µm, n = 20), 8-spored, uniseriate, short stipitate, 20–25 µm long (n = 30), cylindrical, with amyloid flat apical apparatus 2–3 µm wide, 1–2 µm high. *Ascospores* 11–16 × 4–5.8 µm, ($\bar{x}$ = 13.3 × 5.2 µm, n = 50), one-celled, equilateral ellipsoidal to broad fusiform, brown, lack germ slit, guttulate to filled with minute oil drops, smooth, surrounded by a 3–6.5 µm thick mucilaginous sheath. **Asexual morph:** Not observed.

Culture characteristics – Colonies on PDA reaching 40 mm diam., after three weeks at 28 °C, cottony, circular, dense, margin entire, white; reverse yellow brown.

Material examined – China, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28°18'56.24" N, 107°06'49.04" E, altitude: 1,538 m, on dead culm of bamboo, August 2022, Qirui Li XWS-79 (GMB6215 holotype; GMBC6215 ex-type); *ibid.*, KUN-HKAS 145736 isotype.

Additional specimen examined – China, Guizhou Province, Suiyang County, Kuankuoshui Nature Reserve, 28°18'56.48" N, 107°06'49.13" E, altitude: 1,542 m, on dead culm of bamboo, August 2024, Qirui Li XWS-120 (GMB6216, GMBC6216).

Notes – Morphologically and phylogenetically (Fig. 22), *Anthostomatopsis suiyangensis* is closely related to *A. chinensis*. However, *A. chinensis* differs from *A. suiyangensis* in having larger ascospores 13–20 × 4.2–7 µm (vs. 11–16 × 4–5.8 µm), smaller ascomata 300–500 µm wide (vs. 400–750 µm wide), and a non-amyloid ascal apical apparatus (vs. amyloid). The ITS sequences of both species showed a length of 537 base pairs, with a similarity of 527 out of 537 (98.2%) and 2 gaps (0.4%), while the *tub2* sequence had a length of 1055 base pairs, with a similarity of 994 out of 1055 (94.2%) and 23 gaps (2.2%).

In key comparisons with *Anthostomella* species (Lu and Hyde 2000), *Anthostomatopsis suiyangensis* keys out closer to *A. zongluensis* and *A. bispapillata*.

Anthostomella zongluensis differs by being reported on *Phoenix* sp. (Palmae), having smaller ascomata (240–310 µm diam. vs. 400–750 µm wide), smaller and wider asci (112.5–130 ×

12.5–15 µm vs. 100–150 × 6–8 µm), and a larger apical apparatus (3–4 µm wide × 2–2.5 µm high, vs. 2–3 µm wide × 1–2 µm high in the current specimen) (Lu and Hyde 2000). *Anthostomella bispapillata* can be easily distinguished by its host, *Xanthorrhoea*, and its much larger ascospores (17.5–27.5 × 7.5–10 µm, vs. 11–16 × 4–5.8 µm), which are surrounded by a thin mucilaginous sheath (vs. a thick sheath) (Lu and Hyde 2000).

Morphologically *Anthostomatopsis suiyangensis* is closely related to *Fasciatispora guizhouensis*. However, the latter can be differentiated by having smaller ascomata 316–355 × 248–336 µm, larger asci 131–182 × 10.4–15.6 µm (vs. 100–150 × 6–8 µm), and slightly broader ascospores 13.4–16.4 × 5.8–6.8 µm with a straight germ slit nearly the length of the spore (vs. lacking a germ slit), surrounded by a 3–4 µm thick mucilaginous sheath (vs. 3–6.5 µm thick mucilaginous sheath). Moreover, *Fasciatispora guizhouensis* has a larger ascal apical apparatus 2.1–3.3 µm high (vs. 1–2 µm high) (Liu et al. 2025). The ITS sequences of both species showed 85.2% identity, with a similarity of 460 out of 540 base pairs and 40 gaps (7.4%), while the TUB2 sequence showed 83.3% similarity and 3.5% gaps.

Muscodoraceae K. Habib & Q.R. Li fam. nov.

Mycobank No: MB858809

Etymology – The family name is derived from the genus *Muscodor*, which is the type genus of this family.

Type genus: *Muscodor* Worapong, Strobel & W.M. Hess, Mycotaxon 79: 71 (2001).

Description – Saprobic on dead wood, leaves, endophytic on leaves, stems and barks. visible as black, carbonaceous spots or papillae. **Sexual morph:** *Ascomata* perithecial, immersed to erumpent, scattered, solitary or in small clusters, globose to subglobose. Clypeus black, leathery to carbonaceous. *Ostiole* papillate, centric, black. *Peridium* pseudoparenchymatous, composed of two layers, brown to dark brown, innermost layer composed of thin-walled, hyaline cells of *textura angularis*; outer layer thick-walled cells of *textura angularis*. *Paraphyses* hyphal, hyaline, thin-walled, septate, rarely branched, longer than the asci. *Asci* cylindrical to fusiform, short-stipitate, with (4–)8 ascospores, with a wedge-shaped or massive bipartite amyloid apical apparatus. *Ascospores* aseptate, single celled (*Spiririma*), or apiosporous, bi-celled with septum (*Emarcea*, *Muscodor*), hyaline or brown to dark brown, ellipsoid or fusoid, with or without germ slit; with or without gelatinous sheath. **Asexual morph.** Conidiophores solitary, erect, subcylindrical, straight to flexuous, unbranched. Conidia idriella-like (*Emarcea*).

Notes – 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 abandoned the family Induratiaceae based on a study of the type species of *Induratia*, *I. apiospora*, which clustered within Barrmaeliaceae. They synonymized Induratiaceae with Barrmaeliaceae and resurrected the genus *Muscodor*, transferring several species of *Induratia* to *Muscodor*. Additionally, *Muscodor* and *Emarcea* were accommodated within the Xylariaceae. However, the authors incorporated a limited number of species in their analysis, which likely influenced the placement of these genera within Xylariaceae.

While the transfer of the type collection of *Induratia* to Barrmaeliaceae is acceptable since its type species clustered within this family, the placement of *Muscodor* and *Emarcea* in Xylariaceae is questionable.

In our phylogenetic analyses (Fig. 22), the species of *Muscodor*, *Emarcea* and *Spiririma* form a distinct clade outside Xylariaceae, represent a distinct family. These findings are consistent with previous studies (Samarakoon et al. 2022, Dissanayake et al. 2024, Zhang et al. 2024, Liu et al. 2025), which challenge the inclusion of these genera in Xylariaceae.

The continued use of the name Induratiaceae is problematic due to the reassignment of its type genus (*Induratia*) to Barrmaeliaceae. Therefore, to resolve this nomenclatural conflict and

maintain a clear and accurate classification, we introduce Muscodoraceae as a new family within Xylariales to accommodate the genera *Muscodor*, *Emarcea*, and *Spiririma*.

We found no teleomorphic characters that reliably distinguish *Muscodor* from *Emarcea*. Both genera share overlapping characters, such as apiosporus ascospores (*Emarcea rostrispora*, *Muscodor lamphunensis*, *M. brunneascosporus*) and cylindrical apical apparatuses (*Emarcea castanopsidicola*, *Muscodor coffeanus*). The anamorphic stage of *Muscodor* is currently unknown.

Phylogenetically, *Muscodor* appears paraphyletic, indicated by a clade formed by *Spiririma* and *Muscodor fengyangensis*. *Spiririma* is morphologically distinct, characterized by aseptate ascospores with a helicoid germ slit, unlike the bi-celled ascospores with or without a straight germ slit observed in *Muscodor* and *Emarcea*.

Anthostomelloides proteae CBS 110127 clustered within the Muscodoraceae clade. However, due to the polyphyletic nature of *Anthostomelloides*, with other species clustering within Xylariaceae, we have excluded *Anthostomelloides* from the current circumscription of Muscodoraceae. These morphological and phylogenetic inconsistencies emphasize the need for more comprehensive research, particularly broader sampling and sequencing, detailed morphological analyses, and clarified anamorph-teleomorph relationships to refine generic and species-level classifications within the family.

Pallidoperidiaceae R. Sugita & Kaz. Tanaka, Mycoscience 65 (1): 30 (2024)

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

Notes – Sugita et al. (2024) introduced *Minuticlypeus* as a new genus with *Minuticlypeus discosporus* designated as the type species. The genus is characterized by its immersed perithecia beneath a minute clypeus, surrounded by pseudostromatic tissue, solitary and subglobose ascomata with periphysate conical ostiolar necks, unbranched paraphyses, 8-spored asci with an amyloid, inverted hat-shaped apical apparatus and unicellular, ellipsoid to oblong brown ascospores flattened fusiform in side view, and surrounded by a mucilaginous sheath, with a germ slit extending over their full length. The genus is currently represented by two species. In this study, a new species and two new combinations are proposed within the genus.

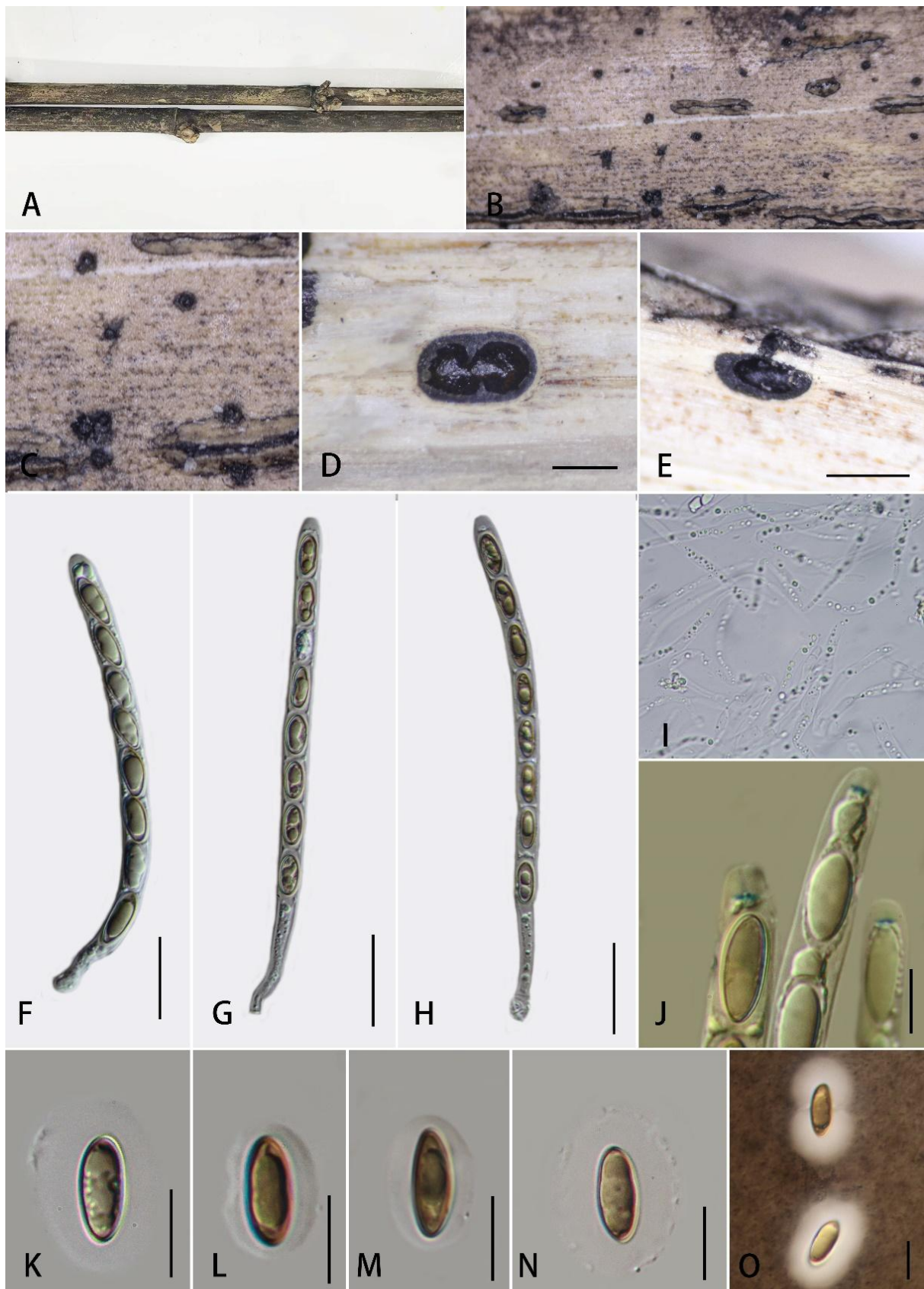


Figure 34 – *Anthostomatopsis suiyangensis* (GMB6215, holotype). A Bamboo host. B, C Surface view of ascomata. D Cross section of ascoma. E Longitudinal section of ascoma. F–H Asci in distilled water. I Paraphyses. J Ascus amyloid apical apparatus (in Melzer reagent). K–N Ascospores. O Ascospores in Indian ink. Scale bars: D, E = 0.5 mm, F–H = 30 µm, J–O = 10 µm.

Minuticlypeus biconcavus K. Habib, X.Y. Luo & Q.R. Li sp. nov.

(Fig. 36)

Mycobank No: MB857199

Etymology – The epithet refers to the biconcave structure of the apical ring

Description – Saprobiic on dead culm of bamboo, visible as black dot. **Sexual morph:** *Ascomata* 300–450 µm wide, 250–350 µm high, perithecial, not deeply immersed, solitary, globose to subglobose, depressed, with a rounded to flattened base, clypeus minute, thin, ostioles inconspicuous. *Ostioles* centric, short conical neck, black, 50–110 µm wide, 30–60 µm high. *Peridium* 15–30 µm thick (n = 20), pale brown, cell texture angularis. *Paraphyses* numerous, filled with flattened large oil drops, 2–4.5 µm wide, longer than asci. *Asci* 140–175 × 15–25 µm ($\bar{x}$ = 149.4 × 21.2 µm, n = 20), 8-spored, cylindrical-clavate, short stipitate, 20–30 µm long (n = 20), with amyloid apical apparatus 4–10 µm high, 4–5.8 µm wide, variable in shape, wedge shaped, become thin in center forming biconcave shape. *Ascospores* 12–20 × 7–11.5 µm, ($\bar{x}$ = 18 × 10.1 µm, n = 50), one-celled, equilateral broad ellipsoidal to broad fusiform, rounded ends, brown, lack germ slit, rarely guttulate, filled with minute oil drops, smooth, surrounded by a 4–6.5 µm thick mucilaginous sheath. **Asexual morph:** Not observed.

Culture characteristics – Ascospores germinating on PDA slow growing, reaching 30 mm in few weeks, velvety, thin, hairy, circular, irregular at the margin, white from above, pale white from below. No sporulation observed.

Materials examined – China, Yunnan Province, Zhaotong City, Tongluoba National Forest Park 28°26'20.40" N, 104°5'12.09" E, altitude: 1315 m, on dead culm of bamboo, April 2024, Xingyu Luo, 2024TLB20 (GMB6221, holotype; GMBC6221 ex-type); *ibid.*, KUN-HKAS 145737 isotype.

Additional specimens examined – China, Guizhou Province, Dushan County, Mawei Village 25°20'25" N, 107°27'21" E, altitude: 846 m, on dead culm of bamboo, August 2024, Wenhao Li 2024DMG29 (GMB6222).

Notes – BLASTn results for the ITS and LSU sequences of *Minuticlypeus biconcavus* did not retrieve any close hits, but showed a close relation to species of Pallidoperidiaceae. The highest similarity was 92% and 94% respectively to the holotype of *M. discosporus* HHUF 30673, and the second highest similarity was to *M. xiaohensis* GMB4503. Phylogenetically (Fig. 35), *M. biconcavus* also clustered closely to these species.

Morphologically, *Minuticlypeus biconcavus* resembles *M. discosporus* in having conical ostiolate ascomata of similar size, with minute clypei and ascospores with sheaths. However, *M. biconcavus* differs from *M. discosporus* by having larger (4–10 µm high, 4–5.8 µm wide) wedge-shaped apical ring that becomes thin in the center, forming a biconcave shape (vs. inverted, hat-shaped, 1–2.5 µm high, 3.5–6 µm diam.) and ascospores lacking a germ slit (vs. having a germ slit extending over the full length) (Sugita et al. 2024). Moreover, *M. discosporus* has smaller and thinner asci (105–130 × 12.5–16.5 µm vs. 140–175 × 15–25 µm). *Minuticlypeus biconcavus* can be differentiated from all *Anthostomella* and *Anthostomella*-like genera by its wider asci and larger (4–10 µm high), distinct biconcave apical ring structure. We classify it as a new species within *Minuticlypeus* based on its morphological similarity and phylogenetic relationship.

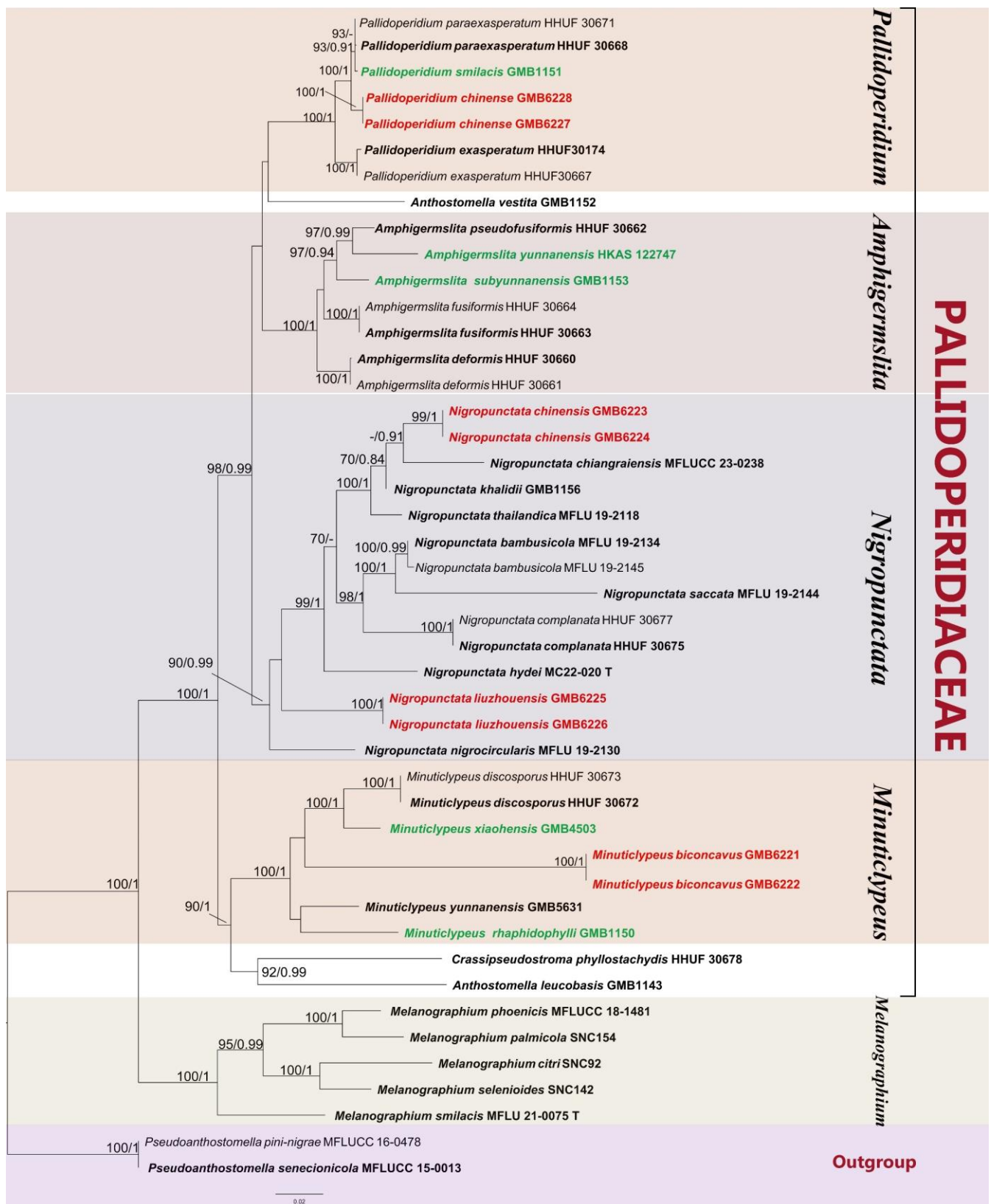


Figure 35 – RAxML tree based on a combined ITS, LSU, *rpb2*, and *tef-1a* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -16001.197024. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in red bold and new combinations in green bold. Ex-type/type strains are indicated in black bold.

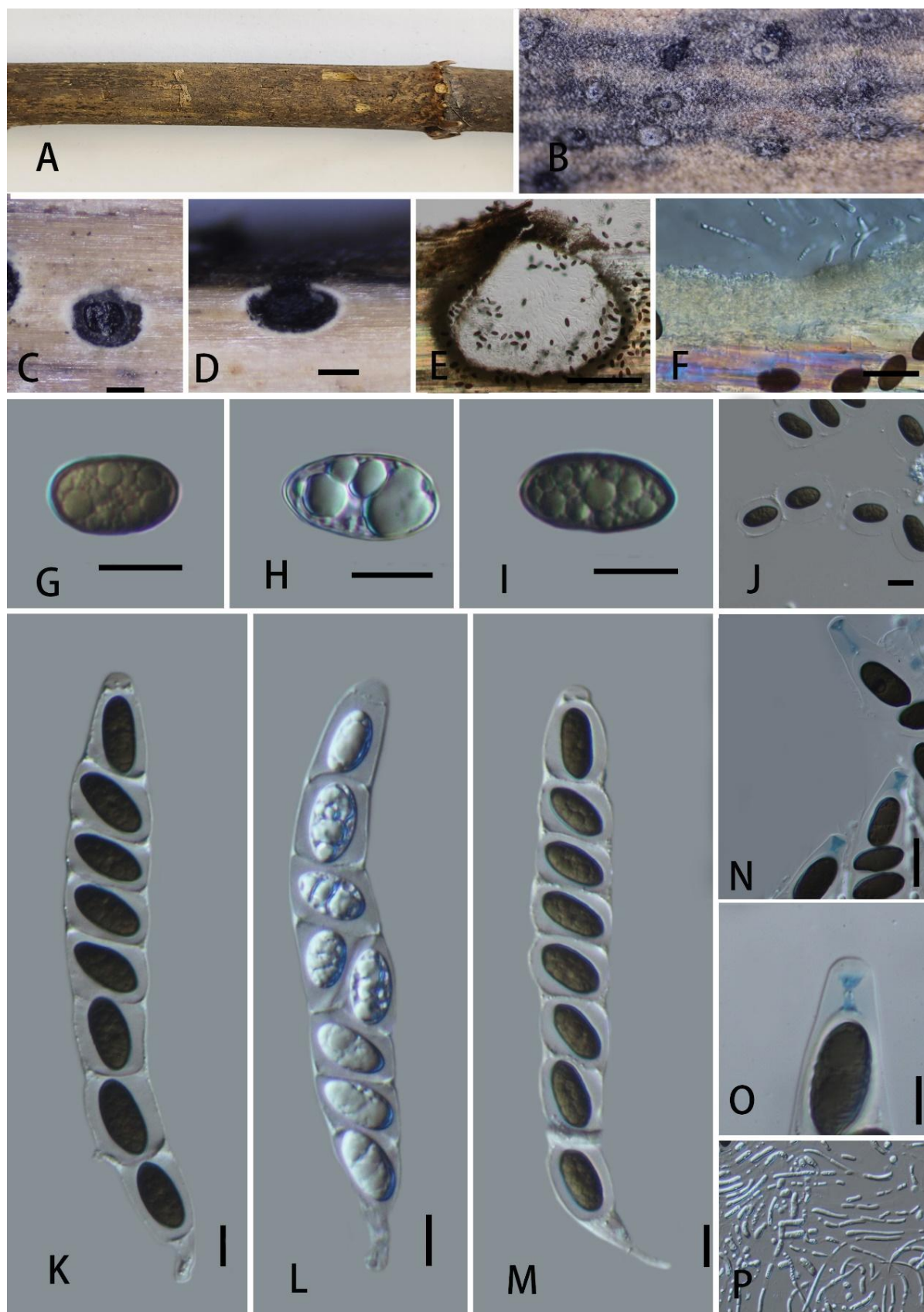


Figure 36 – *Minuticlypeus biconcavus* (GMB6221, holotype) A bamboo host. B ascomata. C Cross section of ascomata. D, E Vertical section of ascomata. F Peridium. G–J ascospores. K–M Asci in distilled water. N–O Asci apical apparatus (stained in Melzer reagent). P Paraphyses. Scale bars: C–E = 0.2 mm, F–J = 10 µm, K–O = 15 µm.

Minuticlypeus rhapsidophylli (Lu & Hyde) K. Habib & Q.R. Li comb. nov.

MycoBank No: MB857200

Basionym: *Anthostomella rhapsidophylli* B.S. Lu & K.D. Hyde, Fungal Diversity Res. Ser. 4: 161 (2000).

Holotype: ARGENTINA, on *Bromelia* sp., 28 Feb. 1979, A.G. Bailey 82-418 (IM243202, as *Anthostomella valparadisiaca*); USA, Florida, on *Rhaphidophyllum hystrix*, 30 Dec. 1944 (W07778, holotype of *Anthostomella rhapsidophylli*).

Description – Refer to Li et al. (2024a).

Notes – The molecular data for *Minuticlypeus rhapsidophylli* were reported by Li et al. (2024a) as a new record from China under the name *Anthostomella rhapsidophylli*. In the same year, the genus *Minuticlypeus* was established by Sugita et al. (2024). However, neither study incorporated the sequences of *M. rhapsidophylli* into their phylogenetic analyses, possibly due to the concurrent publication of the genus and species. In the present study, phylogenetic analyses based on combined ITS, LSU, *rpb2*, and *tef-1α* sequences (Fig. 35), as well as ITS, LSU, *rpb2*, and *tub2* sequences (Fig. 22), *M. rhapsidophylli* clustered within the well-supported clade of *Minuticlypeus*. Morphologically, the species also aligns with key characteristics of the genus. Therefore, we transfer *Anthostomella rhapsidophylli* to the genus *Minuticlypeus*.

Minuticlypeus xiaohensis (Zhou et al.) K. Habib & Q.R. Li comb. nov.

MycoBank No: MB857201

Basionym: *Nigropunctata xiaohensis* X. Zhou, K. Habib & Q.R. Li, MycoKeys 109: 120 (2024)

Holotype: China, Guizhou Province, Guiyang City, Huaxi District, Xiaohe Village, 25°33'10.46"N, 105°38'22.57"E, altitude: 120 m, on bamboo, 1 June 2023, Xin Zhou, Wenyu Zeng, 2023XHC1 (GMB4503, holotype); *ibid.*, KUN-HKAS 134921, isotype.

Description – Refer to Zhou et al. (2024b).

Notes – *Minuticlypeus xiaohensis* was recently introduced as a new species within the genus *Nigropunctata* under the name *N. xiaohensis* (Zhou et al. 2024b). In the phylogenetic analysis, the authors did not include sequences of *Minuticlypeus*, which led to its placement in *Nigropunctata*. In this study, comprehensive phylogenetic analyses were conducted using datasets of ITS, LSU, *rpb2*, and *tef-1α* sequences (Fig. 35), as well as ITS, LSU, *rpb2*, and *tub2* sequences (Fig. 22). The analyses showed that *M. xiaohensis* forms a strongly supported clade in a sister relationship with the type species of *Minuticlypeus*. Moreover, the morphology of *M. xiaohensis* also aligns with the key characteristics of the genus. Therefore, supported by both molecular and morphological evidence, we reclassify this species from *Nigropunctata* to *Minuticlypeus*.

Nigropunctata Samar. & K.D. Hyde, Fungal Diversity 112: 68 (2022)

Notes – *Nigropunctata* was introduced by Samarakoon et al. (2022) to accommodate *N. bambusicola*, *N. nigrocircularis*, and *N. thailandica*, with the former designated as the type species. It was previously classified as a genus *incertae sedis* within the Xylariales (Samarakoon et al. 2022). Recently, Sugita et al. (2024) re-evaluated the genus using multigene phylogenetic analyses and placed it within the Pallidoperidiaceae. The genus is characterized by immersed, solitary or scattered ascomata appearing as small black dots, unitunicate cylindrical asci with a J+ discoid or inverted hat-shaped apical ring, and cylindrical to broadly ellipsoidal ascospores, surrounded by a thick mucilaginous sheath or lack, with a straight germ slit running the entire spore length (Samarakoon et al. 2022). Species within *Nigropunctata* exhibit limited morphological variation, necessitating a combined approach of morphological observation and DNA sequence analysis for accurate identification.

Currently, *Nigropunctata* comprises nine species (Zhou et al. 2024b). In this study, we reclassify two species to other genera, describe two new species from China, and provide an updated key.

Mycobank No: MB857203

Etymology – The epithet *chinensis* refers to the country of the species, China.

Description – Saprobic on dead bamboo culms. **Sexual morph:** *Ascomata* 580–670 µm wide, 355–420 µm high ($\bar{x} = 540.5 \times 392.5$ µm, $n = 10$), immersed under a black thin clypeus, visible as black, circular dots, solitary, scattered, in cross-section subglobose. *Ostioles* papillate on the center, black. *Peridium* 55–80 µm ($\bar{x} = 67.5$ µm, $n = 10$) wide, comprising two layers, outer layer comprising brown to dark brown, cells of *textura angularis*, inner layer thin, composed of hyaline, thin-walled cells of *textura angularis*. *Paraphyses* 1.8–3 µm wide ($\bar{x} = 2.3$ µm, $n = 10$), longer than the asci, numerous, filamentous, sinuous, septate, guttulate. *Asci* 144–180 × 12–16 µm ($\bar{x} = 159 \times 14.3$ µm, $n = 25$), 8-spored, unitunicate, long-cylindrical, short pedicellate, apically rounded, non-amyloid apical apparatus. *Ascospores* 15–17.5 × 9–11.5 µm ($\bar{x} = 16.7 \times 9.9$ µm, $n = 30$), uniseriate, unicellular, brown to dark brown, broad ovoid or elliptical to broadly ellipsoidal, guttulate, lack germ slit and mucilaginous sheath. **Asexual morph:** undetermined.

Materials examined – China, Guangxi Zhuang Autonomous Region, Nanning City, Liangfengjiang National Forest Park, 22°43'20.90" N, 108°26'33.52" E, altitude 99 m, on dead culms of bamboo, April 2023, Y.L. Ren, Q.R. Li, 2023LFJ14 (GMB6223 holotype; GMBC6223, ex-type); *ibid.*, KUN-HKAS 145738 isotype.

Additional materials 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, November 2023, Q.R. Li, LJB10 (GMB6224, GMBC6224).

Notes – Morphologically, *Nigropunctata chinensis* resembles *N. saccate* in lacking mucilaginous sheath around ascospores. However, *N. chinensis* can be distinguished from *N. saccate* by having significantly thicker peridium (55–80 µm vs. 10–15 µm), larger asci (144–180 × 12–16 µm vs. 90–130 × 7–10 µm) with a non-amyloid apical apparatus (vs. amyloid), and wider ascospores (9.2–11.5 µm vs. 4.5–8 µm), which lack a germ slit (present in *N. saccate*) (Samarakoon et al. 2023).

All other species within the genus are characterized by asci with amyloid apical rings and ascospores with germ slits surrounded by a thick mucilaginous sheath, except for *N. khalidii*, which lacks a germ slit. Based on these morphological distinctions and phylogenetic evidence, we propose our collection as a new species.

Key to *Nigropunctata* species

- 1a. Ascospores without mucilaginous sheath 2
- 1b. Ascospores with mucilaginous sheath and germ slit 3
- 1c. Ascospores with mucilaginous sheath and lack germ slit 5
- 2a. Asci 90–130 × 7–10 µm, J+ apical ring *N. saccata*
- 2b. Asci 144–180 × 12–16 µm, J– apical ring *N. chinensis*
- 3a. Ascal apical apparatus 3.2–3.6 µm wide *N. nigrocircularis*
- 3b. Ascal apical apparatus >3.6 µm wide 4
- 4a. Ascomata 615–830 × 770–965 µm, asci 120–155 × 11–16 µm, ascospores 15–18.5 × 7–11.5 µm *N. thailandica*
- 4b. Ascomata 260–340 µm diam., asci 95–140 × 9.5–12.5 µm, ascospores 13.5–17 × 5.5–9.5 µm *N. bambusicola*
- 4c. Ascomata 390–450 µm diam., asci 130–175 × 13–20 µm, ascospores 14.5–19.5 × 7.5–10 µm *N. complanata*
- 5a. Ascomata 606–782 × 762–830 µm, asci 146–173 × 8.6–13.6 µm, ascospores 14.8–18 × 6.3–9 µm *N. khalidii*
- 5b. Ascomata 400–520 × 485–575 µm, asci 150–185 × 11.5–16.5 µm, ascospores 10.5–18 × 4.5–8 µm *N. hydei*
- 5c. Ascomata 450–550 × 510–600 µm, asci 109–157.5 × 9.2–15.5 µm, ascospores 12.4–22 × 6.5–9.7 *N. liuzhouensis*

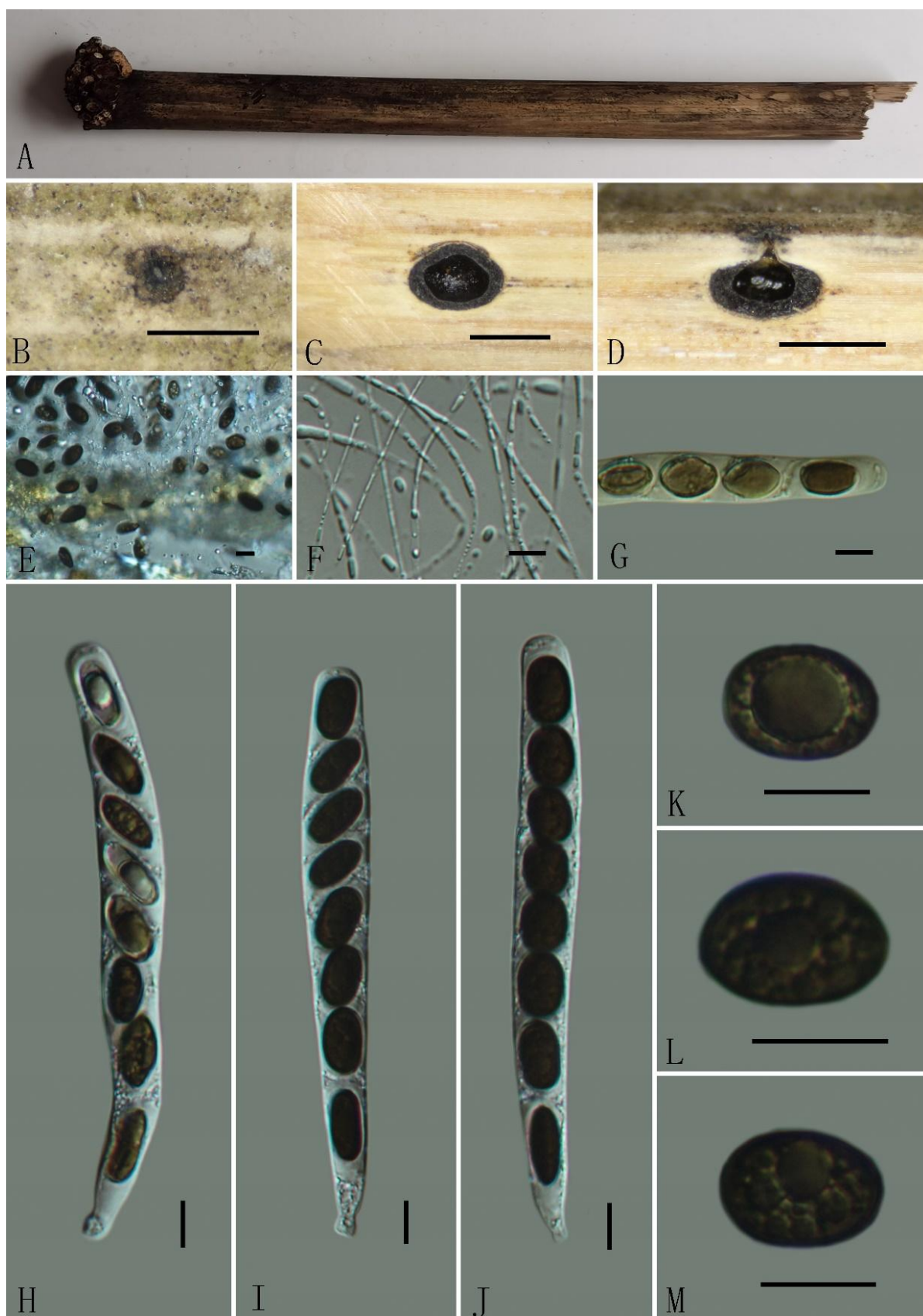


Figure 37 – *Nigropunctata chinensis* (GMB6223, holotype) A Bamboo host. B Ostioles appearance at the host surface. C Cross section of ascoma. D Vertical section of ascoma. E Ascospores. F Paraphyses. G non-amyloid ascal apical apparatus (stained in Melzer reagent). H–J Asci in distilled water. K–M Ascospores. Scale bars: B–D = 0.5 mm, E–G = 15 µm, H–J = 20 µm, K–M = 15 µm.

Nigropunctata liuzhouensis K. Habib, Xin Zhou & Q.R. Li sp. nov.

(Fig. 38)

MycoBank No: MB857202

Etymology – The epithet *liuzhouensis* refers to the Liuzhou City, where the holotype was collected.

Description – Saprobic on dead bamboo culms. **Sexual morph:** *Ascomata* 510–600 μm wide, 450–550 μm high ($\bar{x} = 555 \times 490 \mu\text{m}$, $n = 10$), immersed under a black thin clypeus, visible as black, circular dots, solitary, scattered, in cross-section subglobose. *Ostioles* papillate on the center, black. *Peridium* 15–35 μm wide, comprising two layers, outer layer comprising brown to dark brown, cells of *textura angularis*, inner layer thin, composed of hyaline, thin-walled cells of *textura angularis*. *Paraphyses* 3–4 μm wide ($\bar{x} = 3.8 \mu\text{m}$, $n = 10$), longer than the asci, numerous, filamentous, septate, guttulate. *Asci* 109–157.5 $\times$ 9.2–15.5 μm ($\bar{x} = 130.7 \times 12.3 \mu\text{m}$, $n = 25$), 8-spored, unitunicate, long-cylindrical, short pedicellate, apically rounded, amyloid discoid apical apparatus 1.5–3 $\times$ 3.2–4.5 μm . *Ascospores* 12.4–22 $\times$ 6.5–9.7 μm ($\bar{x} = 16.7 \times 8.6 \mu\text{m}$, $n = 30$), uniseriate, unicellular, brown to dark brown, cylindrical to broadly ellipsoidal, guttulate, surrounded by a 3–6.4 μm mucilaginous sheath, lack germ slit. **Asexual morph:** undetermined.

Materials 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, November 2023, Xin Zhou, 2023LFJ12A (GMB6225 holotype; GMBC6225, ex-type); *ibid.*, KUN-HKAS 145739 isotype.

Additional materials examined – China, Guangxi Zhuang Autonomous Region, Nanning City, Liangfengjiang National Forest Park, 22°43'20.21" N, 108°26'35.15" E, altitude 106 m, on dead culms of bamboo, April 2023, Lu Changtao, LFJ39 (GMB6226; GMBC6226).

Notes – The ITS sequence of *Nigropunctata liuzhouensis* showed no close matches in BLASTn analysis, with its highest similarity being 90% to *Pallidoperidium paraexasperatum* (HHUF 30668). LSU sequences revealed a closer relationship to *Nigropunctata nigrocircularis* (MFLU 19-2130) with 97.8% similarity. The morphological characteristics of *N. liuzhouensis* align with *Nigropunctata*. In both the phylogenetic analyses based on ITS, LSU, *rpb2*, and *tef-1a* sequences (Fig. 35), as well as ITS, LSU, *rpb2*, and *tub2* sequences (Fig. 22), *N. liuzhouensis* clusters closely with *N. nigrocircularis*, however, with low support. Morphologically, *N. liuzhouensis* resembles *N. nigrocircularis* in having similar-sized ascomata, a J+ apical ring, and mucilaginous ascospores. However, *N. nigrocircularis* is distinguishable by its thinner and larger asci (125–170 $\times$ 8–10.5 μm vs. 109–157.5 $\times$ 9.2–15.5 μm) and slightly smaller ascospores (12.5–19 $\times$ 5–8 μm vs. 12.4–22 $\times$ 6.5–9.7 μm), which also possess a straight germ slit along the entire spore length (vs. lack germ slit) (Samarakoon et al. 2022).

Morphologically, *Nigropunctata liuzhouensis* resembles *N. khalidii* and *N. hydei* in key characters, ascospores with mucilaginous sheath and lack germ slit. However, *Nigropunctata khalidii* is differentiated by larger ascomata (608–782 $\times$ 762–830 μm vs. 510–600 μm wide, 450–550 μm high), a thicker peridium (55–80 μm vs. 15–35 μm), larger asci (146–173 $\times$ 8.6–13.6 μm vs. 109–157.5 $\times$ 9.2–15.5 μm), and slightly smaller ascospores (14.8–18 $\times$ 6.3–9 μm vs. 12.4–22 $\times$ 6.5–9.7 μm) (Li et al. 2024a). *Nigropunctata hydei* has larger asci (150–185 $\times$ 11.5–16.5 μm), wider apical apparatus (3.8–5.2 μm vs. 3.2–4.5 μm), and smaller ascospores (10.5–18 $\times$ 4.5–8 μm) (Samarakoon et al. 2023).

The LSU sequence of *Nigropunctata liuzhouensis* shows a high similarity of 97.8% (gaps 0/803) to *N. nigrocircularis* MFLU 19-2130, 96.8% similarity (gaps 2/727) to *N. khalidii* GMB1156, and 95.2% similarity (gaps 15/1064) to *N. hydei* CMUB 40018. ITS sequence similarity is lower, showing 84.6% similarity (gaps 43/521) to *N. nigrocircularis*, 83.8% similarity (gaps 40/458) to *N. khalidii*, and 87.3% similarity (gaps 28/521) to *N. hydei*. Based on these morphological and molecular differences, we introduce our collection as a new species.

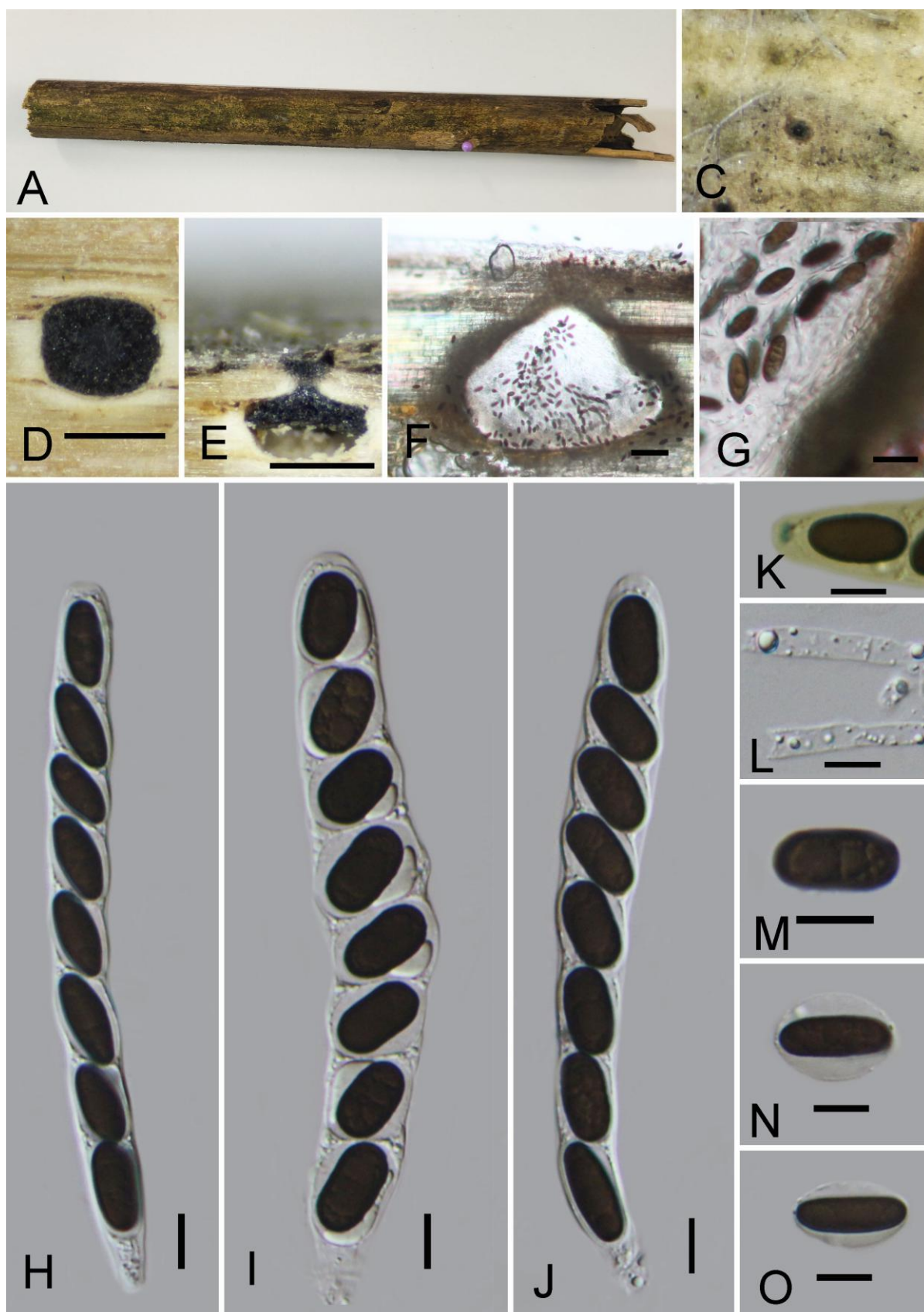


Figure 38 – *Nigropunctata liuzhouensis* (GMB6225, holotype) A Bamboo host. C Ostioles appearance at the host surface. D Cross section of ascoma. E, F Vertical section of ascomata. G Peridium. H–J Asci in distilled water. K Amyloid ascal apical apparatus (stained in Melzer reagent). L Paraphyses. M–O Ascospores. Scale bars: D–E = 0.5 mm, F–G = 200 μ m, H–L = 20 μ m, M–O = 15 μ m.

Pallidoperidium R. Sugita & Kaz. Tanaka, Mycoscience 65 (1): 41 (2024).

The genus *Pallidoperidium* was introduced by Sugita et al. (2024), with *Pallidoperidium exasperatum* designated as the type species. The genus is characterized by perithecial ascomata, immersed, solitary, with a conical to cylindrical, periphysate ostiolar neck, a thick, inconspicuous ascomatal wall composed of hyaline to pale brown cells, surrounded by pseudostromatic tissue, numerous, septate, unbranched paraphyses, unitunicate, cylindrical, 8-spored asci with a thin discoid, amyloid apical apparatus, and ellipsoid to fusiform, unicellular, brown, rough ascospores surrounded by a mucilaginous sheath and with a germ slit. The genus is currently represented by two species, *P. exasperatum* and *P. paraexasperatum*, both reported from Japan (Sugita et al. 2024). In this study, we introduce a new species and a new combination within the genus from China.

Pallidoperidium chinense K. Habib, W.H. Li & Q.R. Li sp. nov.

(Fig. 39)

Mycobank No: MB857204

Etymology – The epithet *chinense* refers to the country of the species, China.

Description – Saprobiic on bamboo. **Sexual morph:** *Ascomata* 300–500 µm high, 350–600 µm wide, perithecial, deeply immersed in host tissue, solitary, globose to subglobose, ostiolar neck cylindrical, 100–200 µm high, 70–100 µm wide. *Peridium* 15–35 µm thick, conspicuous to inconspicuous, inner layer composed of hyaline elongated 6–10 × 2–4 µm cells, outer layer pseudostromatic, pale brown. *Paraphyses* numerous, septate, unbranched, hyaline, 2.5–4 µm wide. *Asci* 120–160 × 10–16 µm ($\bar{x}$ = 139.4 × 14.2 µm, n = 15), 8-spored, unitunicate, cylindrical, apical apparatus non-amyloid. *Ascospores* 18–35 × 5–9.5 µm ($\bar{x}$ = 24.2 × 7.8 µm, n = 40), ellipsoid to fusiform, unicellular, equilateral to rarely inequilateral, hyaline when immature, brown to dark brown mature, smooth, with a germ slit extending over the full-length, surrounded by a thick 3–6.5 µm mucilaginous sheath. **Asexual morph:** undetermined.

Culture characteristics – Ascospores germinating on PDA within 36h, reaching 55 mm in a week at 28 °C, effuse, velvety to hairy, circular, irregular at the margin, white from above, pale yellowish white from below. No sporulation observed.

Material examined – China, Yunnan Province, Xishuangbanna Scenic Spot, 22°16'4.29" N, 100° 54' 21.10" E, altitude: 969 m, on dead culm of bamboo, August 2024, Qirui Li, Wenhao Li, XS-67 (GMB6227 holotype; GMBC6227 ex-type); *ibid.*, KUN-HKAS 145740 isotype.

Additional material examined – China, Guizhou Province, Dushan County, Mawei Village 25°20'25" N, 107°27'21" E, altitude: 846 m, on dead culm of bamboo, August 2024, Wenhao Li 2024X-66 (GMB6228; GMBC6228)

Notes – *Pallidoperidium*, a newly described genus by Sugita et al. (2024), includes species with pseudostromatic ascomatal wall and ellipsoid to fusiform ascospores, characterized by a full-length germ slit surrounded by a thick mucilaginous sheath. Phylogenetically (Fig. 22, 35), *Pallidoperidium chinense* clusters within the *Pallidoperidium* clade and shares key morphological traits of the genus. The genus is currently represented by two species, *P. exasperatum* and *P. paraexasperatum*. *Pallidoperidium chinense* can be distinguished from these species by its larger ascomata, 300–500 µm high and 350–600 µm in diameter (compared to 300–440 µm high and 320–390 µm in diameter for *P. exasperatum*, and 290–350 µm high and 320–340 µm in diameter for *P. paraexasperatum*). Additionally, *P. chinense* has inamyloid apical apparatus and larger ascospores, 18–35 × 5–9.5 µm (vs. 15.5–22.5 × 6–7.5 µm for *P. exasperatum*, and 15–19 × 5.5–7.5 µm for *P. paraexasperatum*) (Sugita et al. 2024).

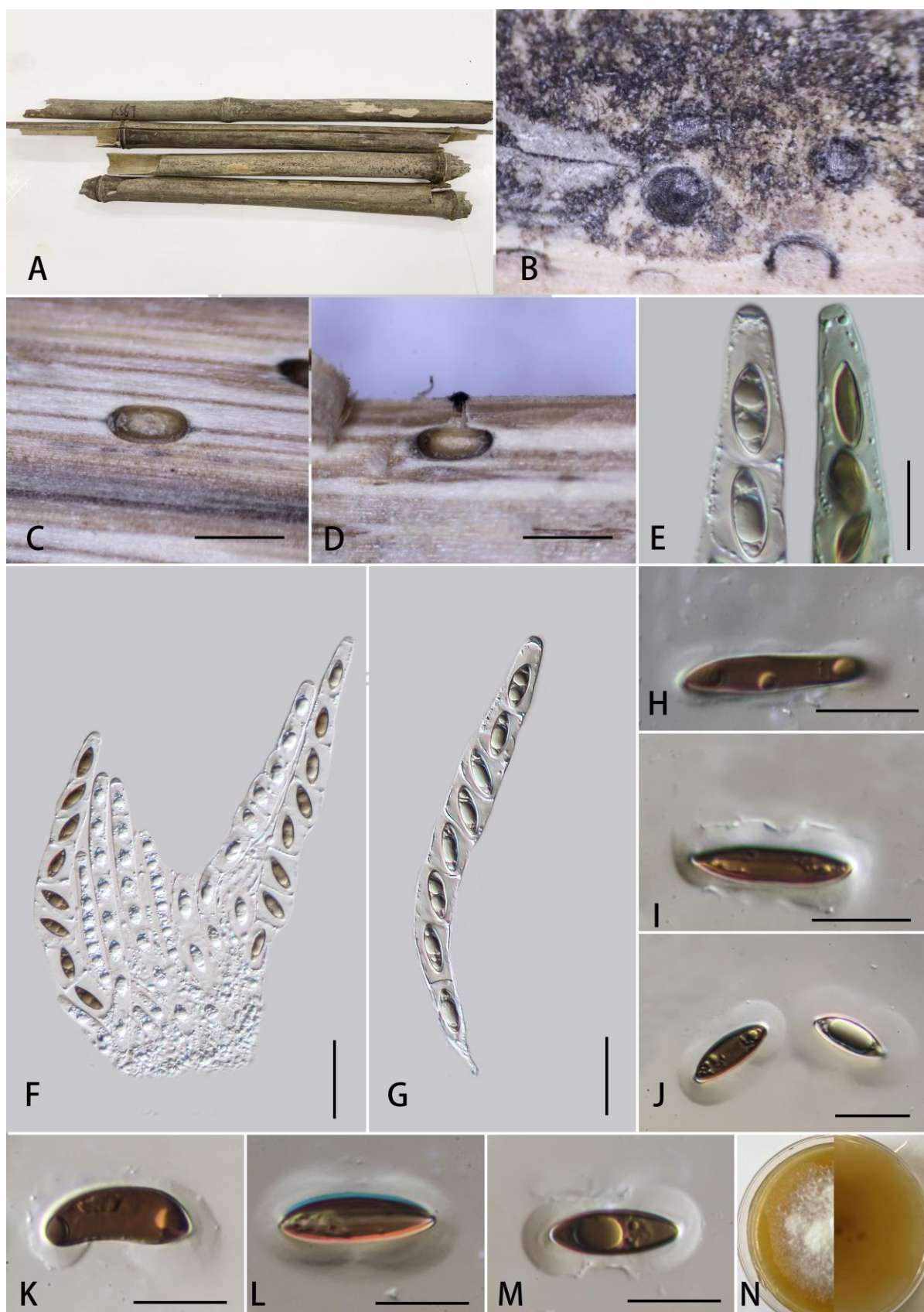


Figure 39 – *Pallidoperidium chinense* (GMB6227, holotype). A Bamboo host. B, Ascoma in face view. C Cross section of ascoma. D Longitudinal section of ascoma. E Ascus apical apparatus (non-amyloid stained in Melzer reagent). F, G Asci in water. H–M Ascospores. N Culture on PDA (white upper surface; yellow yellow–brownish reverse). Scale bars: C, D = 0.5 mm, E–G = 30 μ m H–M = 20 μ m.

Pallidoperidium smilacis (Fabre) K. Habib & Q.R. Li comb. nov.

MycoBank No: MB857205

Basionym: *Anthostomella smilacis* Fabre, Annls Sci. Nat., Bot., sér. 6 9: 80 (1879)

Holotype: FRANCE, Montaud les Miramas, ex Fungi Herb. Brux, 13, slide ex herb. BR (IMI 193880, as *Anthostomella smilacis*); Montaud les Miramas, on *Smilax* sp. (PAD, Holotype of *Sphaeria constipate*).

Description – Refer to Li et al. (2024a).

Notes – The molecular data for *Pallidoperidium smilacis* were reported by Li et al. (2024a) as a new record from China under the name *Anthostomella smilacis*. The morphological characteristics of *P. smilacis* are similar to *P. paraexasperatum* except for the non-amyloid apical ring. In both the phylograms (Fig. 22, 35), *P. smilacis* clustered closely with *P. paraexasperatum*. Based on these molecular and morphological resemblances, we reclassify *Anthostomella smilacis* as a member of *Pallidoperidium*.

Amphigermslita yunnanensis (Ren & Hyde) K. Habib & Q.R. Li comb. nov.

MycoBank No: MB857206

Basionym: *Nigropunctata yunnanensis* G.C. Ren & K.D. Hyde, Mycosphere 15(1): 1063 (2024).

Holotype: China, Yunnan Province, Lijiang, on dead woody twigs of *Magnolia henryi* (Magnoliaceae) 21 December 2019, G.C. Ren, KM16 (HKAS 122747, holotype), ex-type living culture KUMCC 21-0597.

Description – Refer to Ren et al. (2024).

Notes – Ren et al. (2024) introduced *Nigropunctata yunnanensis* as a new species within *Nigropunctata*. However, their phylogenetic analysis included only species of *Nigropunctata*, which likely led to its misclassification. In our phylogenetic analyses of its family (Fig. 35) and (Fig. 22), *N. yunnanensis* formed a well-supported sister clade with *Amphigermslita pseudofusiformis* (HHUF 30662).

Species of *Amphigermslita* form a monophyletic clade and are morphologically characterized by ascospores with short germ slits at both ends, which are difficult to observe and may be overlooked without careful examination (Sugita et al. 2024). Moreover, the apical ring of *Nigropunctata yunnanensis* has not been documented, leaving an important morphological characteristic unaccounted for. A reexamination of the type material is essential to document these characteristics for future comparisons and accurate identification. Based on the strong phylogenetic evidence, we classify it as a member of *Amphigermslita*.

Amphigermslita subyunanensis (Wu & Li) K. Habib & Q.R. Li comb. nov.

MycoBank No: MB857207

Basionym: *Anthostomella yunnanensis* Y.P. Wu & Q.R. Li, Mycosphere 15(1): 300 (2024).

Holotype: China, Yunnan Province, Kunming City, Xishan Forest Park 24°38'53" N, 102°24'24" E, altitude: 1208 m, on dead wood of bamboo, 10 August 2021, Youpeng Wu 2021XS10-1 (GMB1153, holotype); *ibid.*, KUN-HKAS 131178 isotype

Description – Refer to Li et al. (2024a).

Notes – *Anthostomella yunnanensis* has been found to cluster within the *Amphigermslita* clade in our phylogenetic analyses (Fig. 22, 35). This phylogenetic positioning provides strong evidence of its close relationship with *Amphigermslita* species. Morphologically, *A. yunnanensis* shares many key characteristics with members of *Amphigermslita*, including the shape and size of the ascospores and the structure of the apical ring. Given the strong phylogenetic support and the morphological similarities, we classify *Anthostomella yunnanensis* as a member of *Amphigermslita*. Since the name *Amphigermslita yunnanensis* has already been assigned to *N. yunnanensis*, we propose the new name *Amphigermslita subyunanensis* for *Anthostomella yunnanensis*.

Vamsapriyaceae Y.R. Sun, et al. Journal of Fungi 7 (11, no. 891): 7 (2021)

Didymobotryum Sacc., Syll. fung. (Abellini) 4: 626 (1886)

Notes – Saccardo (1886) introduced the genus *Didymobotryum* with *D. rigidum* as the type species. The genus is characterized as saprobic on decaying plant material in terrestrial habitats, forming colonies on natural substrates that are effuse, olivaceous to dark brown or black, and velvety in appearance. The mycelium is mostly immersed, comprising septate, branched, thick-walled, subhyaline hyphae. The asexual morph is hyphomycetous with macronematous, synnematus, erect, straight or broadly curved, dark brown, cylindrical, septate conidiophores, rigid dark brown synnemata of compact parallel conidiophores, monotretic conidiogenous cells that are integrated or discrete, cylindrical to clavate, olivaceous brown to dark brown, and catenate, dry, acrogenous, cylindrical, verrucose, 1-septate, slightly constricted at the septa and olivaceous brown to brown conidia. The sexual morph remains unknown. According to Species Fungorum (accessed April 20, 2025), six species of *Didymobotryum* are currently recognized.

The three genera of Vamsapriaceae, *Didymobotryum*, *Podosporium*, and *Vamsapriya*, have overlapping conidial characteristics. For example, *V. uniseptata* shares conidial features with *Didymobotryum*, but it clusters with the type species of *Vamsapriya* while *V. breviconidiophora* and *V. yunnana* resemble *Podosporium*, classified under *Vamsapriya* (Sun et al. 2021).

In this study, a new species of *Didymobotryum* is described, classified based on its close morphological characteristics with the type species of *Didymobotryum* and its close phylogenetic relationship. Moreover, an identification key to the species of *Didymobotryum* is provided. The morphological descriptions of two species of the genus, *D. korthalsiae* and *D. hymenaeorum*, were not found. We contacted the relevant journals for copies of the original articles, but unfortunately, the journals no longer have copies of these older records.

Didymobotryum bambusae K. Habib, W.H. Li & Q.R. Li sp. nov.

(Fig. 41)

Mycobank No: MB857210

Etymology – The specific epithet *bambusae* refers to the host plant bamboo.

Description – Saprobic on dead bamboo culms, colonies effuse, black, hairy. **Asexual morph:** *Conidiomata* synnematus, erect, rigid, arising in groups of 2–5, sometimes singly, straight or slightly flexuous, fertile at the apex, black, 500–1200 µm long, up to 160 µm wide at the base, 40–75 µm wide in the middle, stipe compact, spirally twisted, flared to a cylindrical to subspherical apical fertile head, 120–190 µm long and 50–80 µm wide, composed of compactly arranged conidiophores, hyphae reddish brown, septate, smooth, 2–2.5 µm wide. *Conidiogenous cells* monotretic, terminal, cylindrical to clavate, integrated to discrete, light brown to reddish brown, smooth-walled, apically rounded, 5–10 × 3.5–5 µm ($\bar{x}$ = 7.5 × 4.2 µm, n = 30). *Conidia* catenate, acrogenous, smooth, cylindrical, rounded at the apex, truncated at the base, thick-walled, 1–2 septate, not constricted at the septa, reddish brown to brown, 12–20 × 4–6 µm ($\bar{x}$ = 15.3 × 5.2 µm, n = 40), thick dark brown band at the septum 1.8–3 µm, sometimes cell with rounded to irregular ornamentation. **Sexual morph:** Undetermined

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 July 2024, W.H. Li GLS15, (GMB6233 holotype); *ibid.*, KUN-HKAS 145743 isotype.

Additional specimen – 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 July 2024, W.H. Li GLS52, (GMB6234)

Notes – Phylogenetically (Fig. 40), *Didymobotryum bambusae* forms a well-supported clade in a sister relationship with *D. rigidum*. Morphological features of *Didymobotryum bambusae* support its placement in *Didymobotryum*, characterized by twisted synnemata and conidia with a prominent dark brown band at the septum. Only *Didymobotryum rigidum* within the genus has smooth conidia and a distinctive thick dark brown band at the septum, which makes it similar to *D. bambusae*. However, *D. rigidum* differs from *D. bambusae* having synnemata with a clavate head and untwisted stipe, as well as smaller 1-septate, 11–12.5 × 4.5–6 µm conidia (vs 1–2 septate 12–20 × 4–6 µm) (Wang et al. 2017).

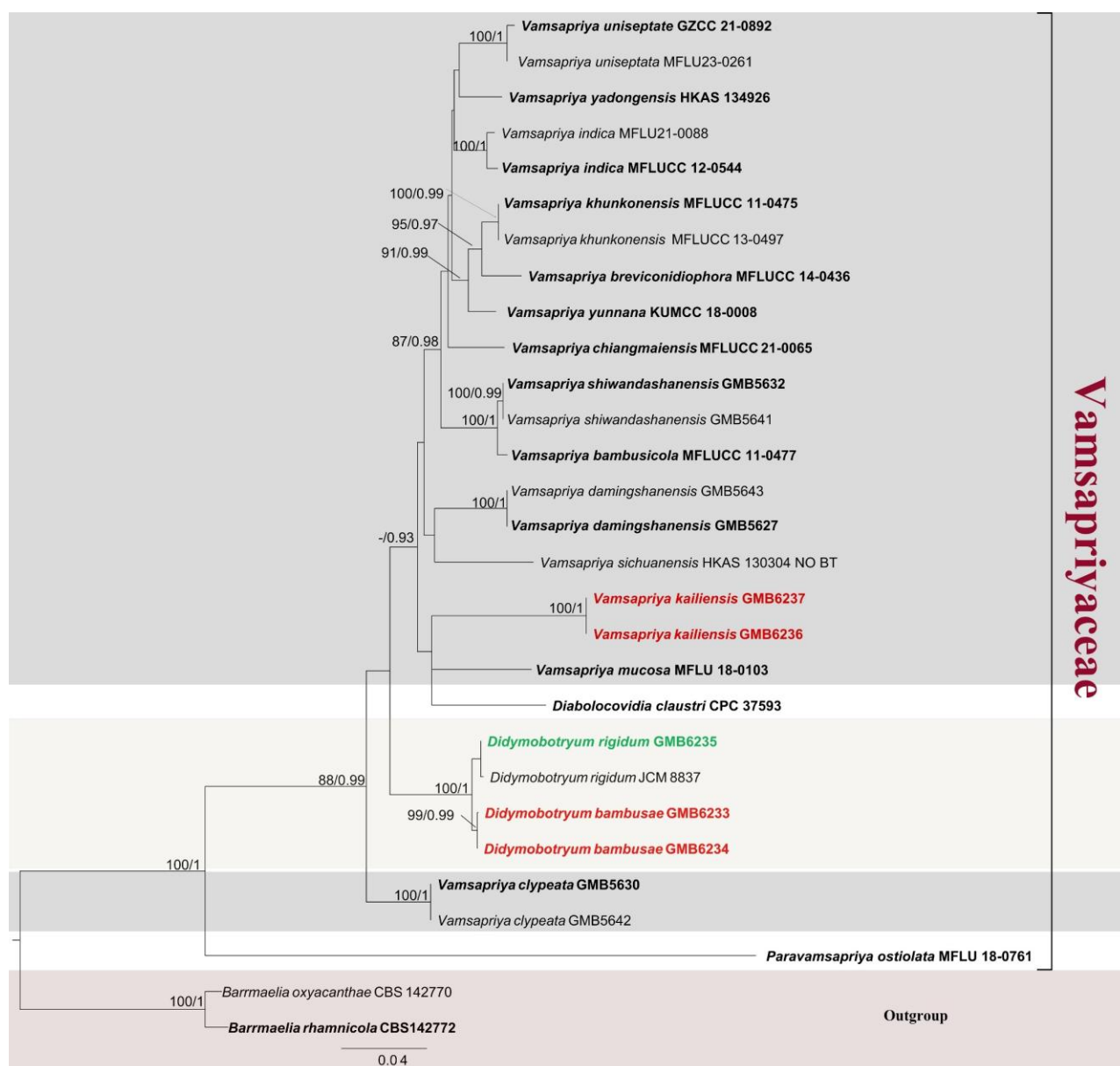


Figure 40 – RAxML tree based on a combined ITS, LSU, *rpb2*, and *tub2* sequences dataset. The best-scoring ML tree had an optimization likelihood value of -8011.582137. Bootstrap support values for maximum likelihood (ML) greater than 70% and Bayesian posterior probabilities (BPP) greater than 0.90 are displayed near the respective branches (ML/BP). The newly described species are marked in red bold and the new record in green bold. Ex-type/typo strains are indicated in black bold.

Key to *Didymobotryum* species

Note – *Didymobotryum kusanoi* is an older record from 1902, and no detailed description and pictures are available; therefore, it is listed separately in the key.

- 1a. Smooth conidia, with thick dark brown band at the septum..... 2
- 1b. Verrucose conidia, without thick dark brown band at the septum 3
- 1c. Synnemata 300–600 µm long, 70–80 µm wide, conidia 1-septate, ovoid or clavate 13–16 × 4–6 µm.....*D. kusanoi*
- 2a. Conidia 1-septate, 11–12.5 × 4.5–6 µm.....*D. rigidum*
- 2b. Conidia 1-2 septate, 12–20 × 4–6 µm.....*D. bambusae*
- 3a. Synnemata with untwisted stipe, conidia 18–22 × 6–8 µm *D. verrucosum*
- 3b. Synnemata with spirally twisted stipe, conidia 10–18 × 4.5–6 µm.....*D. spirillum*

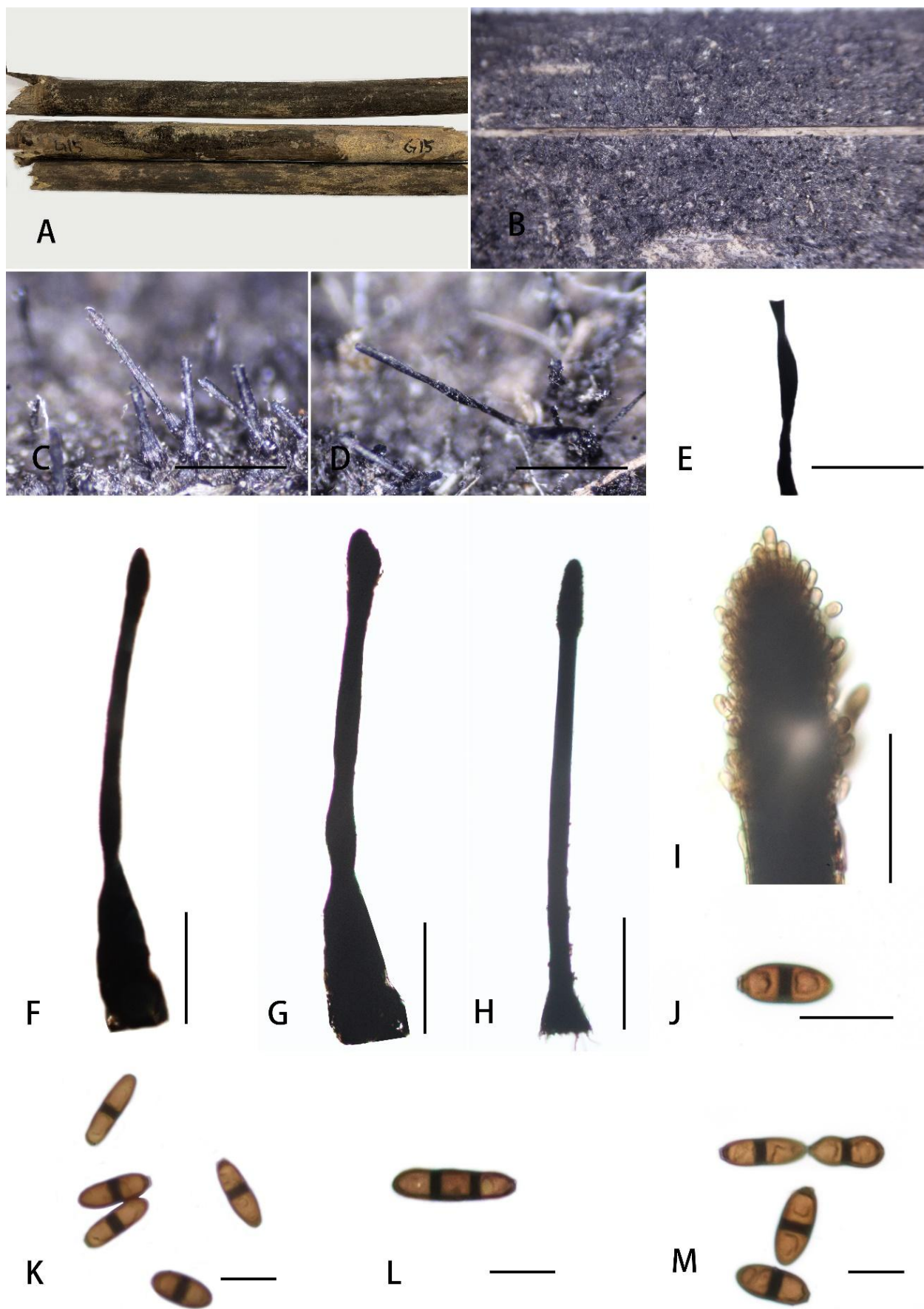


Figure 41 – *Didymobotryum bambusae* (GMB6233, holotype) A–D Colonies on bamboo host. E Twisted stipe. F–H Microscopic view of synnemata. I Apical fertile head (Conidiophore). J–M Conidia. Scale bars: C, D = 0.5 mm, E–H = 300 μ m, I = 100 μ m, J–M = 10 μ m.

Didymobotryum rigidum (Berk. & Broome) Sacc., Syll. Fung. 4: 627. 1886.

(Fig. 42)

MycoBank No: MB190762

Description – Saprobiic on dead bamboo culms, colonies effuse, black, hairy. **Asexual morph:** *Conidiomata* synnematal, base upto 3 mm wide, arising in groups of 2–3, sometimes singly, straight or slightly flexuous, unbranched to branched, erect, black stalk, up to 3 mm long, terminating in olivaceous dark globose to flared or cylindrical fertile heads, up to 1000 μm long, up to 160 μm wide at the base, 40–90 μm wide in the middle, hyphae dark reddish brown, septate, smooth, 2–2.2 μm wide. *Conidiogenous cells* monotretic, terminal, cylindrical to oval, integrated to discrete, light brown, smooth-walled, apically rounded, $4\text{--}6 \times 3\text{--}5 \mu\text{m}$ ($\bar{x} = 5.7 \times 4.3 \mu\text{m}$, $n = 30$). *Conidia* catenate, acrogenous, smooth, cylindrical, rounded at the apex, truncated at the base, thick-walled, 1-septate, slight constricted at the septa, reddish brown to brown, $10\text{--}13.8 \times 3.5\text{--}5.3 \mu\text{m}$ ($\bar{x} = 12.4 \times 4.8 \mu\text{m}$, $n = 30$), thick dark brown band at the septum 1.8–3 μm . **Sexual morph:** Undetermined

Material examined – China, Guizhou Province, Dushan County, Mawei Village 25°20'25" N, 107°27'21" E, altitude: 846 m, on dead culm of bamboo, August 2024, Wenhao Li 2022K6 (GMB6235).

Notes – The morphology of our collection closely resembles that of *Didymobotryum rigidum*, and sequence analysis shows 100% similarity. This species was previously reported in Guangdong Province, China, on decaying twigs of an unidentified broadleaf tree (Wang et al. 2017). In this study, we document it on bamboo from Guizhou Province, indicating a broader host range and distribution.

Vamsapriya Gawas & Bhat, Mycotaxon 94: 150 (2006)

Notes – *Vamsapriya* was introduced by Gawas and Bhat (2006), with its type species *V. indica* described from an anamorph found on dead and decaying bamboo twigs in India. Its anamorph is characterized by colonies on natural substrate, black, mycelium immersed, septate, branched, conidiophores macronematous, synnematos, erect, dark brown, cylindrical, synnemata composed of compact parallel conidiophores, monotretic clavate to cylindrical conidiogenous cells, integrated and brown to dark brown conidia, catenate or solitary, acrogenous, cylindrical, fusiform or obclavate, septate, verruculos. Teleomorph of the genus is characterized by black perithecial ascomata immersed, sub-globose, ostiolate, surrounded by a brown thin-walled peridium, 8-spored short pedicellate, asci, with a J+ apical ring and fusiform to broad fusiform apiosporous ascospores, hyaline, pointed at both ends, with or without mucilaginous sheath (Sun et al. 2021). Fourteen species of *Vamsapriya* have been documented worldwide and only six species of the genus are known to possess a teleomorph (Dai et al. 2017, Sun et al. 2021, Samarakoon et al. 2022, Dissanayake et al. 2024, Liu et al. 2025). In this study, we introduce a new teleomorphic species of *Vamsapriya*, and present a comprehensive key to distinguish the teleomorphic species.

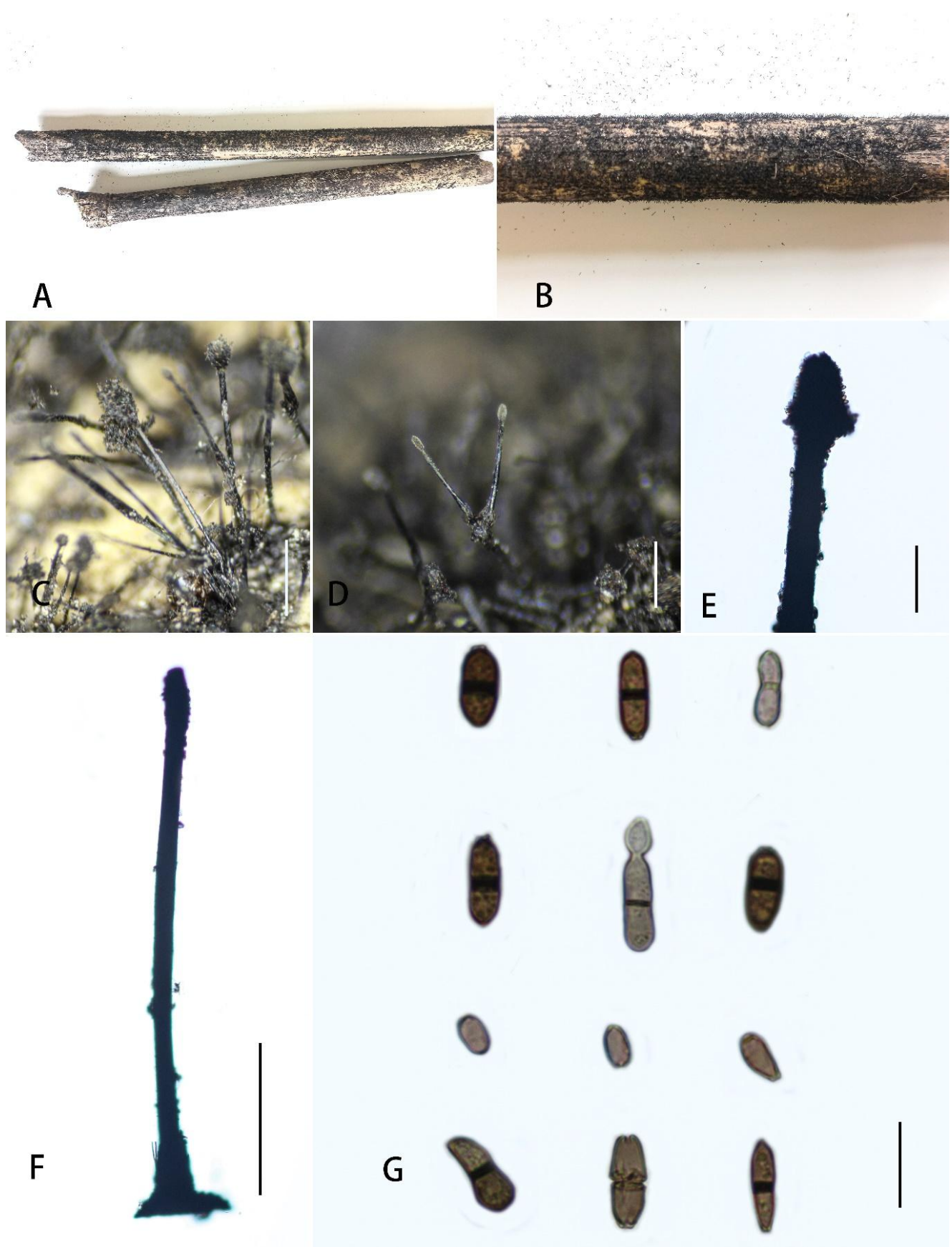


Figure 42 – *Didymobotryum rigidum* (GMB6235) A–B Colonies on bamboo host. C, D Stipe. E Apical fertile head (Conidiophore). F Microscopic view of synnemata. G Conidia and conidiogenous cells. Scale bars: C, D, F = 1 mm, E = 300 μ m G = 10 μ m.

Vamsapriya kailiensis K. Habib & Q.R. Li sp. nov.

(Fig. 43)

MycoBank No: MB857211

Etymology – The specific epithet is derived from Kaili City, where the holotype was collected.

Description – Saprobiic on the surface of dead bamboo. **Sexual morph:** *Ascomata* 320–420 × 475–600 µm ($\bar{x}$ = 364 × 520 µm, n = 10), immersed, visible as black, circular dots, solitary, scattered, in cross-section subglobose. *Ostioles* centric, raised, ostiolar canal periphysate. *Peridium* 10–15 µm ($\bar{x}$ = 12.2 µm, n = 10) wide, two-layered, outer layer comprising yellowish, brown, thick-walled cells of *textura angularis*, inner layer hyaline of flattened cells. *Paraphyses* 1.4–3.2 µm ($\bar{x}$ = 2.4 µm, n = 10) wide, shorter than the asci, hyaline, constricted at septa, guttulate. *Asci* 116–145 × 7–9 µm ($\bar{x}$ = 125 × 8 µm, n = 30), 8-spored, unitunicate, cylindrical, short pedicellate, apex rounded, with a discoid apical ring, J+, in Melzer reagent, 0.8–1.5 × 1.6–2.4 µm ($\bar{x}$ = 1.1 × 2.1 µm, n = 10). *Ascospores* 10–14 × 3.8–5 µm ($\bar{x}$ = 12.8 × 4.5 µm, n = 30), uniseriate, hyaline, ellipsoidal, constricted, apiosporous, usually with large guttules, fusiform to broad fusiform, rounded at both ends, lack mucilaginous sheath. **Asexual morph:** Undetermined.

Material examined – China, Guizhou Province, Kaili City, Leigongshan Nature Reserve 26°13'26.57" N, 108°13'17.83" E, altitude: 892 m, on dead culm of bamboo, August 2023, Youpeng Wu 2020LGS1 (GMB6236 holotype); *ibid.*, KUN-HKAS 145744 isotype.

Additional material examined – China, Guizhou Province, Kaili City, Leigongshan Nature Reserve, 26°13'28.43" N, 108°13'15.63" E, altitude: 780 m, on dead culm of bamboo, August 2023, Q.Z. Wu 2023LGS22 (GMB6237).

Notes – In the BLAST search, the ITS and *tub2* sequences of *Vamsapriya kailiensis* show 93.84% and 88.3% similarity to *V. indica* MFLUCC 12-0544, and 92.9% and 88.1% similarity to *V. mucosa* MFLU 18-0103, respectively. *Vamsapriya indica* is a hyphomycetous fungus characterized by the absence of a known teleomorph. *Vamsapriya mucosa* is the only species within the genus that morphologically resembles *V. kailiensis*. However, *V. mucosa* can be distinguished by its smaller ascomata (260–300 × 320–380 µm vs. 320–420 × 475–600 µm), significantly smaller asci (80–95 × 5–7.5 µm, $\bar{x}$ = 90 × 6 µm vs. 116–145 × 7–9 µm, $\bar{x}$ = 125 × 8 µm), and ascospores surrounded by a 4–10 µm wide mucilaginous sheath (vs. lacking in *V. kailiensis*) (Samarakoon et al. 2022). The sequence analysis of both species also shows low similarity and phylogenetically distinct. All other species within the genus have larger ascospores, greater than 15 µm. Hence, we introduce our collection as a new species based on molecular and morphological differences and phylogeny.

Key to teleomorphic *Vamsapriya* species

- 1a. Ascospores lack a mucilaginous sheath 2
- 1b. Ascospores surrounded by a mucilaginous sheath 3
- 2a. Ascospores 18.5–21 × 7.2–8.9 µm *V. clypeata*
- 2b. Ascospores 20–29 × 5.5–7.5 µm *V. shiwandashanensis*
- 2c. Ascospores 10–14 × 3.8–5 µm *V. kailiensis*
- 3a. Ascospores with a thick mucilaginous sheath 4
- 3b. Ascospores with a thin or inconspicuous mucilaginous sheath 5
- 4a. Ascospores 17–26 × 5.5–8 µm *V. chiangmaiensis*
- 4b. Ascospores 10–14 × 3.5–4.5 µm *V. mucosa*
- 5a. Peridium 10–15 µm wide, ascospores 20.5–26.5 × 6.5–7.5 µm *V. bambusicola*
- 5b. Peridium 50–60 µm wide, ascospores 18–23 × 5–7 µm *V. sichuanensis*
- 5c. Peridium 26.5–55 µm wide, ascospores 21–25 × 7–12.5 µm *V. damingshanensis*

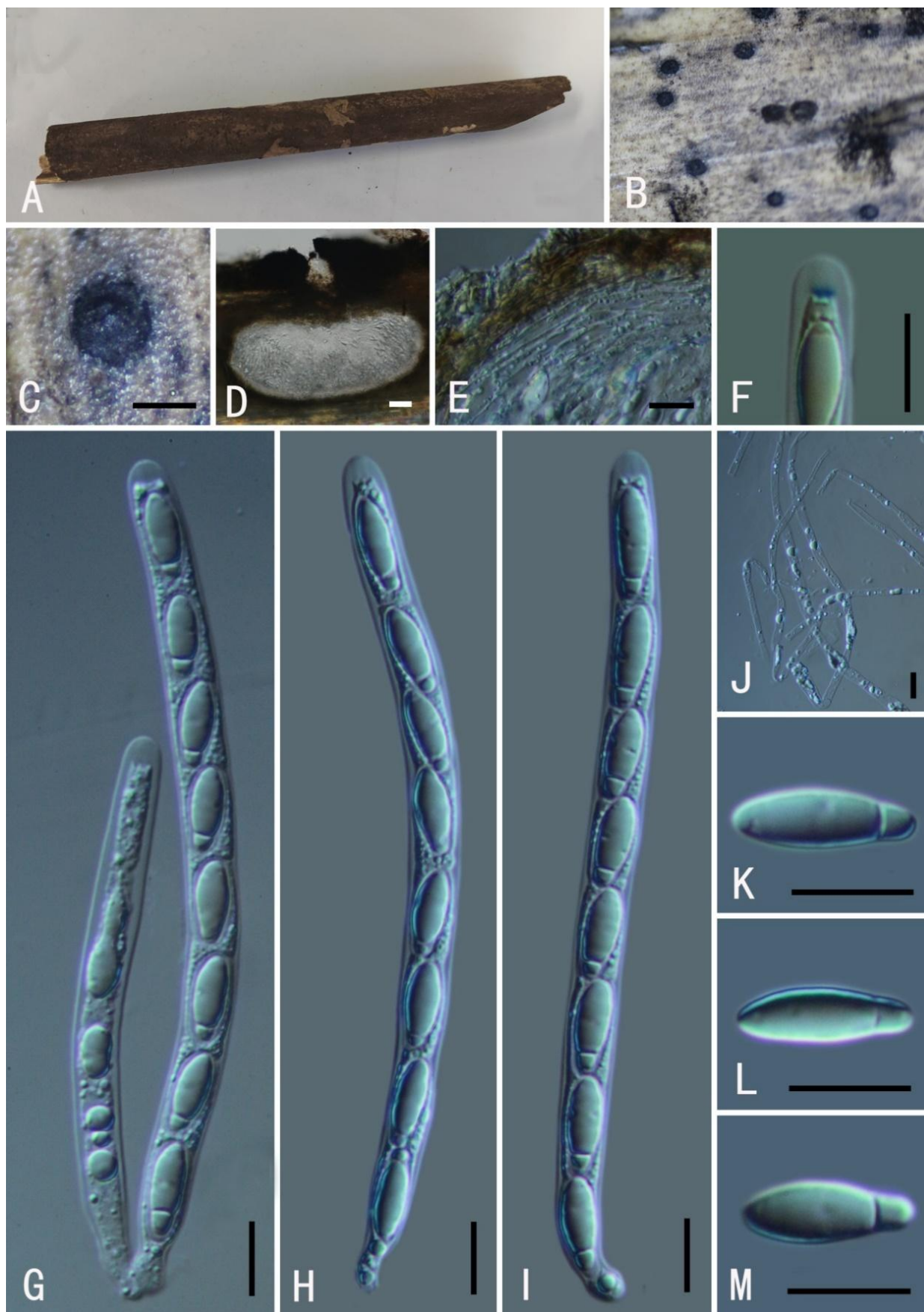


Figure 43 – *Vamsapriya kailiensis* (GMB6236, holotype) A bamboo host. B, C ascomata. D Vertical section of ascomata. E Peridium. F Ascus apical apparatus (stained in Melzer reagent). H–I Asci in distilled water. J Paraphyses. K–M ascospores. Scale bars: C = 0.4 mm, D = 50 μ m, E = 10 μ m, F–I = 20 μ m, J–M = 10 μ m.

Xylariaceae Tul. & C. Tul., Select. fung. carpol. 2: 3 (1861)

Astrocystis Berk. & Broome, J. Linn. Soc., Bot. 14 (73 & 74): 123 (1875)

Berkeley and Broome (1875) introduced the genus *Astrocystis*, with *Astrocystis mirabilis* as the type species, and it has thus far been recorded only from monocots in tropical, subtropical, and neotropical climates (Li et al. 2022, Petrini 2023). The genus, comprising 28 species (Petrini 2023), characterized by uni-, few-, or rarely multi-peritheciate stromata that erumpent through the host epidermis or develop beneath the cuticle, lacking a false subiculum, with 8-spored cylindric-clavate asci bearing a short stipe and small amyloid apical apparatus, and dark brown, unicellular, ellipsoid to beaked ascospores often surrounded by a gel sheath and a straight ventral germ slit of variable length (Læssøe and Spooner 1994). The size of the spores and stromata, along with the length of the germ slit, the shape of the ascospores, and the number of perithecia in a stroma, play a key role in distinguishing the species of *Astrocystis* (Petrini 2023). In this study, we describe a new species of this genus found on *Phyllostachys heterocycla* from China.

Astrocystis liuzhouensis K. Habib, W.H. Li & Q.R. Li sp. nov.

(Fig. 44)

MycoBank No: MB857208

Etymology – The specific epithet is derived from Liuzhou City, where the holotype was collected.

Description – Saprobic on culms of *Phyllostachys heterocycla*, visible as black raised lump on the host. **Sexual morph:** *Stromata* 0.45–0.7 mm diam., 0.4–0.65 mm high, gregarious or scattered, solitary, rarely confluent, superficial, black, oblate to dome-shaped, carbonaceous, mainly 1, sometimes 2 peritheciate ascomata, surrounded by a basal black pseudostromatic region ca. 250 μm wide, with conspicuous protruding thick papillary to irregular shaped ostioles. *Stromata wall* 30–90 μm thick, black. *Ascomata* 400–680 μm diam., 380–600 μm high ($\bar{x}$ = 620 $\times$ 510 μm , n = 30), perithecial, embedded in stromata, black, fragile, carbonaceous. *Ostioles* conspicuous, thick, above stromatal surface, protruding, papillate to irregular thickened. *Paraphyses* 3–4.5 μm wide, septate longer than the asci, branching not observed. *Asci* 100–145 $\times$ 4.5–7 μm ($\bar{x}$ = 125 $\times$ 5.9 μm , n = 30), 8-spored, unitunicate, cylindrical, long pedicellate 40–70 μm , the spore-bearing 50–70 μm , apically rounded, with amyloid tubular shaped apical apparatus, 2–3.5 μm high $\times$ 1.4–2.2 μm wide ($\bar{x}$ = 2.8 $\times$ 1.8 μm , n = 20). *Ascospores* 9–12 $\times$ 4–5 μm ($\bar{x}$ = 11 $\times$ 4.6 μm , n = 30), uniseriate, unicellular, hyaline when immature, dark brown at maturity, equilateral ellipsoid, with rounded ends, smooth, with a straight germ slit of full-length, lack mucilaginous sheath, lack appendages. **Asexual morph:** undetermined.

Culture characteristics – Ascospores germinated on PDA within 24 hours at 28 °C, colonies reached 4–5 cm diam., after 2 weeks, cottony, slightly thinning towards the edge, edge irregular, white from above, reverse similar in color. No conidia observed on PDA.

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, July 2024, W.H. Li CS11 (GMB6229 holotype; GMBC6229, ex-type); *ibid.*, KUN-HKAS 145741 isotype.

Additional specimen – China, Guangxi Zhuang Autonomous Region, Shiwandashan National Forest Park, 21°41'52.03" N, 107°33'54.26" E, altitude: 1,540 m, on dead culm of bamboo, July 2024, W.H. Li, Q.R. Li, SWS22 (GMB6230; GMBC6230).

Notes – *Astrocystis liuzhouensis* is characterized by protruding, papillate to irregular thickened ostioles, long-pedicellate asci (40–70 μm), and ascospores 9–12 $\times$ 4–5 μm lacking a mucilaginous sheath and appendages. These characteristics together differentiate it from other species within the genus. In the ITS BLAST search, *Astrocystis liuzhouensis* showed a high similarity (89%) to *A. bambusae*. Phylogenetically (Fig. 22), also clustered closely. Both species share comparable ascomata sizes. However, *A. bambusae* is distinguished from *A. liuzhouensis* by its stellate or triangular lobate stromata and larger ascospores (10–16.5 $\times$ 4–6 μm vs. 9–12 $\times$ 4–5 μm) with a slimy sheath around the flattened sides and ends. Additionally, immature ascospores of *A. bambusae* possess a single cellular appendage (Ju and Rogers 1990, Petrini 2023).

Astrocystis liuzhouensis shows similarities in ascospore size to the recently described species *Astrocystis heterocyclae* from China, with an 88% similarity in the ITS BLAST search. However, *A. heterocyclae* differs from *A. liuzhouensis* by having wider stromata (0.65–1 mm in diameter), slightly broader ascospores (4.5–6 μm) surrounded by a conspicuous mucilaginous sheath, and smaller, broader asci (108.5–122 $\times$ 8.5–15.5 μm) with a short pedicel (less than 30 μm) (Li et al. 2024a).

Based on the key provided in Petrini (2023), *Astrocystis liuzhouensis* keys out close to *A. rarissima*. *Astrocystis rarissima* is differentiated from *A. liuzhouensis* by its smaller stromata (300–450 μm in diameter, 250–400 μm high vs. 0.45–0.7 mm diam., 0.4–0.65 mm high), filiform paraphyses (1–2 μm wide vs. 3–4.5 μm wide), smaller asci (88–108 μm long vs. 100–145 μm long) with a short pedicel (20–25 μm long), and ascospores with a germ slit extending only half their length (Petrini 2023). Based on these morphological differences and phylogeny, we introduce *Astrocystis liuzhouensis* as a new species.

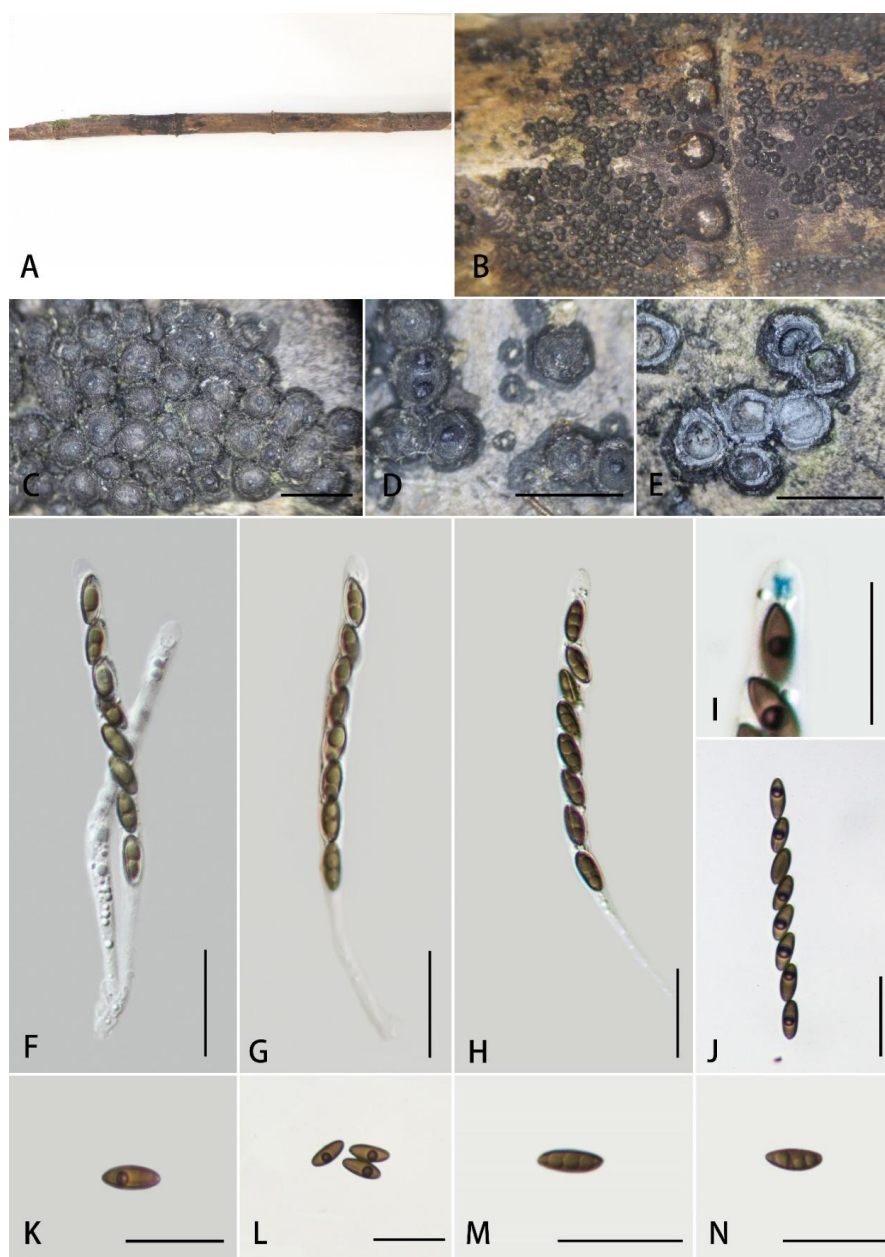


Figure 44 – *Astrocystis liuzhouensis* (GMB6229, holotype). A Bamboo host. B, C Ascstromata in face view. D Ostioles. E Cross sections of ascstromata. F–H Asci in distilled water. I Apical ring (stained in Melzer reagent). J–N Ascospores. Scale bars: C–E = 1 mm, F–H = 30 μm , I–N = 20 μm .

Coniolarrella Dania García, Stchigel & Guarro, Mycol. Res. 110(11): 1285 (2006).

García et al. (2006) introduced the genus *Coniolarrella* with *C. gamsii* as a type species. The genus currently includes four species, characterized by ascomata globose or pyriform, ostiolate or non-ostiolate, and embedded in a well-developed stroma or sometimes lacking a stroma, lack a subiculum, with cylindrical, 8-spored asci with a non-amyloid apex and no apical ring, brown to nearly black ascospores, ellipsoid to slightly asymmetric, with a germ slit (Checa et al. 2008). In this study, we emend the description of *Coniolarrella* by incorporating the presence of amyloid asci and ascospores lacking a germ slit, based on detailed morphological observations of the newly described species, *C. cuneiapicalis*.

Coniolarrella cuneiapicalis K. Habib, W.Y. Zeng & Q.R. Li sp. nov.

(Fig. 45)

MycoBank No: MB857209

Etymology – The epithet refers to the presence of wedge-shaped apical ring.

Description – on a dead branch of an unidentified plant, visible as black raised lump on the host. **Sexual morph:** *Stromata* 0.5–0.7 mm diam., solitary or several fused, globose to dome shaped, wall of ascoma up to 150 µm thick, becoming thin and fragile at maturity, shiny, black soft, smooth, composed of cell of circular to angularis, with small shiny ostiole. *Ascomata* 400–600 µm diam., perithecial, embedded in stroma, globose to sub-globose, dull black. *Ostiole* central to slightly sided, minute papillate, conical. *Paraphyses* aseptate, unbranched 4–8 µm wide. *Asci* 80–102 × 7–10 µm ($\bar{x}$ = 90.3 × 8.8 µm, n = 30), 8-spored, unitunicate, cylindrical, short-stipitate, 15–30 µm long, spore bearing part 60–73 µm with a J+, wedge-shaped, apical ring, 2–3 × 1.8–2.7 µm ($\bar{x}$ = 2.6 × 2.3 µm, n = 30). *Ascospores* 9–11.5 × 4–6.8 µm ($\bar{x}$ = 10.4 × 5.3 µm, n = 30), uniseriate, brown to dark brown, equilateral limoniform, aseptate, with 2–3 guttules when fused form vertical septa, lacking mucilaginous sheath and germ slit. **Asexual morph:** Undetermined, not germinated on PDA nor MAE.

Material examined – China, Guangxi Zhuang Autonomous Region, Chongzuo City, Longzhou County, Nonggang National Nature Reserve 22°28'4.57" N, 106°57'38.52" E, altitude: 535 m, on a dead branch of an unidentified plant, July 2024, Wenyu Zeng, NGYRS23 (GMB6231 holotype); *ibid.*, KUN-HKAS 145742 isotype.

Additional specimen – China, Guangxi Zhuang Autonomous Region, Chongzuo City, Longzhou County, Nonggang National Nature Reserve, 22°28'4.57" N, 106°57'38.52" E, altitude: 535 m, on a dead branch of an unidentified plant, July 2024, Xin Zhou, 2024NG102 (GMB6232).

Notes – BLASTn results of the ITS sequence of *Coniolarrella cuneiapicalis* did not retrieve any close hits, with most hits being unidentified fungal sp. The partial 28S rRNA sequence BLASTn results retrieve *C. cuneiapicalis* within the Xylariaceae, showing similarities to *Xylaria acuta* (96.69%, JQ862637), *Rosellinia sanctae-cruciana* (97.20%, OL704818), and *Coniolarrella macrothecia* (96.55%, MH875219). Phylogenetically (Fig. 22), *Coniolarrella cuneiapicalis* clusters closely with *Rosellinia sanctae-cruciana*, however, its position is not stable. *Rosellinia* species are characterized by uniperithecioid stromata growing from a subiculum and unicellular, asymmetrically ellipsoid, brown, often with a germ slit ascospores (Petrini 2013). The morphological characteristics of our collection do not support its placement within *Rosellinia* but align with the key characteristics of the genus *Coniolarrella*, except for the presence of amyloid asci. The genus currently comprises four species, and *C. cuneiapicalis* is proposed as the fifth. Morphologically, *C. cuneiapicalis* can be distinguished from other *Coniolarrella* species by its smaller ascospores, 9–11.5 × 4–6.8 µm, which lack a germ slit, and by its asci, which possess an amyloid, wedge-shaped apical ring. In ascospore comparison, *Coniolarrella hispanica* (16–17.5 × 9–9.5 µm), *C. ershadii* (16–18 × 9.5–10.5 µm), *C. limoniispora* (16–18 × 10.5–12 µm), *C. gamsii* (16–19 × 6–11 µm), and *C. macrothecia* has the largest ascospores (16–20 × 9–12 µm) (Checa et al. 2008, Zare et al. 2010).

Key to *Coniolarrella* Species

1a. Ascomata ostiolate 2

- 1b. Ascomata non-ostiolate, paraphyses absent *C. hispanica*
 2a. Asci non-amyloid 3
 2b. Asci amyloid, ascospores $9\text{--}11.5 \times 4\text{--}6.8\ \mu\text{m}$ *C. cuneiapicalis*
 3a. Ascomata $>500\ \mu\text{m}$ diam., without setae 4
 3b. Ascomata $200\text{--}500\ \mu\text{m}$ diam., covered with blunt-ended setae *C. ershadii*
 4a. Ascomata $0.6\text{--}0.8\ \text{mm}$ diam., often flattened or depressed above *C. limoniispora*
 4b. Ascomata not flattened or depressed above 5
 5a. Ascomata $500\text{--}800\ \mu\text{m}$ diam., peridium $80\text{--}110\ \mu\text{m}$ thick *C. gamsii*
 5b. Ascomata $800\text{--}1200\ \mu\text{m}$ diam., peridium $170\text{--}250\ \mu\text{m}$ thick *C. macrothecia*

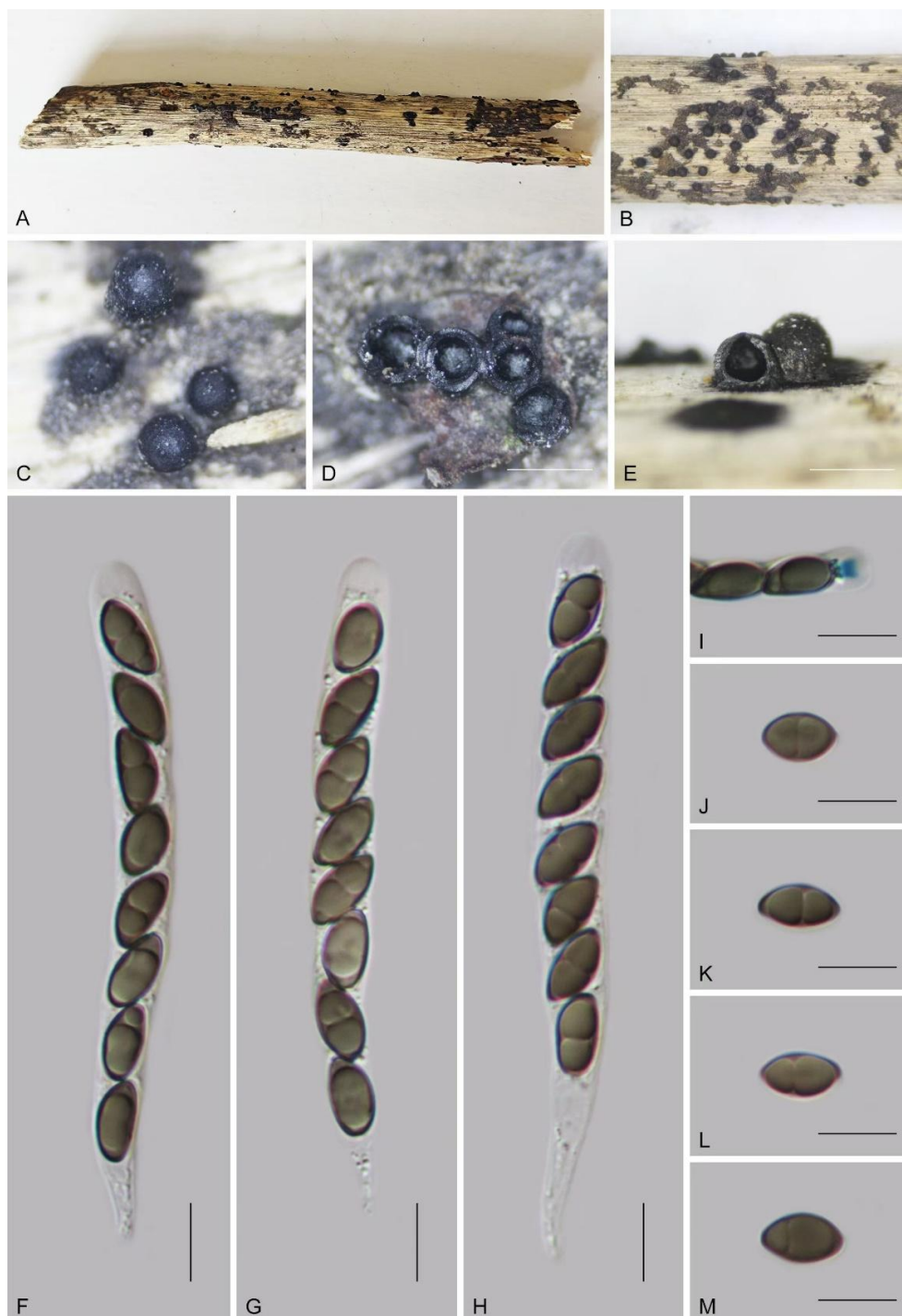


Figure 45 – *Coniolarrella cuneiapicalis* (GMB6231, holotype). A Stromatal habit. B, C Ascstromata in face view. D Cross section of ascostromata. E Vertical section of ascostroma. F–H

Asci in distilled water. I Apical ring (stained in Melzer reagent). J–M Ascospores. Scale bars: D, E= 1 mm, F–H = 20 μ m, I–M = 10 μ m.

Nemania Gray, A natural arrangement of British plants 1: 516 (1821)

Notes – *Nemania* is typified by *N. serpens*, characterized by dark or dull-colored, carbonaceous or brittle stromata that do not release pigment in 10% potassium hydroxide (KOH), stromata pulvinate and attached along the entire base, bearing multiple perithecia not easily separable (cannot be lifted intact from the stroma with a needle), carbonaceous or whitish stromatal interior, cylindrical, long-stipitate asci with amyloid apical rings, and yellowish to dark brown ascospores with ventral or dorsal germ slits, lacking perispore (Ju and Rogers 2002). As of April 20, 2025, Species Fungorum lists 87 species under this genus (www.speciesfungorum.org). In this study, we describe a new species of the genus found on dead branch of an unidentified plant.

Nemania jiuwanshanensis W.Y. Zeng, K. Habib, & Q.R. Li, sp. nov.

(Fig. 46)

Mycobank No: MB857308

Etymology – The species epithet refers to Jiuwanshan National Nature Reserve, the locality where the holotype was collected.

Description – Saprobiic on a dead branch of an unidentified plant. **Sexual morph:** *Stromata* 1–3 mm wide, 0.5–0.9 mm high, pulvinate, 1–3 perithecioid, single distribution to coalescent, rounded to irregular elongated, surface black, hard-textured, with moderately exposed perithecial contours, sloping margins, internally black between ascomata, carbonaceous, does not release a colored pigment in 10% KOH. *Perithecia* 600–1000 μ m diam. $\times$ 500–800 μ m high, globose to subglobose. *Ostioles* black, conspicuous, shiny, finely to conic-papillate, with slight flattened to convex disc. *Asci* 160–240 $\times$ 6–9 μ m ($\bar{x}$ = 218.8 $\times$ 7.1 μ m, n = 30), 8-spored, unitunicate, cylindrical, long-stipitate, the spore-bearing parts 60–95 μ m long, apically rounded with a J+, apical apparatus, 2–2.4 high $\times$ 1.2–2 μ m wide ($\bar{x}$ = 2.2 $\times$ 1.8 μ m, n = 30), tubular shaped with a sharp upper rim. *Ascospores* 11–13.2 $\times$ 4.5–6.5 μ m ($\bar{x}$ = 12.9 $\times$ 5.6 μ m, n = 30), uniseriate, unicellular, ellipsoid, inequilateral, rounded ends, smooth, brown to dark brown, with a fairly conspicuous, straight, spore-length germ slit on the least convex side, lacking a sheath and appendage; perispore indehiscent in 10% KOH. **Asexual morph:** Undetermined.

Culture characteristics. Ascospores germinated on PDA within 24 hours. reach 6 cm diam., after two weeks at 25 °C, cottony, circular, white above, back white, slightly yellow at the center.

Materials 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 a dead branch of an unidentified plant, August 2023, Wenyu Zeng, 2023JWS58 (GMB6267, holotype; GMBC6267 ex-type); *ibid.*, KUN-HKAS 145714 isotype.

Additional specimen examined – China, Guizhou Province, Anshun City, Pingba District, Gaofeng Town, 106°24'23.23" E, 26°17'34.47" N, altitude: 1,261 m, on dead branch of an unidentified plant, August 2024, W.H. Li, Q.R. Li, 2024PG23 (GMB6268, GMBC6268).

Notes – Phylogenetically (Fig. 22), *Nemania jiuwanshanensis* is closely related to *N. landingshanensis*, with both species sharing similar ascospore sizes and finely to conically papillate ostioles. However, *N. landingshanensis* can be distinguished by its light brown to brown stromatal surface, with dark brown to black pigmentation restricted to the area around the ostioles, slightly smaller stromata (0.55–0.8 mm in diameter), and larger asci (180.5–268 μ m in length) with a larger jar- or urn-shaped apical apparatus (2–3 μ m wide, 2.5–4 μ m high) (Li et al. 2024a). In contrast, *N. jiuwanshanensis* has a black stromatal surface including the area around the ostioles, larger ascomata (600–1000 μ m diam) and smaller asci (160–240 μ m in length) with a smaller tubular-shaped apical apparatus, (1.2–2 μ m wide, 2–2.4 μ m high). The ITS sequence comparison of both species revealed a similarity of 97.9%, with 10 nucleotide differences and 0.8% gaps (4/481). The LSU sequences showed 42 nucleotide differences and 1.2% gaps (10/844), the *rpb2* sequences exhibited 10 nucleotide differences and 0.1% gaps (1/1055), and the *tub2* sequences revealed 12 nucleotide differences and 1.1% gaps (8/732).

Morphologically, *Nemania jiuwanshanensis* resembles *N. immersidiscus* in ascomatal size and ascal apical apparatus. However, *N. jiuwanshanensis* differs in having a carbonaceous stromatal interior, a non-sunken ostiolar disc, larger asci (160–240 μm in length), and smaller ascospores (11–13.2 μm in length). In contrast, *N. immersidiscus* has a stromatal interior consisting of soft, whitish, fibrous to cottony tissue between and beneath the perithecia, sunken ostiolar discs, smaller asci (110–200 μm), and slightly larger ascospores (10–16 μm) (Van Der Gucht 1995)

Morphologically, *Nemania jiuwanshanensis* is also similar to *Nemania camelliae* in having a carbonaceous stromatal interior and similar ascospore sizes. However, *N. camelliae* differs by possessing finely papillate ostioles that are conspicuously sunken within a shallow discoid depression and larger asci (180–290 μm) with a larger jar- or urn-shaped apical apparatus ($2\text{--}3 \times 2.5\text{--}4 \mu\text{m}$) (Pi et al. 2021). In contrast, *N. jiuwanshanensis* has a non-sunken ostiolar disc, smaller asci, and a smaller tubular-shaped apical apparatus ($2\text{--}2.4 \times 1.2\text{--}2 \mu\text{m}$). Based on these differences and phylogeny, we introduce our collection as a new species.



Figure 46 – *Nemania jiuwanshanensis* (GMB6267, holotype). A Host. B Stromata on host surface. C Ostiole. D Cross section of stroma. E Vertical section of stroma. F–H Asci in distilled water. I

Apical ring (stained in Melzer reagent). J–M Ascospores. Scale bars: C–E = 0.5 mm, F–I = 15 μ m, J–M = 10 μ m.

Rosellinia De Not., Giorn. Bot. Ital. 1: 334 (1844)

Notes – *Rosellinia* is a cosmopolitan genus typified with *R. aquila*, characterized by uniperithecioid stromata sometimes confluent, growing from a subiculum, globose perithecia, filiform paraphyses, cylindrical, long-stipitate asci and asymmetrically ellipsoid to fusoid, light to dark brown, often with a germ slit ascospores (Petrini 2013). The genus is represented by approximately 200 species worldwide (Hyde et al. 2024). In the present study, we have identified two new species of the genus growing on dead culm of bamboo.

Rosellinia nemaniae K. Habib, W.Y. Zeng & Q.R. Li sp. nov.

(Fig. 47)

MycoBank No: MB857306

Etymology – The epithet is derived from the genus *Nemania*, reflecting its phylogenetic placement within the *Nemania* clade.

Description – Saprobiic on submerged dead culm of bamboo. *Subiculum* sulphur yellow, felted to woolly, appressed, covering complete stromata and in between stromata, persistent.

Sexual morph: Stromata 400–800 μ m high, 500–680 μ m wide ($n = 30$), sub globose, with a flattened to dome shaped top, black, solitary to gregarious, rarely 2 fused together, uni-perithecioid, surface black, shiny, conspicuous papillate ostiole, often with discoid base. *Ectostroma* 30–70 μ m thick, black. *Entostroma* white to cream, reduce to the base, absent in mature. *Perithecia* 500–720 μ m high, 400–620 μ m wide. *Asci* 91–120 $\times$ 7–11 μ m ($\bar{x} = 100.4 \times 8.6 \mu$ m, $n = 20$) total length, the spore-bearing parts 45–70 μ m ($\bar{x} = 57.1 \mu$ m, $n = 10$), 8-spored, cylindrical, unitunicate, with a J+ cuboid apical ring, 1.3–2.5 $\times$ 0.9–2.6 μ m ($\bar{x} = 1.7 \times 1.6 \mu$ m, $n = 15$). *Ascospores* 8–10 μ m $\times$ 4–6.6 μ m ($\bar{x} = 9 \times 5.6 \mu$ m, $n = 30$), equilaterally ellipsoidal with broad rounded ends, brown to dark brown, with straight germ slit, less than spore length. **Asexual morph:** Undetermined

Culture characteristics – Ascospores germinated on PDA within 48 hours, colonies on PDA reached 3.5 cm diam. in 1 week. On OA media, colonies medium thin, irregular edge, margin flat, white from above, reverse yellow white. No conidia observed on PDA or OA media within two months.

Materials examined – China, Guangxi Zhuang Autonomous Region, Nanning City, Liangfengjiang National Forest Park, 22°43'20.90" N, 108°26'33.52" E, altitude 99 m, on dead culms of bamboo, April 2023, Y.L. Ren 2023LBX15, (GMB6263 holotype; GMBC6263, ex-type); *ibid.*, KUN-HKAS 145715 isotype.

Additional specimen examined – China, Guangxi Zhuang Autonomous Region, Nanning City, Liangfengjiang National Forest Park, 22°43'20.73 " N, 108°26'32.48 " E, altitude 99 m, on dead culms of bamboo, April 2023, Hongmin Hu, 2023LFJ91, (GMB6264, GMBC6264).

Notes – In ITS, LSU, and *rpb2* BLASTn sequence analysis, *Rosellinia nemaniae* showed similarity to species of *Nemania* and *Rosellinia*. The highest similarity in LSU and *rpb2* was 98% and 91%, respectively, to an unidentified *Nemania* sp. (BCC 30850), reported in a study on fungal chemistry (Kornsakulkarn et al. 2017). In ITS, the highest similarity was 94.63% to *Rosellinia subiculata*. In the phylogram (Fig. 22), *Rosellinia nemaniae* is closely related to both of these species. *Nemania* sp. BCC 30850 is an unpublished taxon and its morphological features, particularly its brownish subiculum visible in the provided images, suggest it may belong to *Rosellinia* (Kornsakulkarn et al. 2017).

Morphologically, *Rosellinia nemaniae* is closely related to *R. subiculata*, which also possesses a felted to cottony yellow subiculum, a similarly sized apical ring, and ascospores with a germ slit shorter than the spore length. However, *R. subiculata* differs by having larger stromata (300–1000 μ m wide vs. 500–680 μ m wide), larger asci (97–155 μ m vs. 91–120 μ m), slightly larger ascospores (8.5–13.5 $\times$ 4–7.5 μ m vs. 8–10 μ m $\times$ 4–6.6 μ m), and being reported on dead dicot hardwoods (Petrini 2013).

Rosellinia pardalios also has a yellow felted subiculum and smaller ascospores, but can be distinguished by its shorter-wider stromata (300–450 × 475–775 µm), asymmetrical ascospores, and its occurrence on decorticated dicot wood (Petrini 2013).

Rosellinia nemaniae shares a similar habitat with *R. neblinae*, as both are associated with monocot hosts. However, *R. neblinae* is distinguished by its white subiculum and smaller ascospores (7.1–7.3 × 3.9–4.5 µm) (Petrini 2013).

Phylogenetically (Fig. 22), *Rosellinia nemaniae* clusters within the *Nemania* clade. However, its morphological characteristics align with those of *Rosellinia*. We classify our collection within *Rosellinia* based on its morphological similarities and the polyphyletic nature of the genus.

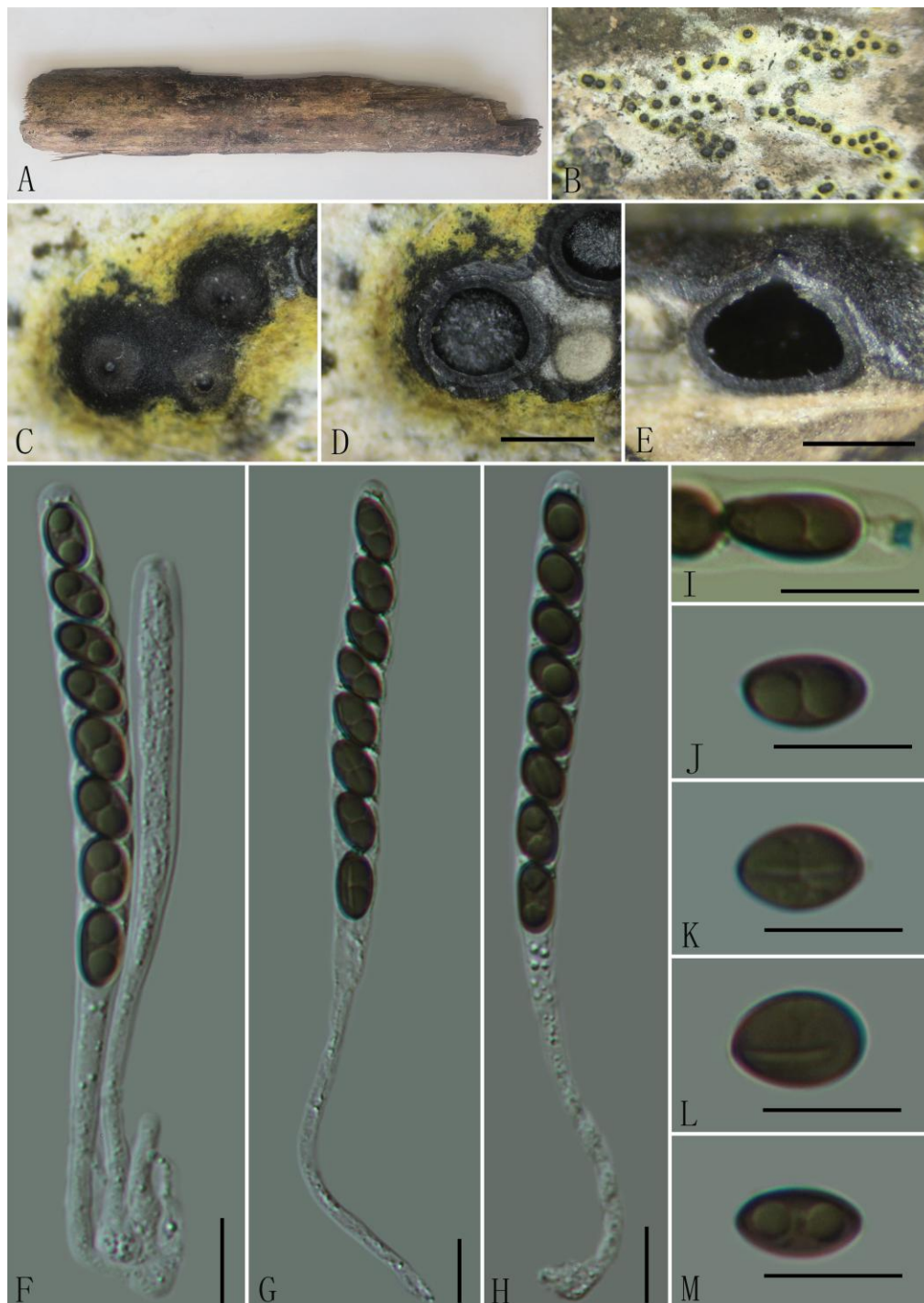


Figure 47 – *Rosellinia nemaniae* (GMB6263, holotype). A Host. B, C Stromata in face view. D Cross section of stromata. E Vertical section of stromata. F–H Asci in distilled water. I Apical ring

(stained in Melzer reagent). J–M Ascospores. Scale bars: D, E= 0.5 mm, F–H = 20 μ m, I–M = 15 μ m.

Rosellinia putrida K. Habib, W.Y. Zeng & Q.R. Li sp. nov.

(Fig. 48)

Mycobank No: MB857307

Etymology – The epithet refers to the rotten substrate on which the species was found.

Description – Saprobiic on rotten bamboo culm. *Subiculum* evanescent, white, felted, appressed, surrounding and between stromata, remnants at stromata base. **Sexual morph:** *Stromata* 500–1000 μ m high, 800–1100 μ m wide ($n = 15$), conical to subglobose, dome shaped top, black, uni-perithecioid, smooth, solitary to gregarious, rarely 2–3 fused together, surrounded with a black carbonaceous tissue, conical papillate, does not release a colored pigment in 10% KOH. *Entostroma* absent in mature. *Ectostroma* 50–110 μ m thick, hard, brittle, black. *Perithecia* 600–1000 μ m high, 600–1100 μ m wide, immersed in stromal tissue, detached from the stromal wall, globose, detached and collapsed when mature. *Paraphyses* thin-walled, septate, 3–5 μ m wide. *Asci* 85–110 $\times$ 7–9.2 μ m, ($\bar{x} = 97.5 \times 8.2 \mu\text{m}$, $n = 20$) total length, the spore-bearing parts 40–60 μ m ($\bar{x} = 53.1 \mu\text{m}$, $n = 10$), 8-spored, cylindrical, unitunicate, with a J+ tubular apical ring, 2–3.2 $\times$ 1.3–2.3 μ m ($\bar{x} = 2.6 \times 1.7 \mu\text{m}$, $n = 15$). *Ascospores* 9–12 μ m $\times$ 4–6 μ m ($\bar{x} = 10.4 \times 5.3 \mu\text{m}$, $n = 30$), equilaterally ellipsoidal with broad rounded ends, brown to dark brown, with straight germ slit, entire length of the spore, situated closer at one side. **Asexual morph:** not observed

Culture characteristics – Ascospores germinated on PDA within 24 hours. Colonies on OA white became light brown, medium dense, irregular thin at edges, white from above, reverse white at margin, yellow brown. No conidia observed on PDA or OA media within two months.

Material examined – China, Sichuan Province, Leshan City, Muchuan County, Bamboo Sea of Muchuan, 28°26'17.27" N, 104°5'18.64" E, altitude: 1,342 m, on rotten culms of *Phyllostachys heterocyclus*, August 2024, Wenyu Zeng, 2024SWS27 (GMB6265, holotype; GMBC6265 ex-type); *ibid.*, KUN-HKAS 145721 isotype.

Additional material examined – China, Sichuan Province, Leshan City, Muchuan County, Bamboo Sea of Muchuan, 28°26'18.29" N, 104°5'17.54" E, altitude: 1,392 m, on rotten culms of *Phyllostachys heterocyclus*, August 2024, Zuquan Yao, 2024SWM72 (GMB6266, GMBC6266).

Notes – Phylogenetically (Fig. 22), *Rosellinia putrida* clusters closely with *Nemania palmarum*, a species characterized by uni-perithecioid stromata (Zhang et al. 2024). However, the authors classified *Nemania palmarum* within the genus *Nemania* based on its phylogenetic placement in *Nemania* clade. They did not incorporate the closely related *Rosellinia johnstonii* in their phylogenetic analysis, which may have likely led to its misclassification.

Morphologically, *Nemania palmarum* differs from *Rosellinia putrida* in habitat preference, found growing on decaying palm petioles, whereas *R. putrida* has been reported on rotten bamboo culms. Additionally, *N. palmarum* has smaller stromata (440–760 μ m high, 480–640 μ m wide vs. 500–1000 μ m high, 800–1100 μ m wide) and smaller asci (70–85 μ m long vs. 85–110 μ m long) (Zhang et al. 2024).

Morphologically and phylogenetically (Fig. 22), *Rosellinia putrida* is closely related to *Rosellinia johnstonii*, similar in having uniperithecioid stromata, white subiculum and ascospores with a full-length straight germ slit. However, *R. johnstonii* differs from *R. putrida* by having cream to light brown subiculum (vs. white), a flattened stromatal apex (vs. conical in *R. putrida*) and larger ascospores, 9.6–16 $\times$ 4.8–9 μ m (Petrini 2003).

The sequence validity of *Rosellinia johnstonii* (PDD 119626) has been thoroughly verified. The sequence is submitted by New Zealand mycologists Johansen, R., and Johnston, P.R., and the species epithet also honors Johnston P. R., introduced by Petrini (2003). The holotype collection for *R. johnstonii* is housed in the same herbarium as the holotype collection, further supporting both the species and its sequence validity.

This combination of morphological and phylogenetic analysis provides support for classifying *R. putrida* within the *Rosellinia* genus.

The genus *Nemania* is distinguished by its stromata containing multiple perithecia, which are tightly integrated and cannot be easily separated or lifted intact using a needle (Ju and Rogers 2002). In contrast, *Rosellinia* is characterized by uniperitheciate stromata and the presence of a subiculum (Petrini 2013). Interestingly, the clade of *R. putrida* includes a few species of *Nemania* with uniperitheciate stromata i.e. *N. hydei*, *N. paraphysata*, *N. thailandensis*, and *N. viridis* (Dayarathne et al. 2020, Samarakoon et al. 2022). These species are currently classified within *Nemania* but may require re-evaluation to properly align their classification within the clade.

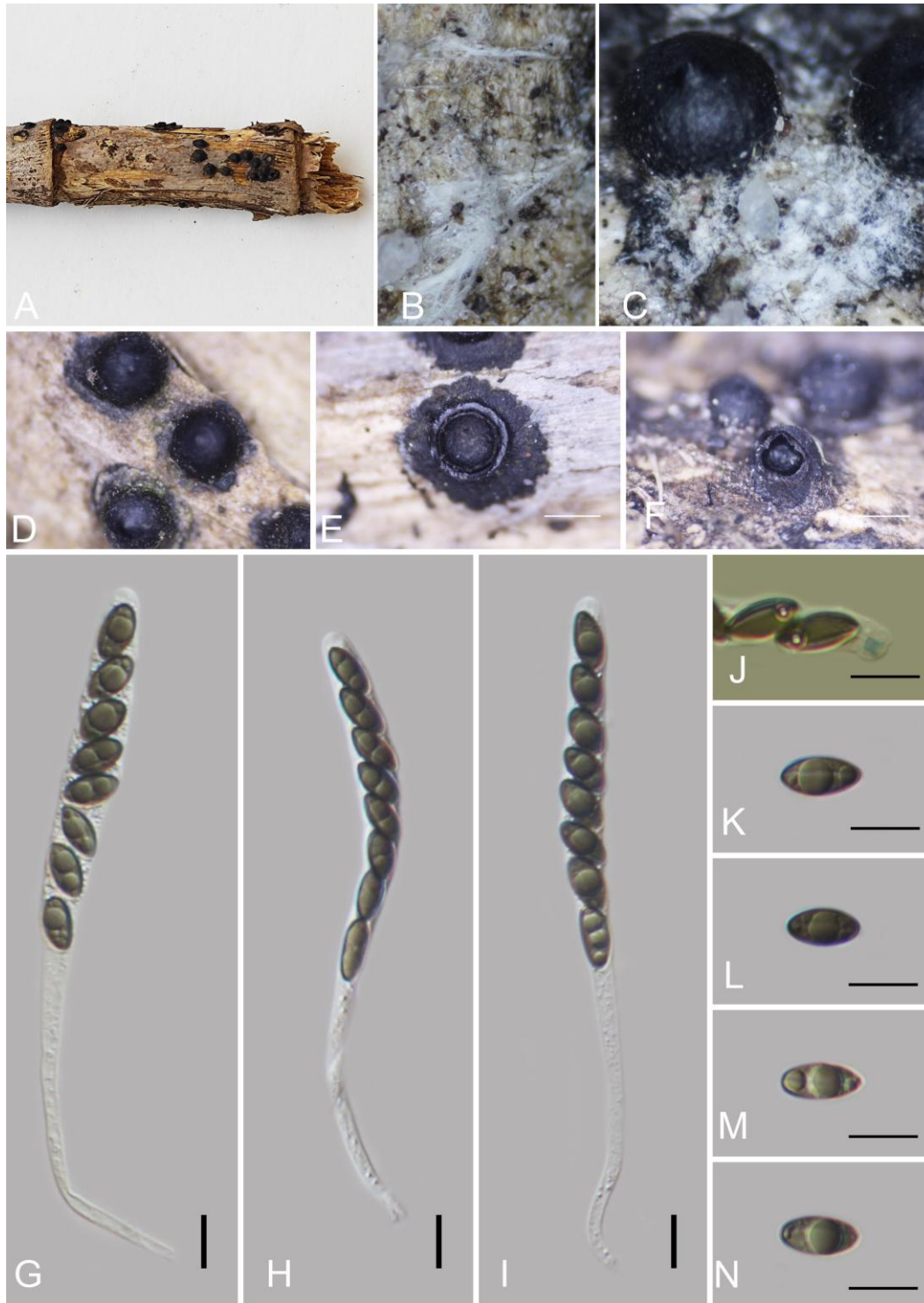


Figure 48 – *Rosellinia putrida* (GMB6265, holotype). A Host. B, C White subiculum. D Stromata in face view. E Cross section of stroma. F Vertical section of stroma. G–I Asci in distilled water. J Apical ring (stained in Melzer reagent). K–N Ascospores. Scale bars: E, F= 1 mm, G–N = 10 µm.

Discussion

Currently, Species Fungorum recognizes over 165,702 accepted fungal species (accessed April 18, 2025). This figure represents only a small fraction of global fungal diversity, as recent estimates suggest that the actual number of fungal species may range from 2 to 3 million (Niskanen et al. 2023). This highlights the big knowledge gap in fungal taxonomy and biodiversity, emphasizing the need for ongoing exploration and characterization of fungi in diverse ecosystems. In this study, we collected approximately 150 wood-inhabiting fungi from southwestern China. We identified 31 new species and a new genus. This region has emerged as a hotspot for fungal diversity, as recent studies have documented the remarkable diversity of ascomycetous fungi, with approximately 200 new species reported in 2024 alone (Du et al. 2024, Dissanayake et al. 2024, Habib et al. 2024, Li et al. 2024a,b, Ren et al. 2024, Yu et al. 2024, Zeng et al. 2024, Zhou et al. 2024a,b,c). These discoveries emphasize the region richness in fungal biodiversity and its potential as a global hotspot for ascomycete diversity.

The diversity of ascomycetes in southwestern China is further evident among bambusicolous fungi. Jiang et al. (2022) documented 512 bambusicolous ascomycete taxa across China, with 174 species identified specifically from southwestern China. This accounts for approximately 34% of the country total bambusicolous Ascomycota diversity. In the past two years (2022–2024), over 60 new species of fungi associated with bamboo have been reported from China (Liang et al. 2023, Wu et al. 2023, Yu et al. 2023, Li et al. 2024a, Habib et al. 2024, Yu et al. 2024, Zeng et al. 2024, Zhou et al. 2024b). In our current study, 24 of the identified taxa are bambusicolous ascomycetes, further contributing to the documentation of fungi associated with bamboo and emphasizing the ecological importance of these habitats in supporting fungal biodiversity.

With advancements in molecular techniques such as DNA barcoding and multi-locus phylogenetic analyses, the classification of fungi has undergone significant revisions over time, particularly concerning the ranking of genera, families, and orders (Hyde et al. 2024). Historically, many classifications were based on morphological characteristics and lacked molecular data, complicating the resolution of their taxonomy. This is also evident in the case of *Anthostomella*, a genus that currently includes 178 species (Species Fungorum accessed April 20, 2025). However, molecular data are not available for most species of the genus. The existing molecular data for *Anthostomella* reveals a high degree of phylogenetic distinction, shown its polyphyletic status within the Xylariales. Morphological diversity within, *Anthostomella*, such as variations in the presence or absence of ascal apical rings and their shapes (flat, wedge-shaped, cylindrical, or inverted hat-shaped), types of germ slits (straight, sigmoid, half or full length, or spiral), and characteristics such as appendages or mucilaginous sheaths suggest that the genus may be better represented by several smaller genera rather than a single large one. Recent phylogenetic studies have led to the establishment of new genera and even a new family, *Pallidoperidiaceae*. These include *Alloanthostomella*, *Anthostomelloides*, *Haploanthostomella*, *Minuticlypeus*, *Pallidoperidium*, *Neoanthostomella*, *Nigropunctata*, *Pseudoanthostomella*, *Virgaria*, and *Xenoanthostomella* (Daranagama et al. 2015, 2016, Hyde et al. 2020, Konta et al. 2021, Sugita et al. 2024). Our phylogenetic analyses place *Anthostomatopsis* within a distinct clade, providing strong support for its recognition as a distinct genus. These findings reflect the ongoing trend of redefining polyphyletic genera in fungal taxonomy to achieve more accurate classification.

In the latest outline of fungi (Hyde et al. 2024), several genera have been placed in families that lack phylogenetic support. For example, *Digitodochium*, *Occultithea*, *Linosporeopsis*, and *Magnostiolata* cluster within the clade of *Clypeosphaeriaceae* but have been assigned to Xylariaceae. Similarly, *Virgaria*, *Neoanthostomella*, *Neodriella*, and *Subanthostomella* form a phylogenetically distant clade from *Xylariaceae*, challenging their current classification within this family. These inconsistencies, highlighted by our phylogenetic analyses and corroborated by previous studies (Samarakoon et al. 2022, Dissanayake et al. 2024), emphasize the need for a re-evaluation of these taxa to establish a more accurate and stable taxonomy.

To resolve these taxonomic ambiguities and achieve a more stable classification, additional investigations with broader taxon sampling and molecular data are necessary. Such studies not only enhance understanding of fungal diversity but also provide a solid foundation for future taxonomic revisions and ecological investigations, helping to better understand diversity and their evolutionary complexities. The new additions will provide valuable insights into the taxonomy of the taxa, aiding in the refinement of species boundaries and improving understanding of its phylogenetic relationships. As more molecular data becomes available, the complex taxonomy of fungi will likely continue to be refined. Future studies should prioritize genomic analyses to uncover cryptic fungal diversity and evolutionary mechanisms, enzyme activity assays to elucidate functional traits and ecological roles of new taxa, and biogeographical analyses to understand distribution patterns and environmental interactions.

ACKNOWLEDGEMENTS

This research was supported by the National Natural Science Foundation of China (31960005, 32000009, 32170019); Guizhou Medical University High level Talent Launch Fund Project (No. [2023] 058); the Guizhou Provincial Scientific and Technologic Innovation Base (No. [2023]003); the High-level Innovation Talents of Guizhou (No. GCC [2023]048); National Natural Science Foundation of China (12132006). The authors extend their appreciation to the Researchers supporting Project Number (RSP2025R120) King Saud University, Riyadh, Saudi Arabia.

REFERENCES

- Afshari N, Karimi O, Gomes de Farias AR, Suwannarach N, et al. 2023 – Additions to Diatrypaceae (Xylariales): Novel taxa and new host associations. *Journal of Fungi* 9(12), 1151. Doi 10.3390/jof9121151.
- Altschul SF, Gish W, Miller W, Myers EW, et al. 1990 – Basic local alignment search tool. *Journal of Molecular Biology* 215(3), 403–410. Doi 10.1016/S0022-2836(05)80360-2
- Barr ME. 1987 – New taxa and combinations in the Loculoascomycetes. *Mycotaxon* 29, 501–505.
- Barr ME. 1990 – Melanommatales (Loculoascomycetes). *American Flora Ser. II*, vol. 13. New York Botanical Garden, 129 pp.
- Barr ME. 1994 – Notes on the *Amphisphaeriaceae* and related families. *Mycotaxon* 51, 191–224.
- Berkeley MJ, Broome CE. 1875 – Enumeration of the fungi of Ceylon. *The Journal of the Linnean Society. Botany* 14:29–140.
- Berlese AN. 1902 – Icones Fungorum 3(3-4), 53–104.
- Bhilabutra W, Lumyong S, Jeewon R, McKenzie EHC, Hyde KD. 2006 – *Neolinocarpon penniseti* sp. nov. on the grass *Pennisetum purpureum* (Poaceae). *Cryptogamie, Mycologie* 27(4), 305–310.
- Bisby GR. 1945 – *Stachybotrys* and *Memnoniella*. *Transactions of the British Mycological Society* 28, 11–12.
- Carmarán CC, Romero AI, Giussani LM. 2006 – An approach towards a new phylogenetic classification in Diatrypaceae. *Fungal Diversity* 23:67–87.
- Cedeño-Sánchez M, Schiefelbein R, Stadler M, Voglmayr H, et al. 2023 – Redisposition of apiosporous genera *Induratia* and *Muscodor* in the Xylariales, following the discovery of an authentic strain of *Induratia apiospora*. *Botanical Studies* 64(1), 8. Doi 10.1186/s40529-023-00372-1
- CEPF Report. 2002–2013 – Mountains of Southwest China Hotspot: Ecosystem Profile – Protecting Biodiversity by Supporting People. Critical Ecosystem Partnership Fund. A decade of conservation by the Critical Ecosystem Partnership Fund. Conservation International.
- Cesati VD, Notaris GD. 1863 – Schema di classificazione degli *Aschigeri* italiani appartenenti al genere *Sphaeria* nell'antico significato attribuito da Persoon. *Commentario Società Crittogamologica Italiana* 1(4), 177–420.

- Checa J, Arenal F, Blanco N, Rogers JD. 2008 – *Coniolarrella hispanica* sp. nov. and other additions to *Coniolarrella*. Mycological Research 112(7), 795–801. Doi 10.1016/j.mycres.2008.01.014
- Chesters CGC, Bell A. 1970 – Studies in the Lophiostomataceae. Mycological Papers 54, 27–34.
- Chi X, Zhang Z, Xu X, Zhang X et al. 2017 – Threatened medicinal plants in China: Distributions and conservation priorities. Biological Conservation 210, 89–95. Doi 10.1016/j.biocon.2017.04.015
- Crous PW, Groenewald JZ, Wingfield MJ. 2006 – Fungal Planet 1 - *Anthostomella eucalyptorum*. In: Fungal Planet – A Global Initiative to Promote the Study of Fungal Biodiversity. CBS-KNAW Fungal Biodiversity Centre.
- Dai DQ, Jiang HB, Tang LZ, Bhat DJ et al. 2016 – Two new species of *Arthrimum* (*Apiosporaceae*, Xylariales) associated with bamboo from Yunnan, China. Mycosphere 7(9), 1332–1345. Doi 10.5943/mycosphere/7/9/7
- Dai DQ, Phookamsak R, Wijayawardene NN, Li WJ, et al. 2017 – Bambusicolous fungi. *Fungal Diversity* 82, 1–105. Doi 10.1007/s13225-016-0367-8.
- Daranagama A, Camporesi E, Jeewon R, Liu XZ, et al. 2016 – Taxonomic rearrangement of *Anthostomella* (Xylariaceae) based on a multigene phylogeny and morphology. Cryptogamie Mycologie 37, 509–538. Doi 10.7872/crym/v37.iss4.2016.509.
- Daranagama DA, Camporesi E, Tian Q, Liu X, et al. 2015 – *Anthostomella* is polyphyletic comprising several genera in Xylariaceae. *Fungal Diversity* 73, 203–238.
- Dayarathne MC, Jones EBG, Maharachchikumbura SSN, Devadatha B, et al. 2020 – Morpho-molecular characterization of microfungi associated with marine-based habitats. *Mycosphere* 11(1), 1–188. Doi 10.5943/mycosphere/11/1/1
- Dissanayake LS, Samarakoon MC, Maharachchikumbura SSN, Hyde KD, et al. 2024 – Exploring the taxonomy and phylogeny of Sordariomycetes taxa emphasizing Xylariomycetidae in Southwestern China. *Mycosphere* 15(1), 1675–1793. Doi 10.5943/mycosphere/15/1/15
- Doilom M, Hyde KD, Phookamsak R, Dai DQ, et al. 2018 – *Mycosphere Notes* 225–274: types and other specimens of some genera of Ascomycota. *Mycosphere* 9(4), 647–754. Doi 10.5943/mycosphere/9/4/3
- Du HZ, Liu NG, Wu N, Cheewangkoon R, Liu JK. 2025 – Morpho-phylogenetic evidence reveals novel hyphomycetous fungi on medicinal plants in Southwestern China. *Mycology* 22, 1–60. Doi 10.1080/21501203.2024.2444436
- Du HZ, Lu YH, Cheewangkoon R, Liu JK. 2024 – Morpho-phylogenetic evidence reveals novel species and new records of *Nigrograna* (*Nigrogranaceae*) associated with medicinal plants in Southwestern China. *MycoKeys* 110, 1–33. Doi 10.3897/mycokeys.110.132628
- Du TY, Karunarathna SC, Zhang X, Dai DQ, et al. 2022 – Morphology and multigene phylogeny revealed *Peroneutypa aquilariae* sp. nov. (*Diatrypaceae*, Xylariales) from *Aquilaria sinensis* in Yunnan Province, China. *Studies in Fungi* 7, 18. Doi 10.48130/SIF-2022-0018.
- Ellis MB. 1971 – Dematiaceous Hyphomycetes. Commonwealth Mycological Institute, Kew, London.
- Ellis MB. 1976 – More Dematiaceous Hyphomycetes. CABI Publishing, Kew, London.
- Feng Y, Liu JK, Lin CG, Chen YY, et al. 2021 – Additions to the genus *Arthrimum* (*Apiosporaceae*) from bamboos in China. *Frontiers in Microbiology* 12, 661281. Doi 10.3389/fmicb.2021.661281
- Francis SM. 1975 – *Anthostomella* Sacc. (Part 1). Mycological Papers 139, 1–97.
- García D, Stchigel AM, Cano J, Calduch M, et al. 2006 – Molecular phylogeny of *Coniochaetales*. Mycological Research 110(11), 1271–1289. Doi 10.1016/j.mycres.2006.07.007
- Gardes M, Bruns TD. 1993 – ITS primers with enhanced specificity for basidiomycetes – application to the identification of mycorrhizae and rusts. *Molecular Ecology* 2, 113–118.
- Gawas P, Bhat DJ. 2006 – *Vamsapriya indica* gen. et sp. nov., a bambusicolous, synnematous fungus from India. *Mycotaxon* 94, 149–154.

- Glass NL, Donaldson GC. 1995 – Development of primer sets designed for use with the PCR to amplify conserved genes from filamentous ascomycetes. *Applied and Environmental Microbiology* 61, 1323–1330.
- Habib K, Zhou X, Zeng W, Zhang X, et al. 2024 – *Stromatolinea*, a new diatrypaceous fungal genus (Ascomycota, Sordariomycetes, Xylariales, Diatrypaceae) from China. *MycKeys* 108, 197–225. Doi 10.3897/mycokeys.108.126712
- Hall TA. 1999 – BioEdit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. *Nucleic Acids Symposium Series* 41, 95–98.
- Han LS, Wijayawardene NN, Liu C, Han LH, Promputtha I, et al. 2024 – *Paramphibambusa bambusicola* gen. et sp. nov., *Arecophila xishuangbannaensis* and *A. zhaotongensis* spp. nov. in Cainiaceae from Yunnan, China. *MycKeys* 104, 113–132. Doi 10.3897/mycokeys.104.117872
- Harper D. 2007 – China's Southwest. Lonely Planet. <https://books.google.com/books?id=lgOGbpzDA5YC>
- Hirayama K, Tanaka K. 2011 – Taxonomic revision of *Lophiostoma* and *Lophiotrema* based on reevaluation of morphological characters and molecular analyses. *Mycoscience* 52, 401–412. Doi 10.1007/S10267-011-0126-3
- Holm L, Holm K. 1988 – Studies in the Lophiostomataceae with emphasis on the Swedish species. *Symbolae Botanicae Upsaliensis* 28, 1–31.
- Hongsanan S, Hyde KD, Phookamsak R, Wanasinghe DN, et al. 2020 – Refined families of Dothideomycetes: Dothideomycetidae and Pleosporomycetidae. *Mycosphere* 11, 1553–2107. Doi 10.5943/mycosphere/11/1/13
- Hu HL. 2010 – Morphological and molecular studies of selected Dothideomycetes. PhD diss. The University of Hong Kong, Pokfulam.
- Hyde KD, Alias SA. 1999 – *Linocarpon angustatum* sp. nov., and *Neolinocarpon nypicola* sp. nov. from petioles of *Nypa fruticans*, and a list of fungi from aerial parts of this host. *Mycoscience* 40(2), 145–149. Doi 10.1007/BF02464293
- Hyde KD, Fröhlich J. 1998 – Fungi from palms XXXVII. The genus *Astrosphaeriella*, including ten new species. *Sydowia* 50(1), 81–132.
- Hyde KD, Jones EG, Liu JK, Ariyawansa H, et al. 2013 – Families of Dothideomycetes. *Fungal Diversity* 63, 1–313. Doi 10.1007/s13225-013-0263-4
- Hyde KD, Noordeloos ME, Savchenko KG, He MQ, et al. 2024 – The 2024 Outline of Fungi and fungus-like taxa. *Mycosphere* 15(1), 5146–6239. Doi 10.5943/mycosphere/15/1/25
- Hyde KD, Norphanphoun C, Abreu VP, Bazzicalupo A, et al. 2017 – Fungal diversity notes 603–708: taxonomic and phylogenetic notes on genera and species. *Fungal Diversity* 87, 1–235. Doi 10.1007/s13225-017-0391-3.
- Hyde KD, Norphanphoun C, Chen J, Dissanayake AJ, et al. 2018 – Thailand's amazing diversity: up to 96% of fungi in northern Thailand may be novel. *Fungal Diversity* 93, 215–239. Doi 10.1007/s13225-018-0415-7
- Hyde KD, Norphanphoun C, Ma J, Yang HD, et al. 2023 – *Mycosphere* notes 387–412: novel species of fungal taxa from around the world. *Mycosphere* 14(1), 663–744. Doi 10.5943/mycosphere/14/1/8.
- Hyde KD, Norphanphoun C, Maharachchikumbura SSN, Bhat DJ, et al. 2020 – Refined families of Sordariomycetes. *Mycosphere* 11(1), 305–1059. Doi 10.5943/mycosphere/11/1/7
- Hyde KD, Saleh A, Aumentado HDR, Boekhout T et al. 2024 – Fungal numbers: global needs for a realistic assessment. *Fungal Diversity* 128, 191–225. Doi 10.1007/s13225-024-00545-8
- Hyde KD, Suwannarach N, Jayawardena RS, Manawasinghe IS, et al. 2021 – *Mycosphere* notes 325–344: Novel species and records of fungal taxa from around the world. *Mycosphere* 12(1), 1101–1156. Doi 10.5943/mycosphere/12/1/14
- Hyde KD, Taylor JE, Fröhlich J. 1998 – Fungi from palms. XXXIV. The genus *Neolinocarpon* with five new species and one new combination. *Fungal Diversity* 1, 115–131.

- Hyde KD. 1991 – A new amphisphaeriaceous fungus from intertidal fronds of *Nypa fruticans*. Transactions of the Mycological Society of Japan 32:265–271.
- Hyde KD. 1992a – Fungi from decaying intertidal fronds of *Nypa fruticans*, including three new genera four new species. Botanical Journal of the Linnean Society 110(2), 95–110. Doi 10.1111/j.1095-8339.1992.tb00284.x
- Hyde KD. 1992b – Fungi from palms. I. The genus *Linocarpon*, a revision. Sydowia 44, 32–54.
- Hyde KD. 1995 – Fungi from palms. XXI. The genus *Seynesia*. Sydowia 47, 199–212.
- Hyde KD. 1996 – Fungi from palms. XXIX. *Arecophila* gen. nov. (Amphisphaeriaceae, Ascomycota), with five new species and two new combinations. Nova Hedwigia 63(1/2), 81–100.
- Jaklitsch W, Fournier J, Voglmayr H. 2018 – Two unusual new species of Pleosporales: *Anteaglonium rubescens* and *Atrocalyx asturiensis*. Sydowia 70, 129–140. Doi 10.12905/0380.sydowia70-2018-0129
- Jaklitsch W, Scheuer C, Voglmayr H. 2002 – Notes on the genus *Immotthia* (Pleosporales, Ascomycetes), including some type studies. Österr Z Pilzk 11, 93–106.
- Jeewon R, Liew ECY, Hyde KD. 2003 – Molecular systematics of the Amphisphaeriaceae based on cladistic analyses of partial LSU rDNA gene sequences. Mycological Research 107(12), 1392–1402. Doi 10.1017/S095375620300875X
- Jiang H, Phookamsak R, Hongsanan S, Bhat DJ, Mortimer PE. 2022 – A review of bambusicolous Ascomycota in China with an emphasis on species richness in southwest China. Studies in Fungi 7, 20. Doi 10.48130/SIF-2022-0020
- Jiang HB, Jeewon R, Karunarathna SC, Phukhamsakda C, et al. 2021 – Reappraisal of *Immotthia* in Dictyosporiaceae, Pleosporales: Introducing *Immotthia bambusae* sp. nov. and *Pseudocyclothyriella clematidis* comb. et gen. nov. based on morphology and phylogeny. Frontier Microbiology 12, 656235. Doi 10.3389/fmicb.2021.656235
- Jong SC, Davis EE. 1976 – Contribution to the knowledge of *Stachybotrys* and *Memnoniella* in culture. Mycotaxon 3, 409–485.
- Ju YM, Rogers JD. 1990 – *Astrocystis* reconsidered. Mycologia 82, 342–349.
- Ju YM, Rogers JD. 2002 – The genus *Nemania* (Xylariaceae). Nova Hedwigia 74, 75–120. Doi 10.1127/0029-5035/2002/0074-0075
- Katoh K, Rozewicki J, Yamada KD. 2019 – MAFFT online service: multiple sequence alignment, interactive sequence choice and visualization. Briefings in Bioinformatics 20, 1160–1166.
- Kang JC, Hyde KD, Kong RYC. 1999 – Studies on *Amphisphaeriales*: The genera excluded from the *Amphisphaeriaceae*, *Cainiaceae* and *Clypeosphaeriaceae*. Fungal Diversity 2, 135–151.
- Kirk PM, Cannon PF, Minter DW, Stalpers JA. 2008 – Dictionary of the Fungi, 10th ed. CABI International: Wallingford, UK, 544.
- Konta S, Hongsanan S, Liu JK, Eungwanichayapant PD, et al. 2017 – *Leptospora* (Leptosporaceae fam. nov.) and *Linocarpon* and *Neolinocarpon* (Linocarpaceae fam. nov.) are accommodated in Chaetosphaeriales. Mycosphere 8(10), 1943–1974. Doi 10.5943/mycosphere/8/10/16
- Konta S, Hyde KD, Eungwanichayapant PD, Karunarathna SC, et al. 2021 – Multigene phylogeny reveals *Haploanthostomella elaeidis* gen. et sp. nov. and familial replacement of *Endocalyx* (Xylariales, Sordariomycetes, Ascomycota). Life 11, 486. Doi 10.5943/mycosphere/7/9/15.
- Konta S, Maharachchikumbura SSN, Senanayake IC, McKenzie EHC, et al. 2020 – A new genus *Allodiatrype*, five new species and a new host record of diatrypaceous fungi from palms (Arecaceae). Mycosphere 11(1), 239–268. Doi 10.5943/mycosphere/11/1/4.
- Kornsakulkarn J, Saepua S, Suvannakad R, Supothina et al. 2017 – Cytotoxic tropolones from the fungus *Nemania* sp. BCC 30850. Tetrahedron 73(25), 3505–3512. Doi 10.1016/j.tet.2017.05.030
- Kwon SL, Cho M, Lee YM, Lee H, et al. 2022 – Diversity of the bambusicolous fungus *Apiospora* in Korea: Discovery of new *Apiospora* species. Mycobiology 50(5), 302–316. Doi 10.1080/12298093.2022.2133808

- Læssøe T, Spooner BM. 1994 – *Rosellinia* & *Astrocystis* (Xylariaceae): new species and generic concepts. *Kew Bulletin* 49, 1–70.
- Li QR, Habib K, Long SH, Wu YP, et al. 2024a – Unveiling fungal diversity in China: New species and records within the Xylariaceae Family. *Mycosphere* 15(1), 275–364, Doi 10.5943/mycosphere/15/1/2.
- Li QR, Habib K, Wu Y, Long S, et al. 2024b – Revisiting *Xylaria* diversity in southern China: descriptions of 40 new species. *Journal of Systematics and Evolution* 62(1), 1–76. Doi 10.1111/jse.13058
- Li QR, Jiang YL. 2011 – *Stachybotrys subreniformis*, new from soil in China. *Mycotaxon* 115, 171–173. Doi 10.5248/115.171
- Li QR, Wu YP, Pi YH, Long SH, Wijayawardene NN. 2022 – Two new species and a new record of *Astrocystis* from Southwestern China. *MycoAsia* 1, 2022–08. Doi 10.59265/mycoasia.2022-08.
- Li QR, Zhang X, Lin Y, Samarakoon MC, Hyde KD, et al. 2022a – Morpho-molecular characterisation of *Arecophila*, with *A. australis* and *A. clypeata* sp. nov. and *A. miscanthi* comb. nov. *MycKeys* 88, 123–149. Doi 10.3897/mycokeys.88.79475
- Li WL, Maharachchikumbura SSN, Cheewangkoon R, Liu JK. 2022 – Reassessment of *Dyfrlomyces* and four new species of *Melomastia* from olive (*Olea europaea*) in Sichuan Province, China. *Journal of Fungi* 8, 76. Doi 10.3390/jof8010076.
- Liang RR, Zhang SN, Liu JK. 2023 – *Bambusicola autumnalis* sp. nov., a bambusicolous ascomycete from Sichuan province, China. *Phytotaxa* 601(3), 203–211.
- Liao C, Senanayake IC, Dong W, Thilini CKW, et al. 2023 – Taxonomic and Phylogenetic Updates on *Apiospora*: Introducing Four New Species from *Wurfbainia villosa* and Grasses in China. *Journal of Fungi* 9(11), 1087. <https://doi.org/10.3390/jof9111087>
- Lin CG, McKenzie EHC, Bhat DJ, Ran SF, et al. 2016 – *Stachybotrys*-like taxa from karst areas and a checklist of *Stachybotrys*-like species from Thailand. *Mycosphere* 7, 1273–1291. Doi 10.5943/mycosphere/7/9/3
- Liu B, Zhang M, Bussmann WR, Liu H, et al. 2018 – Species richness and conservation gap analysis of Karst areas: A case study of vascular plants from Guizhou, China. *Global Ecology and Conservation* 16, e00460. Doi 10.1016/j.gecco.2018.e00460
- Liu HM, Yu SX, Wang CZ, Wang Q. 2013 – Distribution patterns, preserve situations and counter measures of the national key protected plants of biodiversity conservation priority area in western Guangxi and southern Guizhou. *Guihaia* 33, 356–363.
- Liu JK, Hyde KD, Jones EBG, Buyck B, et al. 2015 – Fungal diversity notes 1–110: Taxonomic and phylogenetic contributions to fungal species. *Fungal Diversity* 72(1), 1–197. Doi 10.1007/s13225-015-0324-y
- Liu JK, Phookamsak R, Jones EG, Zhang Y, et al. 2011 – *Astrosphaeriella* is polyphyletic, with species in *Fissuroma* gen. nov., and *Neoastrosphaeriella* gen. nov. *Fungal Diversity* 51, 135–154. Doi 10.1007/s13225-011-0142-9.
- Liu LL, Ren YL, Habib K, Lu CT, et al. 2025 – New taxa of Xylariales from Karst areas in Southwestern China. *Mycosphere* X(X), X–X, Doi 10.5943/mycosphere/X/X/X (Accepted).
- Liu YL, Whelen S, Hall BD. 1999 – Phylogenetic relationships among ascomycetes: evidence from an RNA polymerase II subunit. *Molecular Biology and Evolution* 16, 1799–1808.
- Lombard L, Houbraken J, Decock C, Samson RA, et al. 2016 – Generic hyper-diversity in Stachybotriaceae (sic!). *Persoonia* 36, 156–246. Doi 10.3767/003158516X691582
- Lu B, Hyde KD. 2000 – A world monograph of *Anthostomella*. Fungal Diversity Press, Fungal Diversity Research Series.
- Mapook A, Hyde KD, McKenzie EH, Jones EG, et al. 2020 – Taxonomic and phylogenetic contributions to fungi associated with the invasive weed *Chromolaena odorata* (Siam weed). *Fungal Diversity* 101, 1–175. Doi 10.1007/s13225-020-00444-8
- Matsushima T. 1985 – Matsushima Mycological Memoirs No. 4, 1–68.

- Misra PC, Srivastava SK. 1982 – Two undescribed *Stachybotrys* species from India. Transactions of the British Mycological Society 78(3), 556–559. Doi 10.1016/S0007-1536(82)80170-8
- Morgan-Jones G, Sinclair RC. 1980 – Notes on Hyphomycetes. XXXIII. *Stachybotrys sphaerospora* sp. nov. from South Africa. Mycotaxon 10, 372–374.
- Mugambi GK, Huhndorf SM. 2009 – Parallel evolution of hysterothecial ascomata in ascolocularous fungi (*Ascomycota*, *Fungi*). *Systematics and Biodiversity* 7, 453–464. Doi 10.1017/S147720000999020X
- Niego AGT, Lambert C, Mortimer P, Thongklang N, et al. 2023 – The contribution of fungi to the global economy. *Fungal Diversity* 121, 95–137. Doi 10.1007/s13225-023-00520-9
- Niranjana M, Sarma VV. 2018 – New ascomycetous fungi in the family *Aigialaceae* from Andaman Islands, India. *Current Research in Environmental & Applied Mycology* 8(3), 351–359. Doi 10.5943/cream/8/3/6.
- Niskanen T, Lücking R, Dahlberg A, Gaya E, et al. 2023 – Pushing the frontiers of biodiversity research: Unveiling the global diversity, distribution, and conservation of fungi. *Annual Review of Environment and Resources* 48(1), 149–176. Doi 10.1146/annurev-environ-112621-090937
- O'Donnell K, Cigelnik E. 1997 – Two divergent intragenomic rDNA ITS2 types within a monophyletic lineage of the fungus *Fusarium* are nonorthologous. *Molecular Phylogenetics and Evolution* 7, 103–116.
- Peng MK, Zhang B, Qu Z, Li Y, Ma HX. 2021 – New record genus and a new species of *Allodiatrype* from China based on morphological and molecular characters. *Phytotaxa* 500(4), 279–281. Doi 10.11646/phytotaxa.500.4.3.
- Petrini LE. 2003 – *Rosellinia* and related genera in New Zealand. *New Zealand Journal of Botany* 41(1), 71–138. Doi 10.1080/0028825X.2003.9512833
- Petrini LE. 2013 – *Rosellinia* – a world monograph. *Bibliotheca Mycologica* 205, 410 p. Doi 10.1017/S0960428617000038
- Petrini LE. 2023 – *Astrocystis* revisited. *Sydowia* 75, 193–219. Doi 10.12905/0380.sydowia75-2023-0193.
- Phookamsak R, Norphanphoun C, Tanaka K, Dai DQ, et al. 2015 – Towards a natural classification of *Astrosphaeriella*-like species; introducing *Astrosphaeriellaceae* and *Pseudoastrosphaeriellaceae* fam. nov. and *Astrosphaeriellopsis* gen. nov. *Fungal Diversity* 74, 143–197. Doi 10.1007/s13225-015-0352-7.
- Phukhamsakda C, McKenzie EHC, Phillips AJL, Jones EGB, et al. 2020 – Microfungi associated with *Clematis* (*Ranunculaceae*) with an integrated approach to delimiting species boundaries. *Fungal Diversity* 102, 1–203. Doi 10.1007/s13225-020-00448-4.
- Pi YH, Long SH, Wu YP, Liu LL, et al. 2021 – A taxonomic study of *Nemania* from China, with six new species. *MycKeys* 83, 39. Doi 10.3897/mycokeys.83.69906.
- Pintos Á, Alvarado P, Planas J, Jarling R et al. 2019 – Six new species of *Arthrinium* from Europe and notes about *A. caricicola* and other species found in *Carex* spp. hosts. *MycKeys* 49, 15–48. Doi 10.3897/mycokeys.49.32115
- Pintos Á, Alvarado P. 2021 – Phylogenetic delimitation of *Apiospora* and *Arthrinium*. *Fungal Systematics and Evolution* 7(1), 197–221. Doi 10.3114/fuse.2021.07.10
- Ptak T. 2019 – Southwest China. In: *The Wiley Blackwell Encyclopedia of Urban and Regional Studies*, pp. 1–10. Wiley. Doi 10.1002/9781118568446.eurs0304
- Rambaut A. 2012 – FigTree: Tree Figure drawing tool 2006–2012, version 1.4.0. Institute of Evolutionary Biology, University of Edinburgh, Edinburgh.
- Rappaz F. 1987 – Taxonomie et nomenclature des Diatrypaceae à asques octosporées. *Mycologia Helvetica* 2:285–648.
- Rehm H. 1914 – Ascomycetes Philippinenses – VI. Leaflets of Philippine Botany 6, 2257–81.
- Rehner SA, Samuels GJ. 1994 – Taxonomy and phylogeny of *Gliocladium* analysed from nuclear large subunit ribosomal DNA sequences. *Mycological Research* 98, 625–634. Doi 10.1016/S0953-7562(09)80409-7

- Ren GC, Jayasiri SC, Tibpromma S, De Farias ARG, et al. 2024 – Saprobiic ascomycetes associated with woody litter from the Greater Mekong Subregion (Southwestern China and Northern Thailand). *Mycosphere* 15(1), 954–1082. Doi 10.5943/mycosphere/15/1/8.
- Rogers JD, Ju YM. 2003 – *Occultitheca costaricensis* gen. et sp. nov. and *Apiocamarops pulvinata* sp. nov. from Costa Rica. *Sydowia* 55(2), 359–364.
- Ronquist F, Teslenko M, Van Der Mark P, Ayres DL, et al. 2012 – MrBayes 3.2: efficient Bayesian phylogenetic inference and model choice across a large model space. *Systematic Biology* 61, 539–542.
- Saccardo P. 1875 – Conspectus generum pyrenomycetum italicorum additis speciebus fungorum venetorum novis vel criticis, systemate carpologico disposito-rum. *Atti della Societa Veneziana-Trentina-Istria di Scienze Naturali* 4, 77–100.
- Saccardo PA. 1886 – *Sylloge Hyphomycetum. Sylloge Fungorum* 4, 807.
- Samarakoon MC, Hyde KD, Maharachchikumbura SS, Stadler M, et al. 2022 – Taxonomy, phylogeny, molecular dating, and ancestral state reconstruction of Xylariomycetidae (Sordariomycetes). *Fungal Diversity* 112(1), 1–88.
- Samarakoon MC, Lumyong S, Manawasinghe IS, Suwannarach N, Chee-wangkoon R. 2023 – Addition of five novel fungal flora to the Xylariomycetidae (Sordariomycetes, Ascomycota) in Northern Thailand. *Journal of Fungi* 9(11), 1065. Doi 10.3390/jof9111065.
- Samarakoon MC, Thongbai B, Hyde KD, Brönstrup M, et al. 2020 – Elucidation of the life cycle of the endophytic genus *Muscodor* and its transfer to *Induratia* in Induratiaceae fam. nov., based on a polyphasic taxonomic approach. *Fungal Diversity* 101, 177–210.
- Scheinflug H. 1958 – Untersuchungen über die Gattung *Didymosphaeria* Fuck. und einige verwandte Gattungen. *Ber Schweiz Bot Ges* 68, 325–383.
- Schröter J. 1894 – Die Pilze Schlesiens. *J.U. Kern* 2, 1889–1908.
- Senanayake IC, Maharachchikumbura SSN, Hyde KD, Bhat JD et al. 2015 – Towards unraveling relationships in Xylariomycetidae (Sordariomycetes). *Fungal Diversity* 73, 73–144. Doi 10.1007/s13225-015-0340-y
- Senwanna C, Phookamsak R, Bahkali AH, Elgorban AM, et al. 2018 – *Neolinocarpon phayaoense* sp. nov. (Linocarpaceae) from Thailand. *Phytotaxa* 362(1), 77–86. Doi 10.11646/phytotaxa.362.1.6
- Senwanna C, Phookamsak R, Doilom M, Hyde KD, et al. 2017 – Novel taxa of Diatrypaceae from Para rubber (*Hevea brasiliensis*) in northern Thailand; introducing a novel genus *Allocryptovalsa*. *Mycosphere* 8(10), 1835–1855. Doi 10.5943/mycosphere/8/10/9.
- Shang QJ, Hyde KD, Phookamsak R, Doilom M, et al. 2017 – *Diatrypella tectonae* and *Peroneutypa mackenziei* spp. nov. (Diatrypaceae) from northern Thailand. *Mycological Progress* 16:463–47. Doi 10.1007/s11557-017-1294-0.
- Smith G. 1962 – Some new and interesting species of micro-fungi. III. *Transactions of the British Mycological Society* 45, 387–IN2
- Smith GJD, Liew ECY, Hyde KD. 2003 – The Xylariales: A monophyletic order containing seven families. *Fungal Diversity* 13, 185–218.
- Stamatakis A. 2014 – RAxML Version 8: A tool for phylogenetic analysis and post-analysis of large phylogenies. *Bioinformatics* 30, 1312–1313.
- Subramanian CV. 1957 – Hyphomycetes – IV. *Proceedings of the Indian Academy of Science Section B* 46, 324–335.
- Sugita R, Yoshioka R, Tanaka K. 2024 – *Anthostomella*-like fungi on bamboo: four new genera belonging to a new family Pallidoperidiaceae (Xylariales). *Mycoscience* 65(1), 28–46. Doi 10.47371/mycosci.2023.11.005.
- Sun YR, Hyde KD, Liu NG, Jayawardena RS, et al. 2025 – Micro-fungi in southern China and northern Thailand: emphasis on medicinal plants. *Fungal Diversity* 10, 1–201. Doi 10.1007/s13225-024-00549-4

- Sun YR, Liu NG, Samarakoon MC, Jayawardena RS, et al. 2021 – Morphology and phylogeny reveal *Vamsapriyaceae* fam. nov. (*Xylariales*, *Sordariomycetes*) with two novel *Vamsapriya* species. *Journal of Fungi* 7(11), 891. Doi 10.3390/jof7110891.
- Tanaka K, Harada Y. 2003 – Pleosporales in Japan (1): the genus *Lophiostoma*. *Mycoscience* 44, 85–96. Doi 10.1007/S10267-002-0085-9
- Tanaka K, Harada Y. 2005 – Bambusicolous fungi in Japan (4): a new combination, *Astrosphaeriella aggregata*. *Mycoscience* 46(2), 114–118. Doi 10.1007/s10267-004-0223-7
- Tang CQ. 2015 – The subtropical vegetation of southwestern China: Plant distribution, diversity and ecology. Springer. Doi 10.1007/978-94-017-9741-2
- Umali TE, Hyde KD, Quimio TH. 1999 – *Arecophila bambusae* sp. nov. and *A. coronata* comb. nov., from dead culms of bamboo. *Mycoscience* 40(2), 185–188. Doi 10.1007/BF02464296
- Van Der Gucht K. 1995 – Illustrations and descriptions of xylariaceous fungi collected in Papua New Guinea. *Bulletin du Jardin botanique national de Belgique/Bulletin van de Nationale Plantentuin van België* 219–403.
- Vilgalys R, Hester M. 1990 – Rapid genetic identification and mapping of enzymatically amplified ribosomal DNA from several *Cryptococcus* species. *Journal of Bacteriology* 172(8), 4238–4246.
- Vitoria NS, Cavalcanti MAQ, Luz EDMN, Bezerra JL. 2011 – *Endocalyx melanoxanthus* var. *melanoxanthus* (Ascomycota): new to Brazil and three new hosts. *Mycotaxon* 117(1), 109–113. Doi 10.5248/117.109
- Vitoria NS, Cavalcanti MAQ, Santos CDD, Pereira J, Bezerra JL. 2013 – *Neolinocarpon attaleae* sp. nov. on *Attalea funifera* (Arecaceae) from Brazil. *Mycotaxon* 123(1), 141–145. Doi 10.5248/123.141
- Voglmayr H, Friebe G, Gardiennet A, Jaklitsch WM. 2018 – *Barrmaelia* and *Entosordaria* in Barrmaeliaceae (fam. nov., Xylariales) and critical notes on *Anthostomella*-like genera based on multigene phylogenies. *Mycological Progress* 17(1–2), 155–177. Doi 10.1007/s11557-017-1329-6.
- Voglmayr H, Tello S, Jaklitsch WM, Friebe G, et al. 2022 – About spirals and pores: Xylariaceae with remarkable germ loci. *Persoonia-Molecular Phylogeny and Evolution of Fungi* 49(1), 58–98. Doi 10.3767/persoonia.2022.49.02
- Wang XM, Liu GN, Chen SS, Du XF. 2017 – Records of *Beltrania rhombica* and *Didymobotryum rigidum* from China. *Mycotaxon* 132, 525–529. Doi 10.5248/132.525.
- Wang Y, Hyde KD, McKenzie EH, Jiang YL, Li DW, Zhao DG. 2015 – Overview of *Stachybotrys* (*Memnoniella*) and current species status. *Fungal Diversity* 71, 17–83. Doi 10.1007/s13225-014-0319-0
- White TJ, Bruns T, Lee S, Taylor J. 1990 – Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: *PCR protocols*, pp. 315–322. Elsevier.
- Wijayawardene NN, Hyde KD, Al-Ani LKT, Tedersoo L, et al. 2020 – Outline of Fungi and fungi-like taxa. *Mycosphere* 11(1), 1060–1456. Doi 10.5943/mycosphere/11/1/8
- Wijayawardene NN, Hyde KD, Mikhailov KV, Péter G et al. 2024 – Classes and phyla of the kingdom Fungi. *Fungal Diversity* 128, 1–165. Doi 10.1007/s13225-024-00540-z
- Wu K, Tian WH, Syed A, Elgorba AM, et al. 2023 – Description of two new species of *Roussoella* (Roussoellaceae, Pleosporales) associated with bamboo from Sichuan Province, China. *Phytotaxa* 607, 235–248.
- Wu YM, Zhang TY. 2010 – Two new species of *Stachybotrys* from soil. *Mycotaxon* 114, 459–462. Doi 10.5248/114.459
- Yamamoto W, Maeda M, Oyasu N. 1954 – Studies on the speckled bamboos caused by parasitic fungi I. On the fuscous speckled bamboo or Bunmonchiku on *Phyllostachys nigra* Mun. var. *henonis* Mun. Science reports of the Hyogo University of Agriculture. 1, 59–65.
- Yu XD, Zhang SN, Liu JK. 2023 – Additions to bambusicolous fungi of Savoryellaceae from Southwest China. *Journal of Fungi* 9(5), 571. Doi 10.3390/jof9050571

- Yu XD, Zhang SN, Liang XD, Zhu JT, Hyde KD, Liu JK. 2024 – Bambusicolous fungi from Southwestern China. *Mycosphere* 15(1), 5038–5145. Doi 10.5943/mycosphere/15/1/24
- Zare R, Asgari B, Gams W. 2010 – The species of *Coniolaria*. *Mycologia* 102(6), 1383–1388. Doi 10.2307/27920442
- Zhang SN, Hyde KD, Jones EBG, Cheewangkoon R, et al. 2020 – Additions to *Fissuroma* and *Neoastrophaeriella* (*Aigialaceae*, *Pleosporales*) from palms. *Mycosphere* 11(1), 269–284. Doi 10.5943/mycosphere/11/1/5.
- Zhang SN, Hyde KD, Jones EG, Yu XD, Cheewangkoon R, Liu JK. 2024 – Current insights into palm fungi with emphasis on taxonomy and phylogeny. *Fungal Diversity* 127(1), 55–301. Doi 10.1007/s13225-024-00536-9
- Zhang Y, Crous PW, Schoch CL, Hyde KD. 2012 – Pleosporales. *Fungal Diversity* 53, 1–221. Doi 10.1007/s13225-011-0117-x
- Zhang ZY, Pan H, Tao G, Li X, et al. 2024c – Culturable Mycobiota from Guizhou Wildlife Park in China. *Mycosphere* 15(1), 654–763. Doi 10.5943/mycosphere/15/1/5
- Zhou DQ, Cai L, Hyde KD. 2003 – *Astrophaeriella* and *Roussoella* species on bamboo from Hong Kong and Yunnan, China, including a new species of *Roussoella*. *Cryptogamie Mycologie* 24(3), 191–197.
- Zhou LJ, Li XL, Yuan HS. 2024a – Three new wood-inhabiting fungi of *Botryobasidium* (*Cantharellales*, *Basidiomycota*) from subtropical forests of Southwestern China. *MycoKeys* 109, 337–354. Doi 10.3897/mycokeys.109.133325
- Zhou X, Habib K, Zeng W, Ren Y, et al. 2024b – Addition of three new species of *Xylariomycetidae* fungi on bamboo from Southern China. *MycoKeys* 109, 109–129. Doi 10.3897/mycokeys.109.128020.