



The wood-decaying fungal diversity unveiled by morphology and phylogeny in Ailaoshan Mountain, Yunnan, China

LU WANG^{1,3} XIN YANG^{1,4} & CHANGLIN ZHAO^{1,2,5*}

¹College of Forestry, Southwest Forestry University, Kunming 650224, P.R. China

²Yunnan Academy of Biodiversity, Southwest Forestry University, Kunming 650224, P.R. China

³fungiluwang@163.com; <https://orcid.org/0009-0004-6274-5953>

⁴fungixiny@163.com; <https://orcid.org/0009-0009-7755-0581>

⁵fungichanglinz@163.com; <https://orcid.org/0000-0002-8668-1075>

*Corresponding author

Abstract

Seven field surveys were carried out in the Ailaoshan area of Yunnan Province, China, from 2016 to 2021, in which 2,814 specimens of wood-decaying fungal species were collected and identified based on morphology and phylogenetic analyses. One hundred and three wood-decaying species were identified, belonging to 64 genera, 29 families, and nine orders. Polyporales is the most abundant order in this area, accounting for 55.34% of all species, while Polyporaceae is the most abundant family, accounting for 18.45% of all species discovered in this area. The wood-decaying fungal checklist is provided according to the latest fungi classification system. Of these species, 11 are edible and therapeutic, four are forest pathogens, eight are threatened, and nine have just been reported from Ailaoshan Mountain. These species comprise 10.68%, 3.88%, 7.77%, and 8.74% of all species, respectively, while 71 species, or 68.93%, have unclear functional relationships. The sequences of the Internal Transcribed Spacer (ITS) gene region of the studied specimens were generated, and the phylogenetic analyses were performed with the maximum likelihood, maximum parsimony, and Bayesian inference methods. This study enriches the diversity of wood-decaying fungi in the Ailaoshan area. Also, it provides a theoretical basis for the future protection and utilization of wood-decaying fungal resources in this area.

Key words: fungal resources, molecular systematics, subtropical zone, taxonomy, wood-associated fungi

Introduction

Wood-decaying fungi belonging to the Agaricomycetes (Basidiomycota) grow on living wood, fallen wood, decayed wood, and forest land (Larsson 2007; Krahl *et al.* 2018; Wu *et al.* 2020; Dai *et al.* 2021a). They secrete various enzymes to degrade lignin, cellulose, and hemicellulose in wood and play a very key role in the degradation and reduction of material circulation and energy flow in forest ecosystems (Wei & Dai 2004, Dai & Zhuang 2010; Purhonen *et al.* 2020; Hobbie *et al.* 2021). Wood-decaying fungi are important members of the forest ecosystem (Yang 2016; Guan *et al.* 2020a, Luo *et al.* 2021; Qu *et al.* 2022; Dong *et al.* 2023; Zhao *et al.* 2023; Yang *et al.* 2024). Among wood-decaying fungi, corticioid fungi, poroid fungi, and hydroid fungi are the three main groups (Dai 2012a, 2012b; Liu *et al.* 2023).

Wood-decaying fungi have rich diversity worldwide and play an important role in the ecosystem (Guo & Chen 2021). The species diversity, taxonomy, and phylogeny of the wood-decaying fungi have been intensively studied in recent years, and the number of taxa has dramatically increased (Dai *et al.* 2014; Zhao & Wu 2017; Chen & Zhao 2020; Guan *et al.* 2020a, 2020b, 2021a, 2021b; Luo *et al.* 2019, 2021, 2022a, 2022b; He *et al.* 2021; He & Zhao 2022; Yang *et al.* 2024). Many species of wood-decaying fungi have edible and medicinal values, while others contain toxic metabolites (Dai *et al.* 2015; Baldrian 2018). Recognition of species diversity, taxonomy, and importance will aid in the conservation of wood-decaying fungi worldwide (Krahl *et al.* 2018).

Yunnan Province has abundant climate types, abundant precipitation, long wet season, and obvious north-south and vertical differences, in which the unique geographical conditions and climate environment have bred extremely rich wood rot fungi resources (Wang & Cai 2023). Systematic surveys of wood-decaying fungi are being carried out

in most parts of Yunnan Province, including Wuliangshan, Ailaoshan, Zixishan, Gaoligongshan and Mopanshan areas, and mycologists have found that the wood-decaying fungi resources in these areas are extremely abundant (Dai 2011; Guo *et al.* 2013; Dai *et al.* 2014, 2015a; Shen *et al.* 2018; Shen *et al.* 2022; Chen & Zhao 2020; Guan *et al.* 2023; He *et al.* 2021, 2022; Xu *et al.* 2020; Luo *et al.* 2021; Qu *et al.* 2022; Dong *et al.* 2023; Duan *et al.* 2023; Yuan *et al.* 2023; Yang *et al.* 2023a, 2023b). However, the knowledge of wood-decaying fungi still needs to be improved in Yunnan.

Ailaoshan, a natural wonder, is located in the center of Yunnan Province, China, near the intersection of the Hengduan Mountains region and the Yunnan-Guizhou Plateau. Encompassing a vast area of 67936 hm², it extends in a northwest-southeast direction, with a length of approximately 102 km (Lu *et al.* 2018). It is the southern extension of Yunling Mountain and the watershed between Yuanjiang and the Amu River, with an east-west width of 4–20 km, an altitude range of 800–3157 m, and a vertical height difference of 2357 m (Li *et al.* 2021). Its forest coverage rate is remarkable, standing at a majestic 85.1%. Ailaoshan's primary forest types include mixed warm coniferous forests, deciduous broad-leaved forests, and evergreen broad-leaved forests. These forests, thriving in their unique geographic position, climatic conditions, and vegetation types, have fostered an abundance of rich forest decay fungi, a sight that never fails to amaze visitors to this natural wonder.

The study conducted seven field expeditions in the Ailaoshan area between 2016 and 2021. Its goals were to recognize species diversity, understand the importance of wood-decaying fungal species in this area, and provide scientific understanding for utilizing and conserving this fungal resource.

Materials and methods

Sample collection and herbarium specimen preparation

The fresh fruiting bodies of basidiomycetous macrofungi growing on trees of stumps, trunks, and branches were collected in the Ailaoshan area from 2016 to 2021. At least three basidiomata were required, and the smallest fruiting structure had to include the hymenophore. The samples were photographed *in situ* using a Canon 80D camera, and their fresh macroscopic details were recorded. The samples were transported to a field station where the fruiting bodies were dried on an electric food dryer (Fsfruit) at 45°C for 48 hours (Hu *et al.* 2022). After the specimen was dried, it was sealed in an envelope and a zip-lock plastic bag and labeled. The dried specimens were deposited in the herbarium of Southwest Forestry University (SWFC), Kunming, Yunnan Province, China.

Morphological studies

The macromorphological descriptions were based on field notes and photos captured in the field and lab. Colour terms followed Petersen (1996). The micromorphological data were obtained from the dried specimens, and sections were separately prepared in Cotton Blue, Melzer's reagent, and 5% potassium hydroxide and observed under a Nikon Eclipse E100 light microscope following Zhao & Wu (2017). Based on morphological and molecular data, the identification was carried out with reference to previous publications (Chen *et al.* 2020; Liu *et al.* 2020; Dai *et al.* 2021; Luo *et al.* 2021; Westphalen *et al.* 2021; Phukhamsakda *et al.* 2022; Zhao *et al.* 2023).

Molecular procedures and phylogenetic analysis

CTAB rapid plant genome extraction kit-DN14 (Aidlab Biotechnologies Co., Ltd., Beijing, China) was used to obtain genomic DNA from dried specimens according to the manufacturer's instructions. ITS region was amplified with primer pair ITS5 and ITS4 (White *et al.* 1990). The PCR procedure for ITS was as follows: initial denaturation at 95 °C for 3 min, followed by 35 cycles at 94 °C for 40 s, 58 °C for 45 s, and 72 °C for 1 min, and a final extension of 72 °C for 10 min. The PCR products were purified using a QIAquick PCR purification kit (Qiagen Inc., Valencia, CA, USA) and directly sequenced at Kunming Tsingke Biological Technology Limited Company, Kunming Yunnan Province, P.R. China. All newly generated sequences were deposited at GenBank (Table 1).

The sequences were aligned in MAFFT version 7 using the G-INS-i strategy (Katoh *et al.* 2019). The alignment was adjusted manually using AliView version 1.27 (Larsson 2014). A sequence from the type material of *Exobasidium vaccinii* (Fuckel) Woronin acquired from GenBank was utilized as an outgroup to root the ITS phylogenetic tree (Figure 1).

Maximum parsimony analysis was applied to the ITS dataset sequences. Approaches to phylogenetic analysis followed Zhao & Wu (2017) and the tree construction procedure was performed in PAUP* version 4.0b10 (Swofford 2002). All of the characters were equally weighted and gaps were treated as missing data. Trees were inferred using

the heuristic search option with TBR branch swapping and 1000 random sequence additions. Max-trees were set to 5000, branches of zero length were collapsed, and all parsimonious trees were saved. Clade robustness was assessed using a bootstrap (BT) analysis with 1000 replicates (Felsenstein 1985). Descriptive tree statistics tree length (TL), the consistency index (CI), the retention index (RI), the rescaled consistency index (RC), and the homoplasy index (HI) were calculated for each maximum parsimonious tree (MPT) generated. Sequences were also analyzed using maximum likelihood (ML) with RAxML-HPC2 through the Cipres Science Gateway (Miller *et al.* 2012). Branch support (BS) for ML analysis was determined by 1000 bootstrap replicates.

MrModeltest 2.3 (Nylander 2004) was used to determine the best-fit evolution model for each data set for Bayesian inference (BI). Bayesian inference was calculated with MrBayes3.1.2 with a general time reversible (GTR+I+G) model of DNA substitution and a gamma distribution rate variation across sites (Ronquist & Huelsenbeck 2003). Four Markov chains were run for 2 runs from random starting trees for 7 million generations (Figure 1) and trees were sampled every 100 generations. The first one-fourth generations were discarded as burn-ins. A majority rule consensus tree of all remaining trees was calculated. A majority rule consensus tree of all remaining trees was calculated. Branches were considered as significantly supported if they received a maximum likelihood bootstrap (BS) of $\geq 70\%$, a maximum parsimony bootstrap (BT) of $\geq 50\%$, or Bayesian posterior probabilities (BPP) of ≥ 0.95 .

TABLE 1. Names, sample numbers, references, and corresponding GenBank accession numbers of the sequences used in this study.

Species name	Sample no.	GenBank accession no.	References
		ITS	
<i>Abundisporus quercicola</i>	CLZhao 4895	MK268806	Present study
<i>Abundisporus quercicola</i>	Dai 3084	KC415907	Zhao & Cui (2013a)
<i>Adustoporia sinuosa</i>	CLZhao 4818	MK268816	Present study
<i>Adustoporia sinuosa</i>	Vlasak 0509_17	KT711021	Spirin <i>et al.</i> (2015b)
<i>Aleurodiscus cerussatus</i>	NH11910	AF506399	Larsson & Larsson (2003)
<i>Aleurodiscus cerussatus</i>	CLZhao 4102	MK268808	Present study
<i>Aleurodiscus isabellinus</i>	CLZhao 3918	MK404311	Present study
<i>Aleurodiscus isabellinus</i>	He 5294	MH109053	Tian <i>et al.</i> (2018)
<i>Aleurodiscus tropicus</i>	CLZhao 4039	MH114607	Present study
<i>Aleurodiscus tropicus</i>	He3830	KX553875	Dai & He (2017)
<i>Alloexidiopsis yunnanensis</i>	CLZhao 9200	MT215571	Guan <i>et al.</i> (2020a)
<i>Alloexidiopsis yunnanensis</i>	CLZhao 9132	MT215566	Guan <i>et al.</i> (2020a)
<i>Bjerkandera adusta</i>	CLZhao 2761	MK268852	Present study
<i>Bjerkandera adusta</i>	935	ON391775	Pristas <i>et al.</i> (2022)
<i>Brunneoporus malicola</i>	CLZhao 3832	MH114612	Present study
<i>Brunneoporus malicola</i>	Vlasak 0404/23-J	KU866274	Spirin <i>et al.</i> (2016)
<i>Byssomerulius corium</i>	CLZhao 3999	MH114629	Present study
<i>Byssomerulius corium</i>	FP-107055	KP135008	Floudas & Hibbett (2015)
<i>Cabalodontia albofibrillosa</i>	CLZhao 8722	MZ713669	Present study
<i>Cabalodontia albofibrillosa</i>	SWFC 006394	MK894083	Unpublished
<i>Cerrena albocinnamomea</i>	CLZhao 3952	MH114615	Present study
<i>Cerrena albocinnamomea</i>	Dai12892	KC485522	Yuan (2014)
<i>Cerrena zonata</i>	CLZhao 5320	ON377090	Present study
<i>Cerrena zonata</i>	HKAS122586	ON794386	Wang <i>et al.</i> (2022)
<i>Coltricia weii</i>	CLZhao 4773	OM891745	Present study
<i>Coltricia weii</i>	Dai 13422	KX364797	Bian & Dai (2017)
<i>Crustodontia rhododendri</i>	CLZhao 8498	MK404480	Zhao <i>et al.</i> (2023)
<i>Crustodontia rhododendri</i>	CLZhao 6168	MW732400	Zhao <i>et al.</i> (2023)
<i>Crustodontia tongxiniana</i>	CLZhao 5175	MW732429	Present study

...continued on the next page

TABLE 1. (Continued)

Species name	Sample no.	GenBank accession no.	References
		ITS	
<i>Crustodontia tongxiniana</i>	CLZhao 5217	MT020778	Huang & Zhao (2020)
<i>Crustomyces subabruptus</i>	CLZhao 4176	MK268878	Present study
<i>Crustomyces subabruptus</i>	CLZhao 5214	OR285305	Present study
<i>Cubamyces lactineus</i>	CLZhao 4811	MK269099	Present study
<i>Cubamyces lactineus</i>	A80FB1	OQ558859	Hong <i>et al.</i> (2023)
<i>Cylindrobasidium evolvens</i>	CLZhao 5051	MK268881	Present study
<i>Cylindrobasidium evolvens</i>	PDD:79912	KT201654	Qin & Yang (2016)
<i>Dacryobolus montanus</i>	CLZhao 5692	MK268883	Present study
<i>Dacryobolus montanus</i>	He 6314	ON417157	Liu <i>et al.</i> (2022)
<i>Daedaleopsis confragosa</i>	CLZhao 4813	MK268892	Present study
<i>Daedaleopsis confragosa</i>	MOGU 155-19	OM530258	Cartabia <i>et al.</i> (2021)
<i>Dentipellis fragilis</i>	CLZhao 3874	MH114643	Present study
<i>Dentipellis fragilis</i>	NH6569	AF506387	Larsson & Larsson (2003)
<i>Earliella scabrosa</i>	CLZhao 3989	MH114644	Present study
<i>Earliella scabrosa</i>	biocode08-110	MZ996936	Osmundson <i>et al.</i> (2022)
<i>Elaphroporia ailaoshanensis</i>	CLZhao 595	MG231568	Wu <i>et al.</i> (2018)
<i>Elaphroporia ailaoshanensis</i>	CLZhao 598	MG231823	Wu <i>et al.</i> (2018)
<i>Exobasidium vaccinii</i>	CBS:183.56	MH857572	Vu <i>et al.</i> (2019)
<i>Fragiliporia fragilis</i>	Dai 13559	KJ734261	Zhao <i>et al.</i> (2015b)
<i>Fragiliporia fragilis</i>	Yuan 5516	KJ734263	Zhao <i>et al.</i> (2015b)
<i>Fuscoporia gilva</i>	CLZhao 6155	MK795135	Present study
<i>Fuscoporia gilva</i>	OAB0087	ON876017	Olou <i>et al.</i> (2023)
<i>Fuscoporia pulviniformis</i>	CLZhao 8327	ON332074	Present study
<i>Fuscoporia pulviniformis</i>	Dai 17247	MH050748	Chen & Dai (2019)
<i>Fuscoporia torulosa</i>	CLZhao 2762	MK343537	Present study
<i>Fuscoporia torulosa</i>	Dai 15518	MN816732	Chen <i>et al.</i> (2020)
<i>Ganoderma lingzhi</i>	CLZhao 4770	MK268933	Present study
<i>Ganoderma lingzhi</i>	Dai 12374	JQ781867	Cao <i>et al.</i> (2012)
<i>Heterobasidium orientale</i>	CLZhao 3868	MH114692	Present study
<i>Heterobasidium orientale</i>	MSM 0099	MH233931	Saba <i>et al.</i> (2018)
<i>Hydnophaerochaete odontoidea</i>	CLZhao 8245	MK404433	Present study
<i>Hydnophaerochaete odontoidea</i>	Wu 9310-8	MF399408	Wu <i>et al.</i> (2018)
<i>Hydnoporia corrugata</i>	CLZhao 5711	MK268964	Present study
<i>Hydnoporia corrugata</i>	He839	JQ279607	Unpublished
<i>Hymenochaete anomala</i>	CLZhao 8200	MK404350	Present study
<i>Hymenochaete anomala</i>	He135	JQ279567	He & Dai (2012)
<i>Hymenochaete cinnamomea</i>	CLZhao 5006	MK268963	Present study
<i>Hymenochaete cinnamomea</i>	HHB-11978-Sp	OQ539565	Yu <i>et al.</i> (2023)
<i>Hymenochaete innexa</i>	CLZhao 4846	MK268967	Present study
<i>Hymenochaete innexa</i>	He446	JQ279585	He & Dai (2012)
<i>Hymenochaete microcycla</i>	CLZhao 2811	MK404358	Present study
<i>Hymenochaete microcycla</i>	CLZhao 4150	OM959417	Present study
<i>Hymenochaete rheicolor</i>	CLZhao 4829	MK269000	Present study

...continued on the next page

TABLE 1. (Continued)

Species name	Sample no.	GenBank accession no.	References
		ITS	
<i>Hymenochaete rheicolor</i>	He503	JQ279530	He & Dai (2012)
<i>Hymenochaete rubiginosa</i>	CLZhao 5745	MK269006	Present study
<i>Hymenochaete rubiginosa</i>	He1049	JQ716407	He & Li (2013)
<i>Hymenochaete separabilis</i>	CLZhao 5684	MK269009	Present study
<i>Hymenochaete separabilis</i>	He267	JQ279573	He & Dai (2012)
<i>Hymenochaete sphaericola</i>	CLZhao 3881	MH114715	Present study
<i>Hymenochaete sphaericola</i>	He413	JQ279600	He & Dai (2012)
<i>Hymenochaete vaginata</i>	CLZhao 3945	MH114717	Present study
<i>Hymenochaete vaginata</i>	He 2599	KU975484	Unpublished
<i>Hymenochaete villosa</i>	CLZhao 5444	ON332079	Present study
<i>Hymenochaete villosa</i>	Cui8139	JQ279527	He & Dai (2012)
<i>Hymenochaete xerantica</i>	CLZhao 8397	OM891750	Present study
<i>Hymenochaete xerantica</i>	CLZhao 8638	OM891755	Present study
<i>Hymenochaetopsis rigidula</i>	CLZhao 5661	MK269016	Present study
<i>Hymenochaetopsis rigidula</i>	He379	JQ279613	He & Dai 2012
<i>Hyphoderma microporoides</i>	CLZhao 8695	MW917170	Guan & Chao (2021a)
<i>Hyphoderma microporoides</i>	CLZhao 6857	MW917169	Guan & Chao (2021a)
<i>Hyphoderma moniliforme</i>	CLZhao 5936	MK795144	Present study
<i>Hyphoderma moniliforme</i>	Wu 0211-46	KC928284	Yurchenko & Wu (2015)
<i>Hyphodontia mollis</i>	CLZhao 5763	MK268888	Present study
<i>Hyphodontia mollis</i>	Wu 0808-32	JX175043	Yurchenko & Wu (2014)
<i>Hyphodontia tropica</i>	CLZhao 3920	MH114772	Present study
<i>Hyphodontia tropica</i>	ICMP 13837	AF145587	Paulus <i>et al.</i> (2000)
<i>Irpex lacteus</i>	CLZhao 3829	MH114794	Present study
<i>Irpex lacteus</i>	LE-BIN 4341	OM033738	Kotlova <i>et al.</i> (2022)
<i>Junghuhnia nitida</i>	CLZhao 4903	MK269091	Present study
<i>Junghuhnia nitida</i>	MT 33/12	KY174989	Westphalen <i>et al.</i> (2021)
<i>Laetiporus ailaoshanensis</i>	CLZhao 3913	OM891737	Present study
<i>Laetiporus ailaoshanensis</i>	Dai 15629	KY886714	Song & Cui (2017)
<i>Lentinus brumalis</i>	CLZhao 4898	MK269243	Present study
<i>Lentinus brumalis</i>	LSPQ-NSM-117	KU761245	Dufresne <i>et al.</i> (2017)
<i>Lenzites betulinus</i>	CLZhao 3825	MH114801	Present study
<i>Lenzites betulinus</i>	IUM5468	KU350750	Im <i>et al.</i> (2016)
<i>Lyomyces bambusinus</i>	CLZhao 4831	MN945968	Chen & Zhao (2020)
<i>Lyomyces bambusinus</i>	CLZhao 3675	MN945969	Chen & Zhao (2020)
<i>Lyomyces cremeus</i>	CLZhao 8295	MN945972	Chen & Zhao (2020)
<i>Lyomyces cremeus</i>	CLZhao 2812	MN945973	Chen & Zhao (2020)
<i>Lyomyces macrosporus</i>	CLZhao 8605	OM959497	Present study
<i>Lyomyces macrosporus</i>	CLZhao 3951	MN945976	Chen & Zhao (2020)
<i>Megasporoporiella pseudocavernulosa</i>	CLZhao 2803	MK404418	Present study
<i>Megasporoporiella pseudocavernulosa</i>	Dai 19379	MW694882	Wang <i>et al.</i> (2021)
<i>Merulius tomentopileatus</i>	CLZhao 5833	MT020761	Present study
<i>Merulius tomentopileatus</i>	TNM:F30815	MZ637039	Chen <i>et al.</i> (2021)

...continued on the next page

TABLE 1. (Continued)

Species name	Sample no.	GenBank accession no.	References
		ITS	
<i>Microporus vernicipes</i>	KUC11046	KJ714006	Jang <i>et al.</i> (2015)
<i>Microporus vernicipes</i>	CLZhao 5510	ON319073	Present study
<i>Microporus xanthopus</i>	CLZhao 5498	ON319077	Present study
<i>Microporus xanthopus</i>	OAB0075	ON876040	Olou <i>et al.</i> (2023)
<i>Mutatoderma mutatum</i>	CLZhao 5287	OR285306	Present study
<i>Mutatoderma mutatum</i>	CBS:290.36	MH855802	Vu <i>et al.</i> (2019)
<i>Nigroporus vinosus</i>	CLZhao 3139	MZ713665	Present study
<i>Nigroporus vinosus</i>	PW17-221	MK589284	Thamvithayakorn <i>et al.</i> (2019)
<i>Peniophora cinerea</i>	CLZhao 5716	MK269148	Present study
<i>Peniophora cinerea</i>	V1M4F82	KT692548	Comby <i>et al.</i> (2016)
<i>Peniophora incarnata</i>	CLZhao 6016	MK795172	Present study
<i>Peniophora incarnata</i>	AF112	OQ450439	Unpublished
<i>Peniophorella praetermissa</i>	CLZhao 3919	OM985740	Present study
<i>Peniophorella praetermissa</i>	TMI 20754 (TMI)	DQ647476	Hallenberg <i>et al.</i> (2007)
<i>Perenniporia luteola</i>	CLZhao 5761	MK269153	Present study
<i>Perenniporia luteola</i>	Harkonen 1308b	JX141457	Zhao & Cui (2013c)
<i>Phaeophlebiopsis peniophoroides</i>	CLZhao 5166	MK269160	Present study
<i>Phaeophlebiopsis peniophoroides</i>	FP-150577	KP135417	Floudas & Hibbett (2015)
<i>Phanerochaete sordida</i>	CLZhao 4835	MK269184	Present study
<i>Phanerochaete sordida</i>	HHB-9899-sp	AY219382	De Koker <i>et al.</i> (2003)
<i>Phanerochaete velutina</i>	CLZhao 8156	MK404438	Present study
<i>Phanerochaete velutina</i>	CBS:137.75	MH860903	Vu <i>et al.</i> (2019)
<i>Phellinus adamantinus</i>	CLZhao 2820	MK404439	Present study
<i>Phellinus adamantinus</i>	Dai 17592	MF860791	Zhou <i>et al.</i> (2021)
<i>Phlebia ailaoshanensis</i>	CLZhao 3882	MH784919	Shen <i>et al.</i> (2018)
<i>Phlebia ailaoshanensis</i>	CLZhao 3904	MH784922	Shen <i>et al.</i> (2018)
<i>Phlebia radiata</i>	CLZhao 4882	MK404484	Present study
<i>Phlebia radiata</i>	JLL-15608-sp	AY219366	De Koker <i>et al.</i> (2003)
<i>Phlebicolorata rosea</i>	Dai 13573	KJ698635	Zhao <i>et al.</i> (2015a)
<i>Phlebicolorata rosea</i>	Dai 13584	KJ698636	Zhao <i>et al.</i> (2015a)
<i>Phlebiopsis crassa</i>	CLZhao 3943	MH114864	Present study
<i>Phlebiopsis crassa</i>	TNM:F30336	MZ637049	Chen <i>et al.</i> (2021)
<i>Phlebiopsis gigantea</i>	CLZhao 3965	MH114868	Present study
<i>Phlebiopsis gigantea</i>	CLZhao 8163	MK404489	Present study
<i>Phlebiopsis yunnanensis</i>	CLZhao 3958	MH744140	Present study
<i>Phlebiopsis yunnanensis</i>	CLZhao 3990	MH744141	Zhao <i>et al.</i> (2019)
<i>Picipes badius</i>	CLZhao 4949	ON319080	Present study
<i>Picipes badius</i>	Cui10853	KU189780	Zhou <i>et al.</i> (2016)
<i>Podoscypha yunnanensis</i>	CLZhao 3963	MK298400	Present study
<i>Podoscypha yunnanensis</i>	CLZhao 4035	MK298403	Wu <i>et al.</i> (2018)
<i>Punctularia bambusicola</i>	CLZhao 9098	MW559983	Present study
<i>Punctularia bambusicola</i>	CLZhao 4133	MW559982	Guan <i>et al.</i> (2021b)
<i>Pycnoporus sanguineus</i>	CLZhao 4807	MK269258	Present study

...continued on the next page

TABLE 1. (Continued)

Species name	Sample no.	GenBank accession no.	References
		ITS	
<i>Pycnoporus sanguineus</i>	KA12-1267	KR673511	Kim <i>et al.</i> (2015)
<i>Sistotrema brinkmannii</i>	CLZhao 5221	MK269275	Present study
<i>Sistotrema brinkmannii</i>	FP-100507-Sp	OQ539595	Yu <i>et al.</i> (2023)
<i>Sistotremastrum guttuliferum</i>	CLZhao 5531	MK343645	Present study
<i>Sistotremastrum guttuliferum</i>	MA:Fungi 82105	JX310445	Telleria <i>et al.</i> (2013)
<i>Steccherinum aurantilaetum</i>	CLZhao 3807	MH114797	Present study
<i>Steccherinum aurantilaetum</i>	CLZhao 3969	MH114616	Present study
<i>Steccherinum bourdotii</i>	CLZhao 8150	MK404501	Present study
<i>Steccherinum bourdotii</i>	MT10/19	MT849312	Westphalen <i>et al.</i> (2021)
<i>Steccherinum fimbriatum</i>	CLZhao 8399	MK404503	Present study
<i>Steccherinum fimbriatum</i>	HR97926	MT849299	Westphalen <i>et al.</i> (2018)
<i>Steccherinum ochraceum</i>	CLZhao 3902	MH114886	Present study
<i>Steccherinum ochraceum</i>	KHL11902 (GB)	JQ031130	Sjökvist <i>et al.</i> (2012)
<i>Steccherinum xanthum</i>	CLZhao 5024	MW204587	Present study
<i>Steccherinum xanthum</i>	CLZhao 9138	MZ713697	Present study
<i>Stereum hirsutum</i>	CLZhao 3912	MH114889	Present study
<i>Stereum hirsutum</i>	NH7960	AF506479	Larsson <i>et al.</i> (2004)
<i>Stereum sanguinolentum</i>	CLZhao 5054	MK269301	Present study
<i>Stereum sanguinolentum</i>	CBS:116.71	MH860027	Vu <i>et al.</i> (2019)
<i>Terana coerulea</i>	CLZhao 5793	MK269227	Present study
<i>Terana coerulea</i>	CBS:163.56	MH857560	Vu <i>et al.</i> (2019)
<i>Theleporus rimosus</i>	CLZhao 5548	MK343667	Present study
<i>Theleporus rimosus</i>	Yuan 6873	KP342529	Yuan (2015)
<i>Trametes hirsuta</i>	CLZhao 4029	MH114902	Present study
<i>Trametes hirsuta</i>	LE 231641	HQ435869	Malysheva & Zmitrovich (2011)
<i>Trametes versicolor</i>	CLZhao 4857	ON319086	Present study
<i>Trametes versicolor</i>	Cui6915	JQ314354	Li & Cui (2013)
<i>Truncospora ochroleuca</i>	CLZhao 5733	MK268887	Present study
<i>Truncospora ochroleuca</i>	JV0610/7B	KJ410698	Spirin <i>et al.</i> (2015a)
<i>Xenamatella ailaoshanensis</i>	CLZhao 4839	MN487106	Present study
<i>Xenamatella ailaoshanensis</i>	CLZhao 3895	MN487105	Huang <i>et al.</i> (2019)
<i>Xylodon flaviporus</i>	CLZhao 8339	OM891748	Present study
<i>Xylodon flaviporus</i>	KA17-0796	MK920119	Kwon <i>et al.</i> (2019)
<i>Xylodon gossypinus</i>	CLZhao 8375	MZ663804	Present study
<i>Xylodon gossypinus</i>	CLZhao 4465	MZ663803	Luo <i>et al.</i> (2021)
<i>Xylodon heterocystidiatus</i>	CLZhao 4827	MK269242	Present study
<i>Xylodon heterocystidiatus</i>	CLZhao 15557	MW742678	Dong <i>et al.</i> (2023)
<i>Xylodon macrosporus</i>	CLZhao 8787	MZ663808	Present study
<i>Xylodon macrosporus</i>	CLZhao 2379	MZ663805	Luo <i>et al.</i> (2021)
<i>Xylodon montanus</i>	CLZhao 8118	OL619259	Qu <i>et al.</i> (2021)
<i>Xylodon montanus</i>	CLZhao 8179	OL619260	Qu <i>et al.</i> (2021)
<i>Xylodon nesporii</i>	CLZhao 3988	MH114741	Present study
<i>Xylodon nesporii</i>	CLZhao 5713	MK269035	Present study

...continued on the next page

TABLE 1. (Continued)

Species name	Sample no.	GenBank accession no.	References
		ITS	
<i>Xylodon rhizomorphus</i>	CLZhao 8294	OM891747	Present study
<i>Xylodon rhizomorphus</i>	Dai 12389	KF917546	Zhao <i>et al.</i> (2014)
<i>Xylodon taiwanianus</i>	CLZhao 8319	MK404393	Present study
<i>Xylodon taiwanianus</i>	CBS:125875	MH864080	Vu <i>et al.</i> (2019)
<i>Yuchengia narymica</i>	CLZhao 3898	MH114926	Present study
<i>Yuchengia narymica</i>	Dai 6998	JN048775	Zhao <i>et al.</i> (2013b)

Results

Phylogenetic analyses

The ITS dataset (Figure 1) included sequences from 197 fungal specimens representing 99 species. The dataset had an aligned length of 1317 characters, of which 416 characters were constant, 143 parsimony-uninformative, and 758 parsimony-informative. The maximum parsimony analysis yielded 1 equally parsimonious tree (TL = 11693, CI = 0.1745, HI = 0.8388, RI = 0.6026, RC = 0.1052). The best-fit model for ITS alignment estimated and applied in the Bayesian was GTR+I+G, lset nst = 6, rates = invgamma; prset statefreqpr = dirichlet (1,1,1,1). The Bayesian and ML analyses showed a similar topology to that of the MP analysis with split frequencies = 0.015088 (BI), and the effective sample size (ESS) across the two runs is double the average ESS (avg ESS) = 250.5.

The phylogeny (Figure 1) inferred from ITS sequences demonstrated that 2814 specimens of wood-decaying fungi belonging to 103 taxa and all of them nested into twenty-eight families: Adustoporiaceae, Auriculariaceae, Bondarzewiaceae, Dacrybolaceae, Fomitopsidaceae, Fragiliporiaceae, Ganodermataceae, Grammotheleaceae, Hericiaceae, Hydnaceae, Hymenochaetaceae, Hyphodermataceae, Irpicaceae, Laetiporaceae, Meruliaceae, Peniophoraceae, Phaeophlebiopsis, Phanerochaetaceae, Physalacriaceae, Podoscyphaceae, Polyporaceae, Punctulariaceae, Rickenellaceae, Schizoporaceae, Sistotremastraceae, Steccherinaceae, Stereaceae and Xenasmataceae, belonging to nine orders: Agaricales, Auriculariales, Cantharellales, Corticiales, Hymenochaetales, Polyporales, Russulales, Sistotrematales and Xenasmatales of Agaricomycetes.

Checklist

An alphabetical list (according to genus name) of corticioid fungal identified in these investigations is given below. The authors of scientific names are according to the second edition of Authors of Fungal Names (<http://www.indexfungorum.org/AuthorsOfFungalNames.html>). Substrate and collecting data are provided after the name of each species.

1. *Abundisporus quercicola* Y.C. Dai, *Annales Botanici Fennici* 39 (3): 171 (2003). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 4955, CLZhao 4895; Jinshan Primitive Forest Park, Xinping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 2 January 2019, CLZhao 9166.

2. *Adustoporia sinuosa* (Fr.) Audet, *Mushrooms nomenclatural novelties* 11: 1 (2017). Brown rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 11 January 2018, CLZhao 4818.

3. *Aleurodiscus cerussatus* (Bres.) Höhn. & Litsch., *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I* 116: 760, 807 (1907). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 5 October 2017, CLZhao 4102.

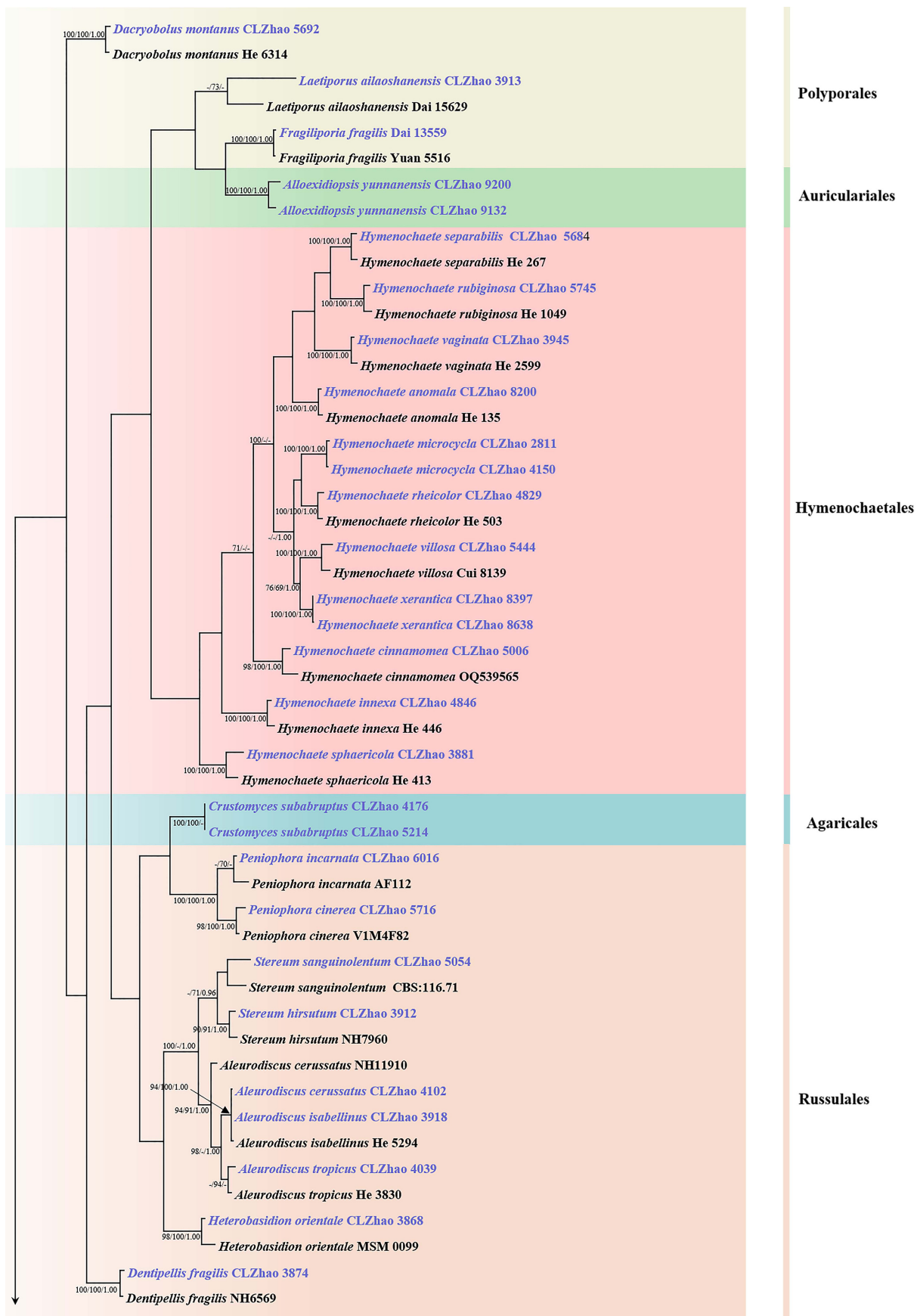


FIGURE 1. Maximum parsimony strict consensus tree illustrating the phylogeny of 103 species in Agaricomycetes based on ITS sequences. Branches are labelled with a maximum likelihood boot-strap >70%, a parsimony bootstrap >50%, and Bayesian posterior probabilities >0.97, respectively. The sequences of collections labelled in black are downloaded from GenBank, while those in purple are generated in this study.

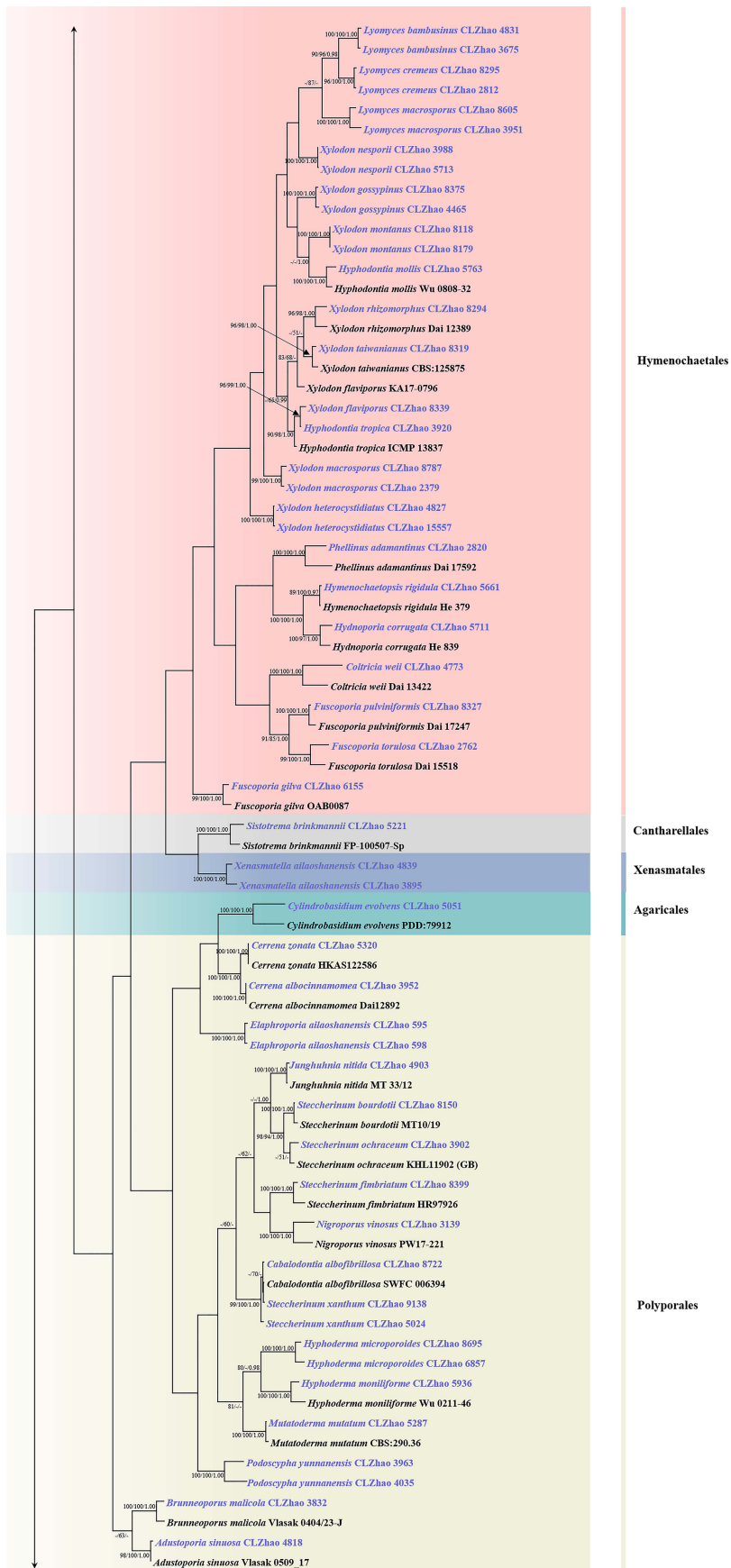


FIGURE 1. Cont.

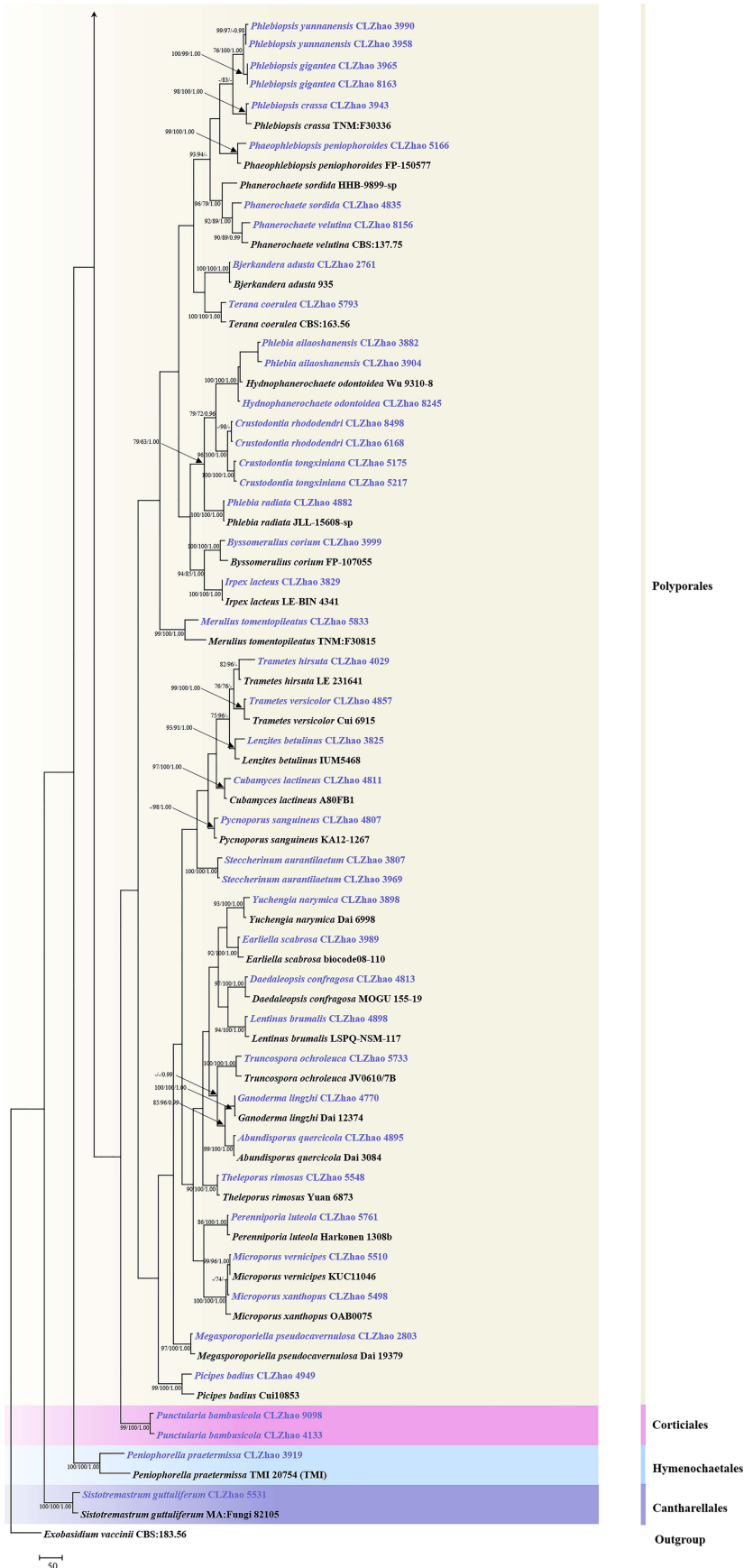


FIGURE 1. Cont.

4. *Aleurodiscus isabellinus* S.H. He & Y.C. Dai, in Tian, Ghobad-Nejhad, He & Dai, MycoKeys 37: 100 (2018). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a fallen branch of angiosperm, 4 October 2017, CLZhao 3918; Tea horse ancient road scenic spot, Xinping County, Yuxi, Yunnan Province, China, on a fallen trunk of angiosperm, 13 January 2018, CLZhao 5176; CLZhao 5199; CLZhao 5405; Ailaoshan National Nature Reserve, Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 14 January 2018, CLZhao 5625.
5. *Aleurodiscus tropicus* L.D. Dai & S.H. He, in Dai, Wu, Nakasone, Burdsall & He, Mycoscience 58(3): 215 (2017). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a dead Bamboo, 4 October 2017, CLZhao 4039.
6. *Alloexidiopsis yunnanensis* (C.L. Zhao) L.W. Zhou & S.L. Liu, Frontiers in Microbiology 13 (no. 894641): 9 (2022). White rot in a broad-leaved forest. Jinshan Forest Park, Xinping County, Yuxi, Yunnan Province, China, on a fallen trunk of angiosperm, 2 January 2019, CLZhao 9200; Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 4 October 2017, CLZhao 4023.
7. *Bjerkandera adusta* (Willd.) P. Karst., Meddn Soc. Fauna Flora fenn. 5: 38 (1879). White rot in a mixed coniferous broad-leaved forest. Ailaoshan Scenic Spot, Xinping County, Yuxi, Yunnan Province, China, on a trunk or a stump of angiosperm, on the fallen branch of *Pinus*, 21 August 2017, CLZhao 2761; white rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3799, CLZhao 3891, CLZhao 3935; Jinshan Primitive Forest Park, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 4925; on a stump of angiosperm, 14 January 2018, CLZhao 5453, CLZhao 5455, CLZhao 5458, CLZhao 5471; Jinshan Primeval Forest, Puer, Yunnan Province, China, on a trunk of angiosperm, 2 January 2019, CLZhao 9207.
8. *Brunneoporus malicola* (Berk. & M.A. Curtis) Audet, Mushrooms nomenclatural novelties 2: 1 (2017). Brown rot in a broad-leaved forest. Ailaoshan, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 4 October 2017, CLZhao 3832.
9. *Byssomerulius corium* (Pers.) Parmasto, Eesti NSV Tead. Akad. Toim., Biol. seer 16(4): 383 (1967). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 4 October 2017, CLZhao 3999.
10. *Cabalodontia albofibrillosa* (Hjortstam & Ryvarden) Westphalen, in Westphalen, Motato-Vásquez, Tomšovský & Gugliotta, Mycologia: 10.1080/00275514.2021.1894536, 5 (2021). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a trunk of angiosperm, 25 August 2018, CLZhao 8722.
11. *Cerrena albocinnamomea* (Y.C. Dai & Niemelä) H.S. Yuan, Mycological Progress 13(2): 362 (2013). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3952; Jinshan Primitive Forest Park, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 5022, CLZhao 5029, CLZhao 5046; Tea horse ancient road scenic spot, Xinping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 13 January 2018, CLZhao 5268, CLZhao 5270, CLZhao 5304; Jinshan Primeval Forest, Puer, Yunnan Province, China, on a trunk of angiosperm, 2 January 2019, CLZhao 9146.
12. *Cerrena zonata* (Berk.) H.S. Yuan, Mycological Progress 13(2): 363 (2013). White rot in a broad-leaved forest. Ailaoshan Scenic Area, Xinping County, Yuxi, Yunnan Province, China, on a trunk or a stump of angiosperm, 21 August 2017, CLZhao 2751; Tea horse ancient road scenic spot, Xinping County, Yuxi, Yunnan Province, China, on a living tree of angiosperm, 13 January 2018, CLZhao 5320; Ailaoshan National Nature Reserve, Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a stump of angiosperm, 14 January 2018, CLZhao 5518, CLZhao 5539.
13. *Coltricia weii* Y.C. Dai, Sydowia 62 (1): 16 (2010). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on the ground, 6 October 2017, CLZhao 4773.
14. *Crustodontia rhododendri* C.L. Zhao, J. Fungi 9 (3, no. 320): 13 (2023). White rot in a broad-leaved forest. Damoshan, Puer, Zhenyuan County, Yunnan Province, China, on a fallen branch of *Rhododendron simii*, 15 January 2018, CLZhao 6168; Ailaoshan Ecological Station, Xujaiba, Yunnan Province, China, on a fallen branch of the angiosperm, 23 August 2018, CLZhao 8413; 24 August 2018, CLZhao 8498, CLZhao 8645; on a dead tree of angiosperm, 24 August 2018, CLZhao 8620; Ailaoshan National Nature Reserve, Zhenyuan County, Puer, Yunnan Province, China, on a fallen branch of the angiosperm, 14 January 2018, CLZhao 5614, CLZhao 5623, CLZhao 5628, CLZhao 5680; 15 January 2018, CLZhao 5821, CLZhao 5841; on a stump of angiosperm, 15 January 2018, CLZhao 5873.

15. *Crustodontia tongxiniana* (C.L. Zhao) C.C. Chen & Sheng H. Wu, in Chen, Chen & Wu, Fungal Diversity 111: 421 (2021). White rot in a broad-leaved forest. Tea Horse Ancient Road Scenic Spot, Xinping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 13 January 2018, CLZhao 5175; 21 August 2018, CLZhao 8168.
16. *Crustomyces subabruptus* (Bourdot & Galzin) Jülich, Persoonia 10 (1): 140 (1978). White rot in a broad-leaved forest. Wuliangshan, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 5 October 2017, CLZhao 4176; Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 13 January 2018, CLZhao 5214.
17. *Cubamyces lactineus* (Berk.) Lücking, Willdenowia 50 (3): 396 (2020). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 11 January 2018, CLZhao 4811, CLZhao 4823.
18. *Cylindrobasidium evolvens* (Fr.) Jülich, Persoonia 8 (1): 72 (1974). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 5051.
19. *Dacryobolus montanus* X.Z. Wan & H.S. Yuan, Phytotaxa 265 (2): 107 (2016). Brown rot in a broad-leaved forest. Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 14 January 2018, CLZhao 5692; Ailaoshan National Nature Reserve, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 23 August 2018, CLZhao 8360.
20. *Daedaleopsis confragosa* (Bolton) J. Schröt., in Cohn, Krypt.-Fl. Schlesien (Breslau) 3.1(25–32): 492 (1888). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 11 January 2018, CLZhao 4813, CLZhao 4820, CLZhao 4828, CLZhao 4836.
21. *Dentipellis fragilis* (Pers.) Donk, Persoonia 2(2): 233 (1962). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3874; Ailaoshan Ecological Station, Puer, Yunnan Province, China, on a trunk of angiosperm, 24 August 2018, CLZhao 8609.
22. *Earliella scabrosa* (Pers.) Gilb. & Ryvardeen, Mycotaxon 22(2): 364 (1985). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Township, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3989, CLZhao 4008.
23. *Elaphroporia ailaoshanensis* Z.Q. Wu & C.L. Zhao, in Wu, Xu, Shen, Liu, Luo & Zhao, MycoKeys 29: 89 (2018). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 October 2016, CLZhao 595, CLZhao 596, CLZhao 597, CLZhao 598.
24. *Fragiliporia fragilis* Y.C. Dai, B.K. Cui & C.L. Zhao, in Zhao, Cui, Song & Dai, Fungal Diversity 70: 115–126. White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 15 October 2013, Dai 13559, Dai 13561 (BJFC015021, BJFC015023, BJFC).
25. *Fuscoporia gilva* (Schwein.) T. Wagner & M. Fisch., Mycologia 94 (6): 1013 (2002). White rot in a broad-leaved forest. Damoshan, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a dead tree of angiosperm, 16 January 2018, CLZhao 6155; Ailaoshan Ecological Station, Puer, Yunnan Province, China, on a trunk of angiosperm, 25 August 2018, CLZhao 8740; Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a stump of angiosperm, 1 January 2019, CLZhao 9096.
26. *Fuscoporia pulviniformis* Tchetet, M.P.A. Coetzee, Rajchenb. & Jol. Roux, Mycologia 112 (4): 734 (2020). White rot in a broad-leaved forest. Ailaoshan Ecological Station, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 23 August 2018, CLZhao 8327.
27. *Fuscoporia torulosa* (Pers.) T. Wagner & M. Fisch., Mycological Research 105 (7): 780 (2001). White rot in a broad-leaved forest. Ailaoshan Scenic Spot, Xinping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 21 August 2017, CLZhao 2762; Jinshan Primitive Forest Park, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 5017; Tea horse ancient road scenic spot, Xinping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 13 January 2018, CLZhao 5324, CLZhao 5325; Ailaoshan Ecological Station, Puer, Yunnan Province, China, on a trunk of angiosperm, 23 August 2018, CLZhao 8318.
28. *Ganoderma lingzhi* S.H. Wu, Y. Cao & Y.C. Dai, Fungal Diversity 56 (1): 54 (2012). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk or a stump of angiosperm, 6 October 2017, CLZhao 4770.

29. *Heterobasidion orientale* Tokuda, T. Hatt. & Y.C. Dai, in Tokuda, Hattori, Dai, Ota & Buchanan, *Mycoscience* 50 (3): 193 (2009). White rot in a mixed coniferous broad-leaved forest. Ailaoshan National Nature Reserve, Puer City, Yunnan Province, China, on a stump of *Pinus*, 4 October 2017, CLZhao 3868.
30. *Hydnophanerochaete odontoidea* (Sheng H. Wu) Sheng H. Wu & C.C. Chen, in Chen, Wu & Chen, *MycKeys* 39: 86 (2018). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 23 August 2018, CLZhao 8245.
31. *Hydnoporia corrugata* (Fr.) K.H. Larss. & Spirin, *Fungal Systematics and Evolution* 4: 88 (2019). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 15 January 2018, CLZhao 5711, CLZhao 5852; Ailaoshan Ecological Station, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 23 August 2018, CLZhao 8303, CLZhao 8449, CLZhao 8431.
32. *Hymenochaete anomala* Burt, *Annals of the Missouri Botanical Garden* 5: 358 (1918). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a stump of angiosperm, 15 January 2018, CLZhao 5700; Jinshan Primeval Forest, Yunnan Province, China, on a fallen trunk of angiosperm, 20 August 2018, CLZhao 7990; Tea horse ancient road scenic spot, Xiping County, Yuxi, Yunnan Province, China, on a fallen trunk of angiosperm, 21 August 2018, CLZhao 8200.
33. *Hymenochaete cinnamomea* (Pers.) Bres., *Atti dell'Istituto Reale dell'Accademia di Rovereto di Scienze* 3: 110 (1897). White rot in a broad-leaved forest. Jinshan Primitive Forest Park, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 12 January 2018, CLZhao 5006; Jinshan Primeval Forest, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 2 January 2019, CLZhao 9148.
34. *Hymenochaete innexa* G. Cunn., *Transactions and Proceedings of the Royal Society of New Zealand* 85 (1): 47 (1957). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 11 January 2018, CLZhao 4846.
35. *Hymenochaete microcycla* (Zipp. ex Lév.) Spirin & Miettinen, *Fungal Systematics and Evolution* 4: 86 (2019). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a trunk of angiosperm, 5 October 2017, CLZhao 4150; Ailaoshan Scenic Area, Xiping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 21 August 2018, CLZhao 2811.
36. *Hymenochaete rheicolor* (Mont.) Lév., *Annales des Sciences Naturelles Botanique* 5: 151 (1846). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 11 January 2018, CLZhao 4829; 12 January 2018, CLZhao 5540; 14 January 2018, CLZhao 5858.
37. *Hymenochaete rubiginosa* (J.F. Gmel.) Lév., *Ann. Sci. Nat., Bot.* 5: 151 (1846). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 14 January 2018, CLZhao 5745, CLZhao 5748.
38. *Hymenochaete separabilis* J.C. Léger, *Bulletin de la Société Mycologique de France* 97 (1): 7 (1981). White rot in a broad-leaved forest. Tea horse ancient road scenic spot, Xiping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 13 January 2018, CLZhao 5257; Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 14 January 2018, CLZhao 5684.
39. *Hymenochaete sphaericola* Lloyd, *Mycological Writings* 7 (74): 1338 (1925). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3881.
40. *Hymenochaete vaginata* G. Cunn., *Transactions and Proceedings of the Royal Society of New Zealand* 85 (1): 30 (1957). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3945.
41. *Hymenochaete villosa* (Lév.) Bres., *Annales Mycologici* 8 (6): 588 (1910). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 14 January 2018, CLZhao 5444.
42. *Hymenochaete xerantica* (Berk.) S.H. He & Y.C. Dai, *Fungal Diversity* 56 (1): 90 (2012). White rot in a broad-leaved forest. Shimexia Forest Park, Xiping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 21 August 2017, CLZhao 2789; Ailaoshan Ecological Station, Xujiaba, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 23 January 2018, CLZhao 8397; 24 January 2018, CLZhao 8638.

43. *Hymenochaetopsis rigidula* (Berk. & M.A. Curtis) S.H. He & Jiao Yang, *Mycological Progress* 15 (2/13): 6 (2016). White rot in a broad-leaved forest. Shimenxia Park, Xiping County, Yuxi, Yunnan Province, China, on a fallen trunk of angiosperm, 21 August 2017, CLZhao 2818; Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 14 January 2018, CLZhao 5661.
44. *Hyphoderma microporoides* C.L. Zhao & Q.X. Guan, in Guan & Zhao, *Journal of Fungi* 7: 308. White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 25 August 2018, CLZhao 8695.
45. *Hyphoderma moniliforme* (P.H.B. Talbot) Manjón, G. Moreno & Hjortstam, in Hjortstam, Manjón & Moreno, *Mycotaxon* 33: 261 (1988). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 16 January 2018, CLZhao 5936.
46. *Hyphodontia mollis* Sheng H. Wu, *Acta Botanica Fennica* 142: 95 (1990). White rot in a broad-leaved forest. Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 15 January 2018, CLZhao 5763.
47. *Hyphodontia tropica* Sheng H. Wu, *Mycotaxon* 76: 62 (2000). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Puer, Yunnan Province, China, on a stump of angiosperm, 4 October 2017, CLZhao 3920.
48. *Irpex lacteus* (Fr.) Fr., *Elenchus Fungorum* 1: 145 (1828). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a stump of angiosperm, 4 October 2017, CLZhao 3829, CLZhao 4011; Ailaoshan National Nature Reserve, Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 15 January 2018, CLZhao 5741; Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a dead Bamboo, 1 January 2019, CLZhao 9092.
49. *Junghuhnia nitida* (Pers.) Ryvarden, *Persoonia* 7(1): 18 (1972). White rot in a broad-leaved forest. Jieqipo Park, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 2 October 2017, CLZhao 3588; Ailaoshan National Nature Reserve, Taizhong Township, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 4 October 2017, CLZhao 3834; Jinshan Primitive Forest Park, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 4903; 14 January 2018, CLZhao 5581; Jinshan Primeval Forest, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 21 August 2018, CLZhao 8093.
50. *Laetiporus ailaoshanensis* B.K. Cui & J. Song, in Song, Chen, Cui, Liu & Wang, *Mycologia* 106 (5): 1042 (2014). Brown rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a trunk of *Lithocarpus*, 4 October 2017, CLZhao 3913, CLZhao 3927, CLZhao 3930, CLZhao 3941, CLZhao 3961, CLZhao 4010.
51. *Lenzites betulinus* (L.) Fr., *Epicrisis Systematis Mycologici*: 405 (1838). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Township, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3825; on the trunk of *Rhododendron simsii*, CLZhao 3925.
52. *Lyomyces bambusinus* C.L. Zhao, in Chen & Zhao, *MycKeys* 65: 101-118 (2020). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a dead Bamboo, 11 January 2018, CLZhao 4831.
53. *Lyomyces cremeus* C.L. Zhao, in Chen & Zhao, *MycKeys* 65: 101-118 (2020). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Township, Jingdong County, Puer, Yunnan Province, China, on a fallen branch of angiosperm, 23 August 2018, CLZhao 8295.
54. *Lyomyces macrosporus* C.L. Zhao, in Chen & Zhao, *MycKeys* 65: 101-118 (2020). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Township, Jingdong County, Puer, Yunnan Province, China, on a fallen branch of angiosperm, 24 August 2018, CLZhao 8605.
55. *Megasporoporiella pseudocavernulosa* B.K. Cui & Hai J. Li, in Li & Cui, *Mycologia* 105(2): 378 (2013). White rot in a broad-leaved forest. Shimenxia Forest Park, Xiping County, Yuxi, Yunnan Province, China, on a fallen trunk of angiosperm, 21 August 2017, CLZhao 2803; Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen of branch angiosperm, 4 October 2017, CLZhao 3793; Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a branch of fallen angiosperm, 14 January 2018, CLZhao 5949, CLZhao 5699; Ailaoshan Ecological Station, Xujiaba, Taizhong Township, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 23 August 2018, CLZhao 8345, CLZhao 8443; 24 August 2018, CLZhao 8557; on a trunk of angiosperm, 23 August 2018, CLZhao 8335.
56. *Merulius tomentopileatus* (C.L. Zhao) C.L. Zhao, *J. Fungi* 9 (3, no. 320): 24 (2023). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 15 January 2018, CLZhao 5833.

57. *Microporus vernicipes* (Berk.) Imazeki, Bulletin of the Tokyo Science Museum 6: 95 (1943). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 14 January 2018, CLZhao 5510, CLZhao 5520, CLZhao 5538, CLZhao 5541, CLZhao 5610, CLZhao 5612, CLZhao 5694; 15 January 2018, CLZhao 5724, CLZhao 5796, CLZhao 5823, CLZhao 5870.
58. *Microporus xanthopus* (Fr.) Kuntze, Revisio generum plantarum 3 (3): 494 (1898). White rot in a broad-leaved forest. Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 14 January 2018, CLZhao 5498; CLZhao 5679.
59. *Mutatoderma mutatum* (Peck) C.E. Gómez, Boletín de la Sociedad Argentina de Botánica 17 (3-4): 346 (1976). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 13 January 2018, CLZhao 5287, CLZhao 5288.
60. *Nigroporus vinosus* (Berk.) Murrill, Bulletin of the Torrey Botanical Club 32 (7): 361 (1905). White rot in a broad-leaved forest. Laiyang River National Forest Park, Puer, Yunnan Province, China, on a trunk of angiosperm, 30 September 2017, CLZhao 3139, CLZhao 3174, CLZhao 3247; Jieqipo Park, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 1 October 2017, CLZhao 3393; on a fallen trunk of angiosperm, CLZhao 3376; white rot in a mixed coniferous broad-leaved forest. Damoshan, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of *Pinus yunnanensis*, 16 January 2018, CLZhao 6012.
61. *Peniophora cinerea* (Pers.) Cooke, Grevillea 8(no. 45): 20 (1879). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 16 January 2018, CLZhao 5716.
62. *Peniophora incarnata* (Pers.) P. Karst., Hedwigia 28: 27 (1889). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 16 January 2018, CLZhao 6016.
63. *Peniophorella praetermissa* (P. Karst.) K.H. Larss., Mycological Research 111 (2): 192 (2007). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3919.
64. *Perenniporia luteola* B.K. Cui & C.L. Zhao, in Zhao & Cui, Mycoscience 54(3): 235 (2013). White rot in a broad-leaved forest. Shimexia Forest Park, Xiping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 21 August 2017, CLZhao 2749, CLZhao 2769, CLZhao 2802; Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 15 January 2018, CLZhao 5761; on a fallen trunk of angiosperm, 15 January 2018, CLZhao 5807.
65. *Phaeophlebiopsis peniophoroides* (Gilb. & Adask.) Floudas & Hibbett, Fungal Biology 119(7): 710 (2015). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 13 January 2018, CLZhao 5166.
66. *Phanerochaete sordida* (P. Karst.) J. Erikss. & Ryvarden, The Corticiaceae of North Europe 5: 1023 (1978). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 11 January 2018, CLZhao 4835.
67. *Phanerochaete velutina* (DC.) P. Karst., Kritisk Öfversigt af Finlands Basidsvampar, (Basisiomycetes; Gastero- & Hymenomycetes) (Helsingfors) 3: 33 (1898). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 21 August 2018, CLZhao 8151, CLZhao 8156.
68. *Phlebia ailaoshanensis* C.L. Zhao, in Shen, Ma, Xu & Zhao, Phytotaxa, 373 (3): 190 (2018). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3882, CLZhao 3879, CLZhao 3893, CLZhao 3897, CLZhao 3905, CLZhao 3942, CLZhao 3953, CLZhao 3904, CLZhao 3996.
69. *Phlebia radiata* Fr., Systema Mycologicum 1: 427 (1821). White rot in a broad-leaved forest. Jinshan Primitive Forest Park, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 12 January 2018, CLZhao 4882, CLZhao 4885.
70. *Phlebicolorata rosea* (C.L. Zhao & Y.C. Dai) C.L. Zhao, J. Fungi 9 (3, no. 320): 32 (2023). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 15 October 2013, Dai 13573 (BJFC).
71. *Phlebiopsis crassa* (Lév.) Floudas & Hibbett, Fungal Biology 119(7): 710 (2015). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3943, CLZhao 3967.

72. *Phlebiopsis gigantea* (Fr.) Jülich, *Persoonia* 10(1): 137 (1978). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3965; Tea horse ancient road scenic spot, Xinping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 21 August 2018, CLZhao 8159; CLZhao 8163; Ailaoshan Ecological Station, Puer, Yunnan Province, China, on a trunk of angiosperm, 23 August 2018, CLZhao 8321.
73. *Phlebiopsis yunnanensis* C.L. Zhao, in Zhao, Liu & Ma, *Nova Hedwigia* 108(1-2): 273 (2018). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 5 October 2017, CLZhao 3958, CLZhao 3990.
74. *Picipes badius* (Pers.) Zmitr. & Kovalenko, *International Journal of Medicinal Mushrooms (Redding)* 18(1): 35 (2016). White rot in a broad-leaved forest. Jinshan Primeval Forest, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2017, CLZhao 4949, CLZhao 5020, CLZhao 5052, CLZhao 5027, CLZhao 5098, CLZhao 8355; Jinshan Primitive Forest, Xinping County, Yuxi, Yunnan province, China, on a trunk of angiosperm, 2 January 2019, CLZhao 9140.
75. *Podoscypha yunnanensis* C.L. Zhao, *Phytotaxa*, 387(3): 210 (2019). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 4 October 2017, CLZhao 3963, CLZhao 3973, CLZhao 3979.
76. *Lentinus brumalis* (Pers.) Zmitr., *International Journal of Medicinal Mushrooms* 12 (1): 88 (2010). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 4941, CLZhao 5021, CLZhao 5025, CLZhao 5038, CLZhao 5043, CLZhao 5045, CLZhao 5097; Jinshan Primitive Forest, Xinping County, Yuxi, Yunnan province, China, on a trunk of angiosperm, 2 January 2019, CLZhao 9107.
77. *Punctularia bambusicola* C.L. Zhao, in Guan, Zhao & Zhao, *Phytotaxa* 489(3): 285-292. Brown rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer City, Yunnan Province, China, on a dead Bamboo, 1 January 2019, CLZhao 9098.
78. *Pycnoporus sanguineus* (L.) Murrill, *Bull. Torrey bot. Club* 31(8): 421 (1904). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 11 January 2018, CLZhao 4807, CLZhao 4814.
79. *Phellinus adamantinus* (Berk.) Ryvarden, *Norw. J. Bot.* 19: 234 (1972). White rot in a broad-leaved forest. Shimenxia Park, Xinping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 21 August 2017, CLZhao 2820; Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 6 October 2017, CLZhao 4759, CLZhao 4763, CLZhao 4764; Ailaoshan Ecological Station, Xujiaba, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 23 August 2018, CLZhao 8365.
80. *Sistotrema brinkmannii* (Bres.) J. Erikss., *K. Fysiogr. Sällsk. Lund. Förhandl.* 18(no. 8): 134 (1948). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 13 January 2018, CLZhao 5221.
81. *Sertulicium granuliferum* (Hallenb.) Spirin & Volobuev, *Mycological Progress* 20(4): 461 (2021). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 14 January 2018, CLZhao 5531.
82. *Steccherinum aurantilaetum* (Corner) Bernicchia & Gorjón, *Polypores of the Mediterranean Region*: 795 (2020). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3807, CLZhao 3969, CLZhao 4007; Jinshan Primitive Forest Park, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 2 January 2019, CLZhao 9160.
83. *Steccherinum bourdotii* Saliba & A. David, *Cryptog. Mycol.* 9(2): 100 (1988). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 13 January 2018, CLZhao 5196; 21 August 2018, CLZhao 8150.
84. *Steccherinum fimbriatum* (Pers.) J. Erikss., *Symbolae Botanicae Upsalienses* 16(1): 134 (1958). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 23 August 2018, CLZhao 8399; Ailaoshan Ecological Station, Puer, Yunnan Province, China, on a trunk of angiosperm, 23 August 2018, CLZhao 8399; Lingbao Mountain, Nanjian County, Dali, Yunnan Province, China, on a fallen trunk of angiosperm, 9 January 2019, CLZhao 10114; on a trunk of angiosperm, 9 January 2019, CLZhao 10069; Wild Ya Lake Forest Park, Kunming, Yunnan province, China, on a fallen trunk of angiosperm, 30 September 2019, CLZhao 13977.

85. *Steccherinum ochraceum* (Pers. ex J.F. Gmel.) Gray, Nat. Arr. Brit. Pl. (London) 1: 651 (1821). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3902; on a fallen trunk of angiosperm, 4 October 2017, CLZhao 3955.
86. *Steccherinum xanthum* C.L. Zhao & Y.X. Wu, in Wu, Wu & Zhao, PLoS ONE 16(1): e0244520, 8 (2021). White rot in a broad-leaved forest. Jinshan Primitive Forest Park, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 5024, CLZhao 5032, CLZhao 5044; on a fallen trunk of angiosperm, 12 January 2018, CLZhao 4892, CLZhao 5030; 21 August 2018, CLZhao 8124; CLZhao 8126; Jinshan Primitive Forest Park, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 2 January 2019, CLZhao 9138, CLZhao 9149;
87. *Stereum hirsutum* (Willd.) Pers., Observationes mycologicae 2: 90 (1800). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3912, CLZhao 3922, CLZhao 3982.
88. *Stereum sanguinolentum* (Alb. & Schwein.) Fr., Epicrisis Systematis Mycologici: 549 (1838). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 12 January 2018, CLZhao 5054.
89. *Terana caerulea* (Schrader ex Lam.) Kuntze, Revisio generum plantarum 2: 872 (1891). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 13 January 2018, CLZhao 5793, CLZhao 5815.
90. *Theleporus rimosus* H.S. Yuan, Phytotaxa 213(1): 52 (2015). White rot in a broad-leaved forest. Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 14 January 2018, CLZhao 5548.
91. *Trametes hirsuta* (Wulfen) Lloyd, Mycological Writings 7 (Letter 73): 1319 (1924). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Township, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 4 October 2017, CLZhao 4029.
92. *Trametes versicolor* (L.) Lloyd, Mycol. Writ. 6(65): 1045 (1920). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 11 January 2018, CLZhao 4857; Jinshan Primitive Forest Park, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 5008, CLZhao 5010, CLZhao 5019, CLZhao 5039; Jinshan Primitive Forest Park, Xinping County, Yuxi, Yunnan Province, China, on a fallen trunk of angiosperm, 2 January 2019, CLZhao 9133, CLZhao 9179, CLZhao 9153.
93. *Truncospora ochroleuca* (Berk.) Pilát, Acta Musei Nationalis Pragae 9B(2): 108 (1953). White rot in a broad-leaved forest. Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a stump of angiosperm, 15 January 2018, CLZhao 5733.
94. *Xenasmatella ailaoshanensis* (C.L. Zhao) C.L. Zhao & T.K. Zong, Phytotaxa 489(2): 118 (2021). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3895; Ailaoshan National Nature Reserve, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 11 January 2018, CLZhao 4839.
95. *Xylodon flaviporus* (Berk. & M.A. Curtis ex Cooke) Riebesehl & E. Langer, Mycological Progress 16(6): 646 (2017). White rot in a broad-leaved forest. Ailaoshan Ecological Station, Xujiaba, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 4 October 2017, CLZhao 3808, CLZhao 4028; on the trunk of *Rhododendron simsii*, 4 October 2017, CLZhao 3824; on a stump of angiosperm, 4 October 2017, CLZhao 3920; on a trunk of angiosperm, 4 October 2017, CLZhao 3926, CLZhao 3954, CLZhao 4031, CLZhao 4032, CLZhao 4037, CLZhao 4053, CLZhao 4054; Jinshan Primitive Forest Park, Zhenyuan County, Puer, Yunnan Province, China, on a trunk of angiosperm, 12 January 2018, CLZhao 4894, CLZhao 5034; on a stump of angiosperm, 12 January 2018, CLZhao 5011; Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 15 January 2018, CLZhao 5718, CLZhao 5777, CLZhao 5850, CLZhao 5882, CLZhao 5884, CLZhao 5894; Ailaoshan Ecological Station, Puer, Yunnan Province, China, on a trunk of angiosperm, 23 August 2018, CLZhao 8339, CLZhao 8358, CLZhao 8362, CLZhao 8423; on a fallen trunk of angiosperm, 23 August 2018, CLZhao 8400, CLZhao 8401; on a fallen trunk of angiosperm, 24 August 2018, CLZhao 8607; on a stump of angiosperm, 24 August 2018, CLZhao 8464; CLZhao 8655.
96. *Xylodon gossypinus* C.L. Zhao & K.Y. Luo, Diversity 13 (11, no. 581): 7 (2021). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Village, Jingdong County, Puer, Yunnan Province, China, on a stump of angiosperm, 23 August 2018, CLZhao 8375.

97. *Xylodon heterocystidiatus* (H.X. Xiong, Y.C. Dai & Sheng H. Wu) Riebesehl, Yurchenko & E. Langer, *Mycological Progress* 16(6): 646 (2017). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Liangzi Village, Heping Town, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 11 January 2018, CLZhao 4827.

98. *Xylodon macrosporus* C.L. Zhao & K.Y. Luo, *Diversity* 13 (11, no. 581): 11 (2021). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Village, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 25 August 2018, CLZhao 8787.

99. *Xylodon montanus* C.L. Zhao, *Journal of Fungi* 8 (1, no. 35): 8, 12 (2021). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 21 August 2018, CLZhao 8118.

100. *Xylodon nesporii* (Bres.) Hjortstam & Ryvarde, *Synopsis Fungorum* 26: 38 (2009). White rot in a broad-leaved forest. Shimenxia Forest Park, Xinping County, Yuxi, Yunnan Province, China, on a trunk of angiosperm, 21 August 2017, CLZhao 2785; 4 October 2017, CLZhao 3988; Ailaoshan National Nature Reserve, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3991, CLZhao 3994; Ailaoshan National Nature Reserve, Liangzi Village, Zhenyuan County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 15 January 2018, CLZhao 5713.

101. *Xylodon rhizomorphus* (C.L. Zhao, B.K. Cui & Y.C. Dai) Riebesehl, Yurchenko & E. Langer, *Mycological Progress* 16(6): 649 (2017). White rot in a broad-leaved forest. Ailaoshan Ecological Station, Xujiaba, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 23 August 2018, CLZhao 8294.

102. *Xylodon taiwanianus* (Sheng H. Wu) Hjortstam & Ryvarde, *Synopsis Fungorum* 26: 41 (2009). White rot in a broad-leaved forest. Ailaoshan Ecological Station, Taizhong Town, Jingdong County, Puer, Yunnan Province, China, on a fallen trunk of angiosperm, 23 August 2018, CLZhao 8319.

103. *Yuchengia narymica* (Pilát) B.K. Cui, C.L. Zhao & Steffen, *Mycoscience* 31: 333 (2013). White rot in a broad-leaved forest. Ailaoshan National Nature Reserve, Taizhong Township, Jingdong County, Puer, Yunnan Province, China, on a trunk of angiosperm, 4 October 2017, CLZhao 3898, CLZhao 3934.

Discussion

This study conducted seven field investigations on Ailaoshan National Nature Reserve and collected wood-decaying fungal samples from different forest types. One hundred and three ITS sequences were newly generated from 103 specimens, each representing one of the species. These species belong to one class, nine orders, 29 families, and 64 genera within Basidiomycota. There were 57 species of Polyporales, accounting for 55.34% of the total species, indicating that Polyporales was the dominant group in this area; there were 30 species of Hymenochaetales, accounting for 29.13%, which were subdominant groups in the region; nine species belong to Russulales; two species belong to Agaricales; the other five species belong to Auriculariales, Cantharellales, Corticiales, Sistotrematales, and Xenasmatales (Table 2, Figure 2). Photos of wood-decaying fungi *in situ* are presented for selected species (Figure 3).

There are 11 species of wood-decaying fungi with edible and medicinal fungi were found in the study: *Abundisporus quercicola*, *Bjerkandera adusta*, *Earliella scabrosa*, *Ganoderma lingzhi*, *Irpex lacteus*, *Lenzites betulinus*, *Pycnoporus sanguineus*, *Pyrrhoderma adamantinum*, *Stereum hirsutum*, *S. sanguinolentum* and *Trametes versicolor*, accounted for 10.68% of the total species (Dai & Yang 2008; Wu *et al.* 2019a). Four of the wood-decaying fungi we recorded are forest pathogens: *Abundisporus quercicola*, *Bjerkandera adusta*, *Daedaleopsis confragosa*, and *Stereum sanguinolentum*, accounted for 3.88% of the total species (Dai 2012a). Due to environmental pollution, climate change, habitat loss and fragmentation, and over-exploitation of resources, macrofungi's diversity is seriously threatened (Li *et al.* 2020; Yao *et al.* 2020; Wei *et al.* 2020). In our study, there are eight wood-decaying fungi we recorded are threatened species: *Hyphoderma moniliforme*, *Hyphodontia mollis*, *Peniophora incarnata*, *Perenniporia luteola*, *Picipes badius*, *Xylodon flaviporus*, *X. heterocystidiatus*, and *X. taiwanianus*, accounted for 7.77% of the total of the species (Yao *et al.* 2020). According to the previous studies combined with field observations, six species (5.83% of the total), *Amyloporia sinuosa*, *Brunneoporus malicola*, *Ceriporiopsis rosea*, *Dacryobolus montanus*, *Laetiporus ailaoshanensis* and *Punctularia bambusicola* can cause a brown-rot; the remaining 97 species (94.17% of the total) cause a white-rot (Dai 2011; Dai 2012a; Fukasawa *et al.* 2020; He & Zhao 2021). Therefore, a comprehensive

understanding of the threat status of wood-decaying fungi can better propose targeted conservation strategies in future studies, which is of great significance for strengthening the biodiversity conservation of macrofungi. Yunnan Province has the most abundant macrofungi diversity. Wood-decaying fungi have been extensively studied, and their members increased rapidly (Zhao *et al.* 2023; Deng *et al.* 2024; Yang *et al.* 2024). *Crustodontia rhododendri*, *Elaphroporia ailaoshanensis*, *Hyphoderma microporoides*, *Phlebia ailaoshanensis*, *Phlebiopsis yunnanensis*, *Podoscypha yunnanensis*, *Steccherinum xanthum*, *Xylodon gossypinus*, and *X. macrosporus*, accounted for 8.74% of the total species, were newly published in recent years from Ailaoshan area (Zhao *et al.* 2018, 2023; Wu *et al.* 2018; Guan *et al.* 2021a, 2021b; Shen *et al.* 2018; Wu *et al.* 2019b; Luo *et al.* 2021; Zhou *et al.* 2021).

TABLE 2. The taxonomic position of 103 corticioid fungal basidiomycetous species in the Ailaoshan Mountains.

Class	Order	Family	Number of genera	Number of species	
Agaricomycetes	Agaricales	Cystostereaceae	1	1	
		Physalacriaceae	1	1	
	Auriculariales	Auriculariaceae	1	1	
	Cantharellales	Hydnaceae	1	1	
	Corticiales	Punctulariaceae	1	1	
	Hymenochaetales	Hymenochaetaceae	Hymenochaetaceae	6	18
			Rickenellaceae	1	1
			Schizoporaceae	2	11
	Polyporales	Polyporales	Adustoporiaceae	1	1
			Dacryobolaceae	1	1
			Fomitopsidaceae	1	1
			Fragiliporiaceae	1	1
			Ganodermataceae	1	1
			Grammotheleaceae	1	1
			Hyphodermataceae	2	4
			Irpicaceae	2	4
			Laetiporaceae	1	1
			Meruliaceae	8	10
			Phaeophlebiopsis	1	1
			Phanerochaetaceae	4	7
			Podoscyphaceae	1	1
			Polyporaceae	16	19
	Steccherinaceae	2	6		
	Russulales	Russulales	Bondarzewiaceae	1	1
			Hericiaceae	1	1
			Peniophoraceae	1	2
			Stereaceae	2	5
Sistotrematales	Sistotremastraceae	1	1		
Xenasmatales	Xenasmataceae	1	1		

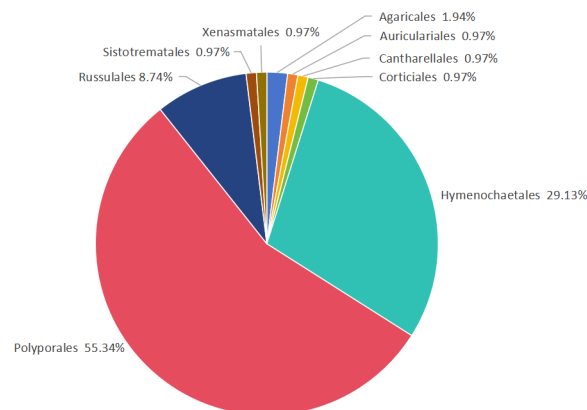


FIGURE 2. Taxonomic composition of 103 corticioid fungal species at the order level in the Ailaoshan Mountains.



FIGURE 3. Fruiting bodies in situ of (A) *Abundisporus quercicola* (CLZhao 4895) (B) *Alloexidiopsis yunnanensis* (CLZhao 9200) (C) *Coltricia weii* (CLZhao 4773) (D) *Daedaleopsis confragosa* (CLZhao 4813) (E) *Fuscoporia pulviniformis* (CLZhao 8327) (F) *Hymenochaete rheicolor* (CLZhao 4829) (G) *Hymenochaete xerantica* (CLZhao 8397) (H) *Laetiporus ailaoshanensis* (CLZhao 3913) (I) *Lenzites betulinus* (CLZhao 3825) (J) *Lyomyces macrosporus* (CLZhao 8605) (K) *Megasporoporiella pseudocavernulosa* (CLZhao 2803) (L) *Microporus vernicipes* (CLZhao 5510) in the Ailaoshan Mountains. Bars: (A), (B), (E) = 2 cm; (C), (F), (G), (H), (I), (J), (K), (L) = 1 cm; (D) = 3 cm.

Recently, some notable explorations have begun to pay attention to the diversity of wood-decaying fungi in Yunnan Province (Wang & Cai 2023). Ninety white-rot fungi and five brown-rot fungi were reported in the Wuliangshan area, China; 49 white-rot fungi and three brown-rot fungi were reported in Haikou Forestry Park, China; 99 white-rot fungi and five brown-rot fungi were reported in Wenshan area, China; 72 white-rot fungi and 24 brown-rot fungi were reported in Laojunshan Mountains, China (Dai & Cui 2012; He *et al.* 2021; He & Zhao 2022; Dong *et al.* 2023). In the current study, 103 wood-decaying fungal species were collected from the Ailaoshan area, Yunnan Province, China, in which six species cause brown rot, and the remaining 97 can cause white rot. In comparison, those in the Wuliangshan area are 5.36%, in the Haikou Forestry Park 5.77%, and in the Wenshan area 4.81%, which indicates that the proportions of brown-rot fungi in the four areas seem similar (He *et al.* 2021; He & Zhao 2022; Dong *et al.* 2023). However, the proportion of brown-rot fungi to wood-decaying fungi in the Laojunshan Mountains is 25%, which is greatly higher than in the Ailaoshan area (Dai & Cui 2012). In addition, there were 11 forest pathogens reported in the Gaoligong Mountains, which accounted for 8.59% of the total wood-decaying fungi (Dai *et al.* 2014), while there are four forest pathogens in the Ailaoshan area account for 3.88%.

Wood-decaying fungi a vital group in the forest ecosystem (Dai 2012a; Zhao *et al.* 2023; Deng *et al.* 2024; Yang *et al.* 2024), contribute significantly to material cycling. They decompose cellulose, semi-cellulose, and lignin of wood into nutrition that can be easily absorbed by themselves and other organisms (Wei 2021; Dai *et al.* 2021a). Given the importance of deadwood decomposition in nutrient cycling, soil formation, and ecosystem carbon budget, it has received increasing attention from ecologists, pathologists, and forest managers (Tedersoo *et al.* 2014; Hyde *et al.* 2019; Ji *et al.* 2022; Liu *et al.* 2023). The functional traits of wood-decaying fungi can reflect the adaptation of species to environmental conditions and help to understand the mechanisms underlying the aggregation of fungal communities in different environments (Tedersoo *et al.* 2014; Dai *et al.* 2021b; Wijayawardene *et al.* 2022). Since wood-decaying fungi have multiple functions in forests, it is necessary to conduct systematic surveys of wood-decaying fungi and understand their distribution in forest communities, which provides insights into nutrient cycling and biodiversity conservation (Dai *et al.* 2021a; Wei 2021; Wang & Cai 2023).

Due to the unique preservation of forest communities in the Ailaoshan area, specimen collection in certain regions poses a challenge. As a result, the diversity of wood-decaying fungi in this area remains a mystery. This paper is the first in a series of studies dedicated to understanding the wood-decaying fungi in this area, a crucial step in revealing the abundance of these species. However, the underlying fungal diversity in the Ailaoshan area is still largely unpredictable, sparking a need for a more intensive investigation to complement future biodiversity research.

The conclusion of this study is summarized as follows: seven field surveys were carried out in the Ailaoshan area of Yunnan Province, China, from 2016 to 2021, in which 2,814 specimens of wood-decaying fungal species were collected. One hundred and three species of wood rot fungi were identified, belonging to 64 genera, 29 families, and nine orders. According to the latest classification system of fungi, the checklist of these wood-decaying fungal species is provided. This study not only enriched the species diversity of wood-decaying fungi in this area but also unveiled a fascinating world of biodiversity. It also provided a theoretical basis for the protection and utilization of wood-decaying fungal resources in this area in the future, inspiring and motivating the scientific community and professionals in the field of mycology and biodiversity conservation to further explore and utilize these resources

Acknowledgements

The research was supported by the National Natural Science Foundation of China (Project No. 32170004, U2102220), the High-level Talents Program of Yunnan Province (YNQR-QNRC-2018-111), and the Yunnan Province College Students Innovation and Entrepreneurship Training Program (Project no. s202310677034).

References

- Baldrian, P. & Lindahl, B.D. (2011) Decomposition in forest ecosystems: after decades of research still novel findings. *Fungal Ecology* 4: 359–361.
<https://doi.org/10.1016/J.FUNECO.2011.06.001>
- Bian, L.S. & Dai, Y.C. (2017) Morphological and molecular evidence for three new species of *Coltricia* (Hymenochaetaceae, Basidiomycota) from southern China. *Mycologia* 109: 64–74.
<https://doi.org/10.1080/00275514.2017.1286571>
- Cao, Y., Wu, S.H. & Dai, Y.C. (2012) Species clarification of the prize medicinal *Ganoderma* mushroom 'Lingzhi'. *Fungal Diversity* 56: 49–62.
<https://doi.org/10.1007/s13225-012-0178-5>
- Cartabia, M., Girometta, C.E., Milanese, C., Baiguera, R.M., Buratti, S., Branciforti, D.S., Vadivel, D., Girella, A., Babbini, S., Savino, E. & Dondi, D. (2021) Collection and characterization of wood decay fungal strains for developing pure mycelium mats. *Journal of Fungi* 7: 1008–1029.
<https://doi.org/10.3390/jof7121008>
- Chen, C.C., Chen, C.Y. & Wu, S.H. (2021) Species diversity, taxonomy and multi-gene phylogeny of phlebioid clade (Phanerochaetaceae, Irpicaceae, Meruliaceae) of Polyporales. *Fungal Diversity* 111: 337–442.
<https://doi.org/10.1007/s13225-021-00490-w>
- Chen, J.Z. & Zhao, C.L. (2020) Morphological and molecular identification of four new resupinate species of *Lyomyces* (Hymenochaetales) from southern China. *MycoKeys* 65: 101–118.
<https://doi.org/10.3897/mycokeys.65.48660>

- Chen, Q. & Dai, Y.C. (2019) Two new species of *Fuscoporia* (Hymenochaetales, Basidiomycota) from southern China based on morphological characters and molecular evidence. *MycKeys* 12: 75–89.
<https://doi.org/10.3897/mycokeys.61.46799>
- Chen, Q., Du, P., Vlasak, J., Wu, F. & Dai, Y.C. (2020) Global diversity and phylogeny of *Fuscoporia* (Hymenochaetales, Basidiomycota). *Mycosphere* 11: 1477–1513.
<https://doi.org/10.5943/mycosphere/11/1/10>
- Comby, M., Lacoste, S., Baillieul, F., Profizi, C. & Dupont, J. (2016) Spatial and temporal variation of cultivable communities of co-occurring endophytes and pathogens in wheat. *Frontiers in Microbiology* 31: 1–16.
<https://doi.org/10.3389/fmicb.2016.00403>
- Dai, L.D. & He, S.H. (2017) A new species and a new combination of *Aleurodiscus* s.l. (Russulales, Basidiomycota). *Mycosphere* 8: 908–916.
<https://doi.org/10.5943/mycosphere/8/7/7>
- Dai, Y.C. (2011) A revised checklist of corticioid and hydroid fungi in China for 2010. *Mycoscience* 52: 69–79.
<https://doi.org/10.1007/s10267-010-0068-1>
- Dai, Y.C. (2012a) Pathogenic wood-decaying fungi on woody plants in China. *Mycosystema* 31: 493–509.
- Dai, Y.C. (2012b) Polypore diversity in China with an annotated checklist of Chinese polypores. *Mycoscience* 53: 49–80.
<https://doi.org/10.1007/s10267-011-0134-3>
- Dai, Y.C. & Cui, B.K. (2012) Wood-decaying fungi in eastern Himalayas 3. Polypores from Laojunshan Mountains, Yunnan Province. *Mycosystema* 31: 486–492.
- Dai, Y.C., Cui, B.K., He, S.H. & Schigel, D.S. (2014) Wood-decaying fungi in eastern Himalayas 4 species from Gaoligong Mountains, Yunnan Province, China. *Mycosystema* 33: 611–620.
<https://doi.org/10.13346/j.mycosystema.130299>
- Dai, Y.C., Cui, B.K., Si, J., He, S.H., Hyde, K.D., Yuan, H.S., Liu, X.Y. & Zhou, L.W. (2015a) Dynamics of the worldwide number of fungi with emphasis on fungal diversity in China. *Mycological Progress* 14: 1–9.
<https://doi.org/10.1007/s11557-015-1084-5>
- Dai, Y.C., Cui, B.K., Si, J., He, S.H., Kevin, D.H., Yuan, H.S., Liu, X.Y. & Zhou, L.W. (2021a) Diversity and systematics of the important macrofungi in Chinese forests. *Mycosystema* 40: 770–805.
<https://doi.org/10.1007/s11557-015-1084-5>
- Dai, Y.C., Cui, B.K. & Zhou, L.W. (2015b) Dynamics of the worldwide number of fungi with emphasis on fungal diversity in China. *Mycological Progress* 14: 1–9.
<https://doi.org/10.1007/s11557-015-1084-5>
- Dai, Y.C. & Yang, Z.L. (2008) A revised checklist of medicinal fungi in China. *Mycosystema* 27: 801–824.
- Dai, Y.C., Yang, Z.L., Cui, B.K., Wu, G., Yuan, H.S., Zhou, L.W., He, H.E., Ge, Z.W., Wu, F., Wei, Y., Yuan, Y. & Si, J. (2021b) Diversity and systematics of the important macrofungi in Chinese forests. *Mycosystema* 40: 770–805.
<https://doi.org/10.13346/j.mycosystema.210036>
- Dai, Y.C. & Zhuang, J.Y. (2010) Numbers of fungal species hitherto known in China. *Mycosystema* 29: 625–628.
<http://journals.im.ac.cn/jwxten>
- De Koker, T.H., Nakasone, K.K., Haarhof, J., Burdsall HH, Jr. & Janse, B.J. (2003) Phylogenetic relationships of the genus *Phanerochaete* inferred from the internal transcribed spacer region. *Mycological Research* 107: 1032–40.
<https://doi.org/10.1017/s095375620300827x>
- Deng, Y.L., Jabeen, S. & Zhao, C.L. (2024) Species diversity and taxonomy of *Vararia* (Russulales, Basidiomycota) with descriptions of six species from Southwestern China. *MycKeys* 103: 97–128.
<https://doi.org/10.3897/mycokeys.103.118980>
- Dong, J.H., Gu, J.Y. & Zhao, C.L. (2023) Diversity of wood-decaying fungi in Wenshan Area, Yunnan Province, China. *Mycosystema* 42: 638–662.
<https://doi.org/10.13346/j.mycosystema.220205>
- Duan, Z.Y., Yang, X. & Zhao, C.L. (2023) Morphological characteristics and phylogenetic analyses revealed two additional taxa in *Cyathus* (Agaricales, Basidiomycota). *Phytotaxa* 598 (1): 1–20.
<https://doi.org/10.11646/phytotaxa.599.1.1>
- Felsenstein, J. (1985) Confidence intervals on phylogenetics: An approach using bootstrap. *Evolution* 39: 783–791.
<https://doi.org/10.1111/j.1558-5646.1985.tb00420.x>
- Floudas, D. & Hibbett, D.S. (2015) Revisiting the taxonomy of *Phanerochaete* (Polyporales, Basidiomycota) using a four gene dataset and extensive ITS sampling. *Fungal Biology* 119: 679–719.
<https://doi.org/10.1016/j.funbio.2015.04.003>

- Fukasawa, Y., Gilmartin, E.C. & Boddy, L. (2020) Inoculum volume effects on competitive outcome and wood decay rate of brown- and white-rot basidiomycetes. *Fungal Ecology* 45: 100938.
<https://doi.org/10.1016/j.funeco.2020.100938>
- Guan, Q.X., Liu, C.M., Zhao, T.J. & Zhao, C.L. (2020a) *Heteroradulum yunnanensis* sp. nov. (Auriculariales, Basidiomycota) evidenced by morphological characters and phylogenetic analyses in China. *Phytotaxa* 437 (2): 51–59.
<https://doi.org/10.11646/phytotaxa.437.2.1>
- Guan, Q.X. & Zhao, C.L. (2021a) Taxonomy and phylogeny of the wood-inhabiting fungal genus *Hyphoderma* with descriptions of three new species from East Asia. *Journal of Fungi* 7: 1–16.
<https://doi.org/10.3390/jof7040308>
- Guan, Q.X., Zhao, T.J. & Zhao, C.L. (2020b) Morphological characters and phylogenetic analyses reveal two new species of *Peniophorella* from southern China. *Mycological Progress* 19: 397–404.
<https://doi.org/10.1007/s11557-020-01568-6>
- Guan, Q.X., Zhao, W. & Zhao, C.L. (2021b) A new species of *Punctularia* (Punctulariaceae, Basidiomycota) from southwest China. *Phytotaxa* 489 (3): 285–292.
<https://doi.org/10.11646/phytotaxa.489.3.5>
- Guan, Q.X., Huang, J., Huang, J. & Zhao, C.L. (2023) Five new species of Schizoporaceae (Basidiomycota, Hymenochaetales) from East Asia. *MycKeys* 14: 25–56.
<https://doi.org/10.3897/mycokeys.96.99327>
- Guo, L.D. & Chen, S.L. (2021) Preface to the special issue of fungal ecology. *Mycosystema* 40: 2521–2522.
<https://doi.org/10.13346/j.mycosystema.210400>
- Guo, L., Li, Z.Y., Lu, C.X., He, S.H. & Chen, S.Z. (2013) *Exobasidium* and *Septobasidium* of Gaoligong and Nu Mountains in Yunnan Province. *Mycosystema* 32: 207–212.
- Hall, T.A. (1999) Bioedit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. *Nucleic Acids Symposium Series* 41: 95–98.
- Hallenberg, N., Nilsson, R.H., Antonelli, A., Wu, S.H., Maekawa, N. & Nordén, B. (2007) The *Peniophorella praetermissa* species complex (Basidiomycota). *Mycological Research* 111: 1366–1376.
<https://doi.org/10.1016/j.mycres.2007.10.001>
- He, S.H. & Dai, Y.C. (2012) Taxonomy and phylogeny of *Hymenochaete* and allied genera of Hymenochaetales (Basidiomycota) in China. *Fungal Diversity* 56: 77–93.
<https://doi.org/10.1007/s13225-012-0174-9>
- He, S.H. & Li, H.J. (2013) *Pseudochaete latesetosa* and *P. subrigidula* spp. nov. (Hymenochaetales, Basidiomycota) from China based on morphological and molecular characters. *Mycological Progress* 12: 331–339.
<https://doi.org/10.1007/s11557-012-0838-6>
- He, X., Chen, J.Z. & Zhao, C.L. (2021) Diversity of wood-decaying fungi in Haikou Forestry Farm, Yunnan Province, P.R. China. *Studies in Fungi* 6: 365–377.
<https://doi.org/10.5943/sif/6/1/27>
- He, X. & Zhao, C.L. (2022) Diversity of wood-decaying fungi in Wuliangshan area, Yunnan Province, P.R. China. *Diversity* 14: 1–29.
<https://doi.org/10.3390/d14020131>
- Hobbie, E.A., Rinne-Garmston, K.T., Penttilä, R., Vadeboncoeur, M.A., Chen, J. & Mäkipää, R. (2021) Carbon and nitrogen acquisition strategies by wood decay fungi influence their isotopic signatures in *Picea abies* forests. *Fungal Ecology* 52: 101069.
<https://doi.org/10.1016/j.funeco.2021.101069>
- Hong, Y., Tan, J.Y., Xue, H., Chow, M.L., Ali, M., Ng, A., Leong, A., Yeo, J., Koh, S.M., Tang, M.S.Y., Lee, Y.Y., Choong, A.M.F., Lee, S.M.L., Delli Ponti, R., Chan, P.M., Lee, D., Wong, J.Y., Mutwil, M. & Fong, Y.K. (2023) A metagenomic survey of wood decay fungi in the urban trees of Singapore. *Journal of Fungi* 9: 1–27.
<https://doi.org/10.3390/jof9040460>
- Hu, Y., Karunarathna, S.C., Li, H., Galappaththi, M.C., Zhao, C.L., Kakumyan, P. & Mortimer, P.E. (2022) The impact of drying temperature on basidiospore size. *Diversity* 14: 239.
<https://doi.org/10.3390/d14040239>
- Huang, R.X., Chen, J.Z., Wu, J.R. & Zhao, C.L. (2019) *Phlebiella ailaoshanensis* sp. nov. (Polyporales, Basidiomycota) described from China. *Phytotaxa* 419: 105–109.
<https://doi.org/10.11646/phytotaxa.419.1.8>
- Huang, R.X. & Zhao, C.L. (2020) Three new species of *Phlebia* (Polyporales, Basidiomycota) based on the evidence from morphology and DNA sequence data. *Mycological Progress* 19: 753–767.
<https://doi.org/10.1007/s11557-020-01591-7>

- Im, K.H., Nguyen, T.K., Choi, J. & Lee, T.S. (2016) Ethanol production from various sugars and cellulosic biomass by white rot fungus *Lenzites betulinus*. *Mycology* 44: 48–53.
<https://doi.org/10.5941/MYCO.2016.44.1.48>
- James, T.Y., Stajich, J.E., Hittinger, C.T. & Rokas, R. (2020) Toward a fully resolved fungal tree of life. *Annual Review of Microbiology* 74: 291–313.
<https://doi.org/10.1146/annurev-micro-022020-051835>
- Jang, Y., Jang, S., Min, M., Hong, J.H., Lee, H., Lee, H., Lim, Y.W. & Kim, J.J. (2015) Comparison of the diversity of Basidiomycetes from dead wood of the Manchurian fir (*Abies holophylla*) as evaluated by fruiting body collection, mycelial isolation, and 454 sequencing. *Microbial Ecology* 70: 634–645.
<https://doi.org/10.1007/s00248-015-0616-5>
- Ji, X., Zhou, J.L., Song, C.G., Xu, T.M., Wu, D.M., & Cui, B.K. (2022) Taxonomy, phylogeny and divergence times of *Polyporus* (Basidiomycota) and related genera. *Mycosphere* 13: 1–52.
<https://doi.org/10.5943/mycosphere/13/1/1>
- Kim, C.S., Jo, J.W., Kwag, Y.N., Sung, G.H., Lee, S.G., Kim, S.Y., Shin, C.H. & Han, S.K. (2015) Mushroom flora of Ulleung-gun and a newly recorded *Bovista* species in the Republic of Korea. *Mycobiology* 43: 239–257.
<https://doi.org/10.5941/MYCO.2015.43.3.239>
- Kotlova, E.R., Senik, S.V., Manzhieva, B.S., Kiyashko, A.A., Shakhova, N.V., Puzansky, R.K., Volobuev, S.V., Misharev, A.D., Serebryakov, E.B. & Psurtseva, N.V. (2022) Diversity of ESI-MS based phosphatidylcholine profiles in Basidiomycetes. *Journal of Fungi* 8: 1–13.
<https://doi.org/10.3390/jof8020177>
- Krah, F.S., Seibold, S., Brandl, R., Baldrian, P., Muller, J. & Bassler, C. (2018) Independent effects of host and environment on the diversity of wood-inhabiting fungi. *Journal of Ecology* 106: 1428–1442.
<https://doi.org/10.1111/1365-2745.12939>
- Kwon, J., Lee, H., Ryu, S.M., Jang, Y., Kwon, H.C., Guo, Y., Kang, J.S., Kim, J.J. & Lee, D. (2019) *Xylodon flaviporus*-derived drimane sesquiterpenoids that inhibit osteoclast differentiation. *Journal of Natural Products* 82: 2835–2841.
<https://doi.org/10.1021/acs.jnatprod.9b00559>
- Larsson, E. & Larsson, K.H. (2003) Phylogenetic relationships of russuloid basidiomycetes with emphasis on aphyllophorean taxa. *Mycologia* 95: 1037–1065.
<https://doi.org/10.1080/15572536.2004.11833020>
- Larsson, K. (2007) Re-thinking the classification of corticioid fungi. *Mycological Research* 111: 1040–1063.
<https://doi.org/10.1016/j.mycres.2007.08.001>
- Larsson, K.H., Larsson, E. & Kõljalg, U. (2004) High phylogenetic diversity among corticioid homobasidiomycetes. *Mycological Research* 108: 983–1002.
<https://doi.org/10.1017/s0953756204000851>
- Li, H.J. & Cui, B.K. (2013) Taxonomy and phylogeny of the genus *Megasporoporia* and its related genera. *Mycologia* 105: 368–383.
<https://doi.org/10.3852/12-114>
- Li, J., Tao, J., Chao, Z.H., Hua, C.L., Yang, Z.X., Xu, J.H., Luo, H.X., Yu, Y. & Gong, C.W. (2021) Evaluation of resource conservation value in Ailao Mountain Nature Reserve. *Inner Mongolia Forestry Investigation and Design* 44: 44–57.
<https://doi.org/10.13387/j.cnki.nmld.2021.05.015>
- Li, Y., Liu, D.M., Wang, K., Wu, H.J., Cai, L., Cai, L., Li, J.S. & Yao, Y.J. (2020) Red list assessment of macrofungi in China: Challenges and measures. *Biodiversity Science* 28: 66–73.
<https://doi.org/10.17520/biods.2019178>
- Lu, L., Jin, Q.R., Liu, G.X. & Zhao, X.T. (2018) Current situation assessment and conservation suggestions for the nanhua section of Ailao Mountain Nature Reserve. *Inner Mongolia Forestry Investigation and Design* 41: 44–46.
<https://doi.org/10.13387/j.cnki.nmld.2018.06.017>
- Liu, S., Chen, Y.Y., Sun, Y.F., He, X.L., Song, C.G., Si, J., Liu, D., Gates, G.M. & Cui, B.K. (2022) Systematic classification and phylogenetic relationships of the brown-rot fungi within the Polyporales. *Fungal Diversity* 118: 1–94.
<https://doi.org/10.1007/s13225-022-00511-2>
- Liu, S., Shen, L.L., Xu, T.M., Song, C.G., Gao, N., Wu, D.M., Sun, Y.F. & Cui, B.K. (2023) Global diversity, molecular phylogeny and divergence times of the brown-rot fungi within the Polyporales. *Mycosphere* 14: 1564–1664.
<https://doi.org/10.5943/mycosphere/14/1/18>
- Luo, K.Y., Chen, Z.Y. & Zhao, C.L. (2022a) Phylogenetic and taxonomic analyses of three new wood-inhabiting fungi of *Xylodon* (Basidiomycota) in a forest ecological system. *Journal of Fungi* 8: 1–18.
<https://doi.org/10.3390/jof8040405>

- Luo, K.Y., Ma, X. & Zhao, C.L. (2019) *Neofavolus yunnanensis* sp. nov. (Polyporales, Basidiomycota) from China: evidence from morphology and DNA sequence data. *Phytotaxa* 408 (2): 109–116.
<https://doi.org/10.11646/phytotaxa.408.2.3>
- Luo, K.Y., Qu, M.H. & Zhao, C.L. (2021) Additions to the knowledge of corticioid *Xylodon* (Schizoporaceae, Hymenochaetales): introducing three new *Xylodon* species from southern China. *Diversity* 13: 581.
<https://doi.org/10.3390/d13110581>
- Luo, K.Y. & Zhao, C.L. (2022b) Morphology and multigene phylogeny reveal a new order and a new species of wood-inhabiting basidiomycete fungi (Agaricomycetes). *Frontiers in Microbiology* 13: 970731.
<https://doi.org/10.3389/fmicb.2022.970731>
- Malysheva, V. & Zmitrovich, I.V. (2011) Testing the *Trametes hirsuta* complex. *Nova Hedwigia* 93: 57–71.
<https://doi.org/10.1127/0029-5035/2011/0093-0057>
- Miller, M.A., Pfeiffer, W. & Schwartz, T. (2012) The CIPRES science gateway: enabling high-impact science for phylogenetics researchers with limited resources. *Association For Computing Machinery* 39: 1–8.
<https://doi.org/10.1145/2335755.2335836>
- Nylander, J.A.A. (2004) MrModeltest v2. Program distributed by the author; Evolutionary Biology Centre, Uppsala University: Uppsala, Sweden.
- Olou, B.A., Langer, E., Ryvarde, L., Krah, F.S., Hounwanou, G.B., Piepenbring, M. & Yorou, N.S. (2023) New records and barcode sequence data of wood-inhabiting polypores in Benin with notes on their phylogenetic placements and distribution. *Fungal Systematics and Evolution* 11: 11–42.
<https://doi.org/10.3114/fuse.2023.11.02>
- Osmundson, T., Bergemann, S.E., Rasmussen, R. & Garbelotto, M. (2022) Using point data to assess biogeographical signal, endemism and factors associated with macrofungal diversity in the data-poor Pacific oceanic island bioregion. *Journal of Biogeography* 49: 891–903.
<https://doi.org/10.1111/jbi.14354>
- Paulus, B., Hallenberg, N., Buchanan, P.K. & Chambers, G.K. (2000) A phylogenetic study of the genus *Schizopora* (Basidiomycota) based on ITS DNA sequences. *Mycological Research* 104: 1155–1163.
<https://doi.org/10.1017/s0953756200002720>
- Pristas, P., Beck, T., Pikhova, M., Gaperova, S., Sebesta, M. & Gaper, J. (2022) Intra-genomic variability of ITS sequences in *Bjerkandera adusta*. *Journal of Fungi* 8: 654.
<https://doi.org/10.3390/jof8070654>
- Phukhamsakda, C., Nilsson, R.H., Bhunjun, C.S., Farias, A.R.G., Sun, Y.R., Wijesinghe, S.N., Raza, M., Bao, D.F., Lu, L., Tibpromma, S., Dong, W., Tennakoon, D.S., Tian, X.G., Xiong, Y.R., Karunarathna, S.C, Cai, L., Luo, Z.L., Wang, Y., Manawasinghe, I.S., Camporesi, E., Kirk, P.M., Promputtha, I., Kuo, C.H., Su, H.Y., Doilom, M., Li, Y., Fu, Y.P. & Hyde, K.D. (2022) The numbers of fungi: contributions from traditional taxonomic studies and challenges of metabarcoding. *Fungal Diversity* 114: 327–386.
<https://doi.org/10.1007/s13225-022-00502-3>
- Purhonen, J., Ovaskainen, O., Halme, P., Komonen, A., Huhtinen, S., Kotiranta, H., Læssøe, T. & Abrego, N. (2020) Morphological traits predict host-tree specialization in wood-inhabiting fungal communities. *Fungal Ecology* 46: 1–55.
<https://doi.org/10.1016/j.funeco.2019.08.007>
- Qin, J. & Yang, Z.L. (2016) Three new species of *Physalacria* from China, with a key to the Asian taxa. *Mycologia* 108: 215–26.
<https://doi.org/10.3852/15-166>
- Qu, M.H., Wang, D.Q. & Zhao, C.L. (2022) A phylogenetic and taxonomic study on *Xylodon* (Hymenochaetales): focusing on three new *Xylodon* species from southern China. *Journal of Fungi* 8: 1–18.
<https://doi.org/10.3390/jof8010035>
- Ronquist, F. & Huelsenbeck, J.P. (2003) MrBayes 3: Bayesian phylogenetic inference under mixed models. *Bioinformatics* 19: 1572–1574.
<https://doi.org/10.1093/bioinformatics/btg180>
- Saba, M., Khalid, A.N., Sharif, S. & Iqbal, M. (2018) The *Heterobasidion insulare* complex from Pakistan. *Mycotaxon* 133: 261–270.
<https://doi.org/10.5248/133.261>
- Shen, H.W., Bao, D.F., Bhat, D.J., Su, H.Y. & Luo, Z.L. (2022) Lignicolous freshwater fungi in Yunnan Province, China: an overview. *Mycology* 13: 119–132.
<https://doi.org/10.1080/21501203.2022.2058638>
- Shen, S., Ma, X., Xu, T.M. & Zhao, C.L. (2018) *Phlebia ailaoshanensis* sp. nov. (Polyporales, Basidiomycota) evidenced by morphological characters and phylogenetic analyses. *Phytotaxa* 373 (3): 184–196.
<https://doi.org/10.11646/phytotaxa.373.3.2>
- Sjökqvist, E.I., Larsson, E., Eberhardt, U. & Ryvarde, L. (2012) Stipitate stereoid basidiocarps have evolved multiple times. *Mycologia*

104: 1046–1055.

- Song, J. & Cui, B.K. (2017) Phylogeny, divergence time and historical biogeography of *Laetiporus* (Basidiomycota, Polyporales). *BMC Evolutionary Biology* 17: 1–12.
<https://doi.org/10.3852/11-174>
- Spirin, V., Kout, J. & Vlasák, J. (2015a) Studies in the *Truncospora ohiensis* – *T. ochroleuca* group (Polyporales, Basidiomycota). *Nova Hedwigia* 100: 159–175.
https://doi.org/10.1127/nova_hedwigia/2014/0221
- Spirin, V., Runnel, K., Vlasák, J., Miettinen, O. & Pöldmaa, K. (2015b) Species diversity in the *Antrodia crassa* group (Polyporales, Basidiomycota). *Fungal Biology* 119: 1291–1310.
https://doi.org/10.1127/nova_hedwigia/2014/0221
- Spirin, V., Vlasák, J., Rivoire, B., Kotiranta, H. & Miettinen, O. (2016) Hidden diversity in the *Antrodia malicola* group (Polyporales, Basidiomycota). *Mycological Progress* 15: 1–12.
<https://doi.org/10.1007/s11557-016-1193-9>
- Štursová, M., Šnajdr, J., Koukol, O., Tláškal, V., Cajthaml, T. & Baldrian, P. (2020) Long-term decomposition of litter in the montane forest and the definition of fungal traits in the successional space. *Fungal Ecology* 46: 100913.
<https://doi.org/10.1016/j.funeco.2020.100913>
- Sun, B.Y., Wu, Y.D. & Yuan, Y. (2023) Species diversity and floral characteristics of wood-inhabiting macrofungi growing on *Quercus mongolica* in Northeast China. *Mycosystema* 42: 278–289.
<https://doi.org/10.13346/j.mycosystema.220258>
- Swofford, D.L. (2002) PAUP*: phylogenetic analysis using parsimony (*and other methods). Version 4.0b10. Massachusetts, Sinauer Associates.
- Tedersoo, L., Bahram, M., Pölme, S., Kõljalg, U., Yorou, N. S., Wijesundera, R., Villarreal Ruiz, L., Vasco-Palacios, A. M., Pham, Q. T., Suija, A., Smith, M. E., Sharp, C., Saluveer, E., Saitta, A., Rosas, M., Riit, T., Ratkowsky, D., Pritsch, K., Pöldmaa, K., Piepenbring, M., Phosri, C., Peterson, M., Parts, K., Pärtel, K., Otsing, E., Nouhra, E., Njouonkou, A. L., Nilsson, R. H., Morgado, L. N., Mayor, J., May, T. W., Majuakim, L., Lodge, D. J., Lee, S. S., Larsson, K.-H., Kohout, P., Hosaka, K., Hiiesalu, I., Henkel, T. W., Harend, H., Guo, L.-D., Greslebin, A., Grelet, G., Geml, J., Gates, G., Dunstan, W., Dunk, C., Drenkhan, R., Dearnaley, J., De Kesel, A., Dang, T., Chen, X., Buegger, F., Brearley, F. Q., Bonito, G., Anslan, S., Abell, S., & Abarenkov, K. (2014) Global diversity and geography of soil fungi. *Science* 346: 1078–1089.
<https://doi.org/10.1126/science.1256688>
- Telleria, M.T., Melo, I., Dueñas, M., Salcedo, I., Beltrán-tejera, E., Rodríguez-Armas, J.L. & Martín, M.P. (2013) *Sistotremastrum guttuliferum*: a new species from the Macaronesian islands. *Mycological Progress* 12: 687–692.
<https://doi.org/10.1007/s11557-012-0876-0>
- Thamvithayakorn, P., Phosri, C., Pisutpaisal, N., Krajangsang, S., Whalley, A.J.S. & Suwannasai, N. (2019) Utilization of oil palm decanter cake for valuable laccase and manganese peroxidase enzyme production from a novel white-rot fungus, *Pseudolagarobasidium* sp. PP17-33. *3 Biotech* 9: 417.
<https://doi.org/10.1007/s13205-019-1945-8>
- Tian, Y., Ghobad-Nejhad, M., He, S.H. & Dai, Y.C. (2018) Three new species of *Aleurodiscus* s.l. (Russulales, Basidiomycota) from southern China. *Mycosystema* 37: 93–107.
<https://doi.org/10.3897/mycokeys.37.25901>
- Vu, D., Groenewald, M., De, V.M., Gehrman, T., Stielow, B., Eberhardt, U., Al-Hatmi, A., Groenewald, J.Z., Cardinali, G., Houbraken, J., Boekhout, T., Crous, P.W., Robert, V., Verkley, G.J.M. (2019). Large-scale generation and analysis of filamentous fungal DNA barcodes boosts coverage for kingdom fungi and reveals thresholds for fungal species and higher taxon delimitation. *Studies in Mycology* 92: 135–154.
<https://doi.org/10.1016/j.simyco.2018.05.001>
- Wang, K. & Cai, L. (2023) Overview of the historical and current status of fungal taxonomy and diversity in China. *Mycosystema* 42: 50–62.
<https://doi.org/10.13346/j.mycosystema.220497>
- Wang, K., Cai, L. & Yao, Y.J. (2021) Overview of nomenclature novelties of fungi in the world and China (2020). *Biodiversity Science* 29: 1064–1072.
<https://doi.org/10.17520/biods.2021202>
- Wang, M. & Chen, Y.Y. (2017) Phylogeny and taxonomy of the genus *Hyphodontia* (Hymenochaetales, Basidiomycota) in China. *Phytotaxa* 309 (1): 45–54.
<https://doi.org/10.11646/phytotaxa.309.1.4>
- Wang, K. & Cai, L. (2023) Overview of the historical and current status of fungal taxonomy and diversity in China. *Mycosystema* 42:

<https://doi.org/10.13346/j.mycosystema.220497>

- Wang, R., Herrera, M., Xu, W., Zhang, P., Moreno, J.P., Colinas, C. & Yu, F. (2022) Ethnomycological study on wild mushrooms in Pu'er prefecture, southwest Yunnan, China. *Journal of Ethnobiology and Ethnomedicine* 18: 1–24.
<https://doi.org/10.1186/s13002-022-00551-7>
- Wang, Y.R., Wu, Y.D. & Dai, Y.C. (2021) Phylogenetic analysis demonstrating four new species in *Megasporoporia* sensu lato (Polyporales, Basidiomycota). *Mycosphere* 12: 1012–1037.
<https://doi.org/10.5943/mycosphere/12/1/11>
- Wei, T.Z., Wang, K., Yu, X.D., Li, Y., Wu, H.J., Wu, H.M., Wang, Y.H., Wei, X.D., Li, B.B., Jiang, L. & Yao, Y.J. (2020) Assessment of the threatened status of macro-basidiomycetes in China. *Biodiversity Science* 28: 41–53.
<https://doi.org/10.17520/biods.2019164>
- Wei, Y.L. (2021) Forming mechanisms and ecological function of wood-decaying fungal community in forest ecosystem. *Chinese Journal of Ecology* 40: 534–543.
- Wei, Y.L. & Dai, Y.C. (2004) Ecological function of wood-inhabiting fungi in forest ecosystem. *Chinese Journal of Applied Ecology* 15: 1935–1938.
<https://doi.org/CNKI:SUN:YYSB.0.2004-10-046>
- Westphalen, M.C., Motato-Vásque, V., Tomšovský, M. & Gugliotta, A.M. (2021) Additions to the knowledge of hydroid Steccherinaceae: *Cabalodontia*, *Etheiroidon*, *Metuloidea*, and *Steccherinum*. *Mycologia* 113: 791–806.
<https://doi.org/10.1080/00275514.2021.1894536>
- Westphalen, M.C., Rajchenberg, M., Tomšovský, M. & Gugliotta, A.M. (2018) A re-evaluation of Neotropical *Junghuhnia* s.lat. (Polyporales, Basidiomycota) based on morphological and multigene analyses. *Persoonia* 41: 130–141.
<https://doi.org/10.3767/persoonia.2018.41.07>
- Wijayawardene, N.N., Hyde, K.D., Dai, D.Q., Sánchez-García, M., Goto, B.T., Saxena, R.K., Erdoğdu, M., Selçuk, F., Rajeshkumar, K.C., Aptroot, A., Błaszczkowski, J., Boonyuen, N., da Silva, G.A., de Souza, F.A., Dong, W., Ertz, D., Haelewaters, D., Jones, E.B.G., Karunarathna, S.C., Kirk, P.M., Kukwa, M., Kumla, J., Leontyev, D.V., Lumbsch, H.T., Maharachchikumbura, S.S.N., Marguno, F., Martínez-Rodríguez, P., Mešić, A., Monteiro, J.S., Oehl, F., Pawłowska, J., Pem, D., Pfliegler, W.P., Phillips, A.J.L., Pošta, A., He, M.Q., Li, J.X., Raza, M., Sruthi, O.P., Suetrong, S., Suwannarach, N., Tedersoo, L., Thiyagaraja, V., Tibpromma, S., Tkalčec, Z., Tokarev, Y.S., Wanasinghe, D.N., Wijesundara, D.S.A., Wimalaseana, S.D.M.K., Madrid, H., Zhang, G.Q., Gao, Y., Sánchez-Castro, I., Tang, L.Z., Stadler, M., Yurkov, A. & Thines, M. (2022) Outline of Fungi and fungus-like taxa – 2021. *Mycosphere* 13: 53–453.
<https://doi.org/10.5943/mycosphere/13/1/2>
- Wu, F., Yuan, H.S., Zhou, L.W., Yuan, Y., Cui, B.K. & Dai, Y.C. (2020) Polypore diversity in South China. *Mycosystema* 39: 653–682.
- Wu, F., Zhou, L.W. & Dai, Y.C. (2019a) Resource diversity of Chinese macrofungi: edible, medicinal and poisonous species. *Fungal Diversity* 98: 1–76.
<https://doi.org/10.1007/s13225-019-00432-7>
- Wu, Y.D., Mao, W.L. & Yuan, Y. (2021) Comparison of polypore floras and diversity from temperate to subtropical forest zones in China. *Biodiversity Science* 29: 1369–1376.
<https://doi.org/10.17520/biods.2021094>
- Wu, Y.X., Shen, S. & Zhao, C.L. (2019b) *Podoscypha yunnanensis* sp. nov. (Polyporales, Basidiomycota) evidenced by morphological characters and phylogenetic analyses. *Phytotaxa* 387 (3): 210–218.
<https://doi.org/10.11646/phytotaxa.387.3.2>
- Wu, Z.Q., Shen, S., Luo, K.Y., Wang, Z.H. & Zhao, C.L. (2017) Morphological and molecular identification of a new species of *Atraporrella* (Polyporales, Basidiomycota) in China. *Phytotaxa* 332 (1): 31–40.
<https://doi.org/10.11646/phytotaxa.332.1.3>
- Wu, Z.Q., Xu, T.M., Shen, S., Liu, X.F., Luo, K.Y. & Zhao, C.L. (2018) *Elaphroporia ailaoshanensis* gen. et sp. nov. in Polyporales (Basidiomycota). *MycKeys* 29: 81–95.
<https://doi.org/10.3897/mycokeys.29.22086>
- Yang, Y., Li, R., Liu, C.M. & Zhao, C.L. (2023a) Morphological and molecular identification for two new species of wood-inhabiting macrofungi (Basidiomycota) from Yunnan-Guizhou Plateau, China. *Phytotaxa* 591 (1): 1–18.
<https://doi.org/10.11646/phytotaxa.591.1.1>
- Yang, Y., Li, R., Jiang, Q.Q., Zhou, H.M., Muhammad, A., Wang, H.J. & Zhao, C.L. (2024) Phylogenetic and taxonomic analyses reveal three new wood-inhabiting fungi (Polyporales, Basidiomycota) in China. *Journal of Fungi* 10: 55.
<https://doi.org/10.3390/jof10010055>
- Yang, Y., Jiang, Q.Q., Li, Q., Yang, J.W., Cha, L., Cheng, L.J., Yang, S.Q., Zhao, C.L. & Zhou, H.M. (2023b) Molecular systematics and taxonomic analyses of three new wood-inhabiting fungi of *Hyphoderma* (Hyphodermataceae, Basidiomycota). *Journal of*

Fungi 9: 1044.

<https://doi.org/10.3390/jof9111044>

- Yang, Z.L. (2016) *Kingdom of wild mushroom-species diversity of wild edible mushroom in Yunnan*. Presented at the the wild mushroom conference of Nanhua, Yunnan, China.
- Yao, Y.J., Wei, J.C., Zhuang, W.Y., Wei, T.Z., Li, Y., Wei, X.L., Deng, H., Liu, D.M., Cai, L., Li, J.S., Wang, K., Wu, H.J., Li, B.B., Wang, Y.H., Wei, X.D., Wu, H.M., Zhao, M.J., Yang, L., Su, J.H. & Zhong, X. (2020) Threatened species list of China's macrofungi. *Biodiversity Science* 28: 20–25.
<https://doi.org/10.17520/biods.2019174>
- Yu, J., Lai, J., Neal, B.M., White, B.J., Banik, M.T. & Dai, S.Y. (2023) Genomic diversity and phenotypic variation in fungal decomposers involved in bioremediation of persistent organic pollutants. *Journal of Fungi* 9: 1–16.
<https://doi.org/10.3390/jof9040418>
- Yuan, H.S. (2014) Molecular phylogenetic evaluation of *Antrodiella* and morphologically allied genera in China. *Mycological Progress* 13: 353–364.
<https://doi.org/10.1007/s11557-013-0921-7>
- Yuan, H.S. (2015) Molecular and morphological evidences reveal two new species in *Grammothele* and *Theleporus* (Basidiomycota) from southern China. *Phytotaxa* 213 (1): 46–56.
<https://doi.org/10.11646/phytotaxa.213.1.4>
- Yuan, Q., Luo, K.Y., Zhang, Y. & Zhao, C.L. (2023) Morphological characteristics and phylogenetic analyses revealed three new wood-inhabiting fungi (Agaricomycetes, Basidiomycota) in Southern China. *Phytotaxa* 592 (3): 179–195.
<https://doi.org/10.11646/phytotaxa.592.3.1>
- Yuan, Y., Bian, L.S., Wu, Y.D., Chen, J.J., Wu, F., Liu, H.G., Zeng, G.Y. & Dai, Y.C. (2023) Species diversity of pathogenic wood-rotting fungi (Agaricomycetes, Basidiomycota) in China. *Mycology* 14: 204–226.
<https://doi.org/10.1080/21501203.2023.2238779>
- Yurchenko, E. & Wu, S.H. (2014) Three new species of *Hyphodontia* with peg-like hyphal aggregations. *Mycological Progress* 13: 533–545.
<https://doi.org/10.1007/s11557-013-0935-1>
- Yurchenko, E. & Wu, S.H. (2015) *Hyphoderma moniliforme* and *H. nemorale* (Basidiomycota) newly recorded from China. *Mycosphere* 6: 113–121.
<https://doi.org/10.5943/mycosphere/6/1/11>
- Zhang, X.J., Yuan, Q., Su, J.Q. & Zhao, C.L. (2023) Diversity of wood-decaying fungi in Zixishan area (Hengduan Mountains), Yunnan Province, China. *Phytotaxa* 612 (2): 113–138.
<https://doi.org/10.11646/phytotaxa.612.2.1>
- Zhang, Y.R., Wang, D.W., Chen, Y.T., Liu, T.T., Zhang, S.S., Fan, H.X., Liu, H.C. & Li, Y. (2021) Healthy function and high valued utilization of edible fungi. *Food Science and Human Wellness* 10: 408–420.
<https://doi.org/10.1016/j.fshw.2021.04.003>
- Zhao, C.L. & Cui, B.K. (2013a) Three new *Perenniporia* (Polyporales, Basidiomycota) species from China based on morphological and molecular data. *Mycoscience* 54: 231–240.
<https://doi.org/10.1016/J.MYC.2012.09.013>
- Zhao, C.L. & Cui, B.K. (2013b) *Truncospora macrospora* sp. nov. (Polyporales) from Southwest China based on morphological and molecular data. *Phytotaxa* 87 (2): 30–38.
<https://doi.org/10.11646/phytotaxa.87.2.2>
- Zhao, C.L., Cui, B.K. & Dai, Y.C. (2014) Morphological and molecular identification of two new species of *Hyphodontia* (Schizoporaceae, Hymenochaetales) from southern China. *Cryptogamie Mycologie* 35: 87–97.
<https://doi.org/10.7872/crym.v35.iss1.2014.8>
- Zhao, C.L., Cui, B.K., Song, J. & Dai, Y.C. (2015a) Fragiliporiaceae, a new family of Polyporales (Basidiomycota). *Fungal Diversity* 70: 115–126.
<https://doi.org/10.1007/s13225-014-0299-0>
- Zhao, C.L., Cui, B.K. & Steffe, K.T. (2013c) *Yuchengia*, a new Polypore genus segregated from *Perenniporia* (Polyporales) based on morphological and molecular evidence. *Nordic Journal of Botany* 31: 331–338.
<https://doi.org/10.1111/j.1756-1051.2012.00003.x>
- Zhao, C.L., Liu, X.F. & Ma, X. (2019) *Phlebiopsis yunnanensis* sp. nov. (Polyporales, Basidiomycota) evidenced by morphological characters and phylogenetic analysis. *Nova Hedwigia* 108: 265–279.
https://doi.org/10.1127/nova_hedwigia/2018/0508
- Zhao, C.L., Qu, M.H., Huang, R.X. & Karunaratna, S.C. (2023) Multi-gene phylogeny and taxonomy of the wood-rotting fungal genus

Phlebia sensu lato (Polyporales, Basidiomycota). *Journal of Fungi* 9: 1–40.

<https://doi.org/10.3390/jof9030320>

Zhao, C.L., Wu, F., Liu, H.X. & Dai, Y.C. (2015b) A phylogenetic and taxonomic study on *Ceriporiopsis* s. str. (Polyporales) in China. *Nova Hedwigia* 101: 403–417.

https://doi.org/10.1127/nova_hedwigia/2015/0282

Zhao, C.L. & Wu, Z.Q. (2017) *Ceriporiopsis kunmingensis* sp. nov. (Polyporales, Basidiomycota) evidenced by morphological characters and phylogenetic analysis. *Mycological Progress* 16: 93–100.

<https://doi.org/10.1007/s11557-016-1259-8>

Zhou, J.L., Zhu, L., Chen, H. & Cui, B.K. (2016) Taxonomy and phylogeny of *Polyporus* group *Melanopus* (Polyporales, Basidiomycota) from China. *PLoS One* 11: 1–23.

<https://doi.org/10.1371/journal.pone.0159495>

Zhou, M., Wang, C.G., Wu, Y.D., Liu, S. & Yuan, Y. (2021) Two new brown rot polypores from tropical China. *MycoKeys* (82): 173–197.

<https://doi.org/10.3897/mycokeys.82.68299>