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Hydnaceous fungi of China 4. *Mycoleptodonoides tropicalis* sp. nov., and a key to the species in China

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Abstract — *Mycoleptodonoides tropicalis* is illustrated and described as a new species from tropical forest in Yunnan Province, southwestern China. It is morphologically characterized by fan-shaped basidiocarps, hydnoid hymenophore, fusiform cystidia, and smooth, subglobose to globose, non-amyloid basidiospores. A key to the Chinese species of *Mycoleptodonoides* is given.

Key words — *Basidiomycota*, lignicolous fungi, taxonomy

Introduction

Recently, significant progress has been made in the investigation of lignicolous fungi diversity in China (Cui & Dai 2006, Cui et al. 2007, 2008, 2009, Dai et al. 2003, 2004, 2007a,b, Dai & Yuan 2007). A number of species, mostly polyporoid (Dai 2004, Dai & Niemelä 2002, Dai & Penttilä 2006) and hydnoid fungi (Yuan & Dai 2005, 2009), have been recorded or described. As a contribution to the study of hydnaceous fungi in China, an undescribed hydnaceous species of *Mycoleptodonoides* is described and illustrated in this paper. The knowledge of *Mycoleptodonoides* is summarized, and a key to Chinese species of the genus is provided.

The genus *Mycoleptodonoides* Nikol. is characterized by its pileate basidiocarps, hydnoid hymenophore, a monomitic hyphal system, generative hyphae with clamp connections in both context and spine trama, basidia with a basal clamp connection, presence or absence of cystidia, and small, smooth, non-amyloid basidiospores (Maas Geesteranus 1971).

The genus was considered to be closely related to *Climacodon* P. Karst. and *Mycorrhaphium* Maas Geest. (Maas Geesteranus 1971). These three genera

share the hydnoid hymenophore, a monomitic hyphal system in context, and small, smooth, non-amyloid basidiospores. However, *Climacodon* is now placed in family *Phanerochaetaceae* (Kirk et al. 2008), separated from the other two genera in family *Meruliaceae* (Kirk et al. 2008) by thick-walled or encrusted cystidia in the hymenium, generative hyphae with simple septa in the spine trama, and basidia with a basal simple septum. *Mycorrhaphium* is similar to *Mycoleptodonoides* in having clamp connections either in context or in spine trama, but the dimitic hyphal system in the spine trama readily distinguishes *Mycorrhaphium* from the latter (Yuan & Dai 2009).

Materials and methods

The studied specimens are deposited at Herbarium of Institute of Applied Ecology, Chinese Academy of Sciences (IFP) (http://sweetgum.nybg.org/ih/). The microscopic studies were made from sections mounted in Cotton Blue (abbreviated CB): 0.1 mg aniline blue dissolved in 60 g pure lactic acid; CB+ = cyanophily, CB– = acyanophily. Amyloid and dextrinoid reactions were tested in Melzer's reagent (IKI): 1.5 g KI (potassium iodide), 0.5 g I (crystalline iodine), 22 g chloral hydrate, aq. dest. 20 ml; IKI– = neither amyloid nor dextrinoid reaction. 5% KOH was used in the tests. Sections were studied at magnifications up to ×1000 using a Nikon Eclipse E600 microscope and phase contrast illumination, and dimensions were estimated subjectively with an accuracy of 0.1 μm. In the spore measurements, the apiculus was excluded. In presenting the spore size variation, 5% of the measurements out of each end of the range are given in parentheses. The following abbreviations are used: L = mean spore length (arithmetical average of all spores), W = mean spore width (arithmetical average of all spores), Q = extreme values of the length/width ratios among the studied specimens, and n = the number of spores measured from a given number of specimens. Special colour terms follow Rayner (1970) and Petersen (1996).

Taxonomy

Mycoleptodonoides tropicalis H.S. Yuan & Y.C. Dai, **sp. nov.** Figs. 1, 2

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Carpophorum annuum, pileatum, hydnaceum; dentes usque ad 3.5 mm longi, 3–4 per mm. Systema hypharum monomiticum, hyphae generatoriae fibulatae, hyphae contexti 3–7 μm in diam. Cystidia fusiformia. Sporae hyalinae, subglobosae vel globosae,non-amyloideae, 2.9–3.3 × 1.7–2 μm.

Type. — **China**. Yunnan Prov., Menglun County, Xishuangbanna Botanical Garden, on angiosperm stump, 6.VIII.2005 Dai 6837 (**holotype** in IFP, isotype in H).

Etymology — *tropicalis* (Lat.): referring to distribute in tropical forest.

Fruitbody — Basidiocarps annual, pileate, sessile with a lateral base, solitary to imbricate, corky to soft fibrous, without odour and taste when fresh. Pilei fan-shaped to semicircular, projecting up to 6 cm, 5 cm wide and 0.5 cm thick. Upper surface velutinate to glabrous, scattered with small warts, indistinctly zonate, fawn to clay buff in central pileus, cream to pale buff at margin when

Fig. 1. Fruitbodies of *Mycoleptodonoides tropicalis*.

fresh, vinaceous buff when dry; margin acute, incurved when dry. Hymenophore hydnoid, hymenophore between the spines velutinate; spines crowded, evenly distributed, buff when fresh, sienna to fulvous when dry, fibrous, subulate, terete or flattened, straight to somewhat flexuous, solitary or confluent, rare furcate, up to 3.5 mm long, 3–4 per mm; sterile margin smooth, up to 1 mm wide. Context buff, corky, azonate, homogeneous, up to 1.5 mm thick.

Hyphal structure — Hyphal system monomitic; generative hyphae bearing clamp connections, slightly thick to thick-walled, IKI–, CB–; tissues unchanged in KOH.

Context — Generative hyphae hyaline, slightly thick to thick-walled, moderately branched, 3–7 μm diam, loosely interwoven.

Spines — Generative hyphae hyaline, thin to slightly thick-walled, moderately branched, 2–4 μm diam, parallel along the spine. Cystidia present, fusiform to ventricose, thin-walled, originating from subhymenium, 22–40 × 6–7 μm. Basidia clavate, with a basal clamp connection and four sterigmata, 13–20 × 4–5 μm; basidioles in shape similar to basidia, but slightly smaller.

Spores — Basidiospores subglobose to globose, hyaline, thin-walled, smooth, IKI–, CB–, (3.2–)3.3–4 (–4.1) × 2.5–3(–3.2) μm, L = 3.66 μm, W = 2.84 μm, Q = 1.25–1.33 (n=60/2).

Additional specimens examined — *Mycoleptodonoides tropicalis*. China, Yunnan Prov., Menglun County, Xishuangbanna Botanical Garden, on angiosperm trunk, 29.IX.2008 *Yuan 5472* (paratype, IFP). — *M. aitchisonii*. China, Heilongjiang Prov., Ning'an County, Jingbohu Forest Park, on fallen gymnosperm trunk, 10.IX.2007 *Dai*

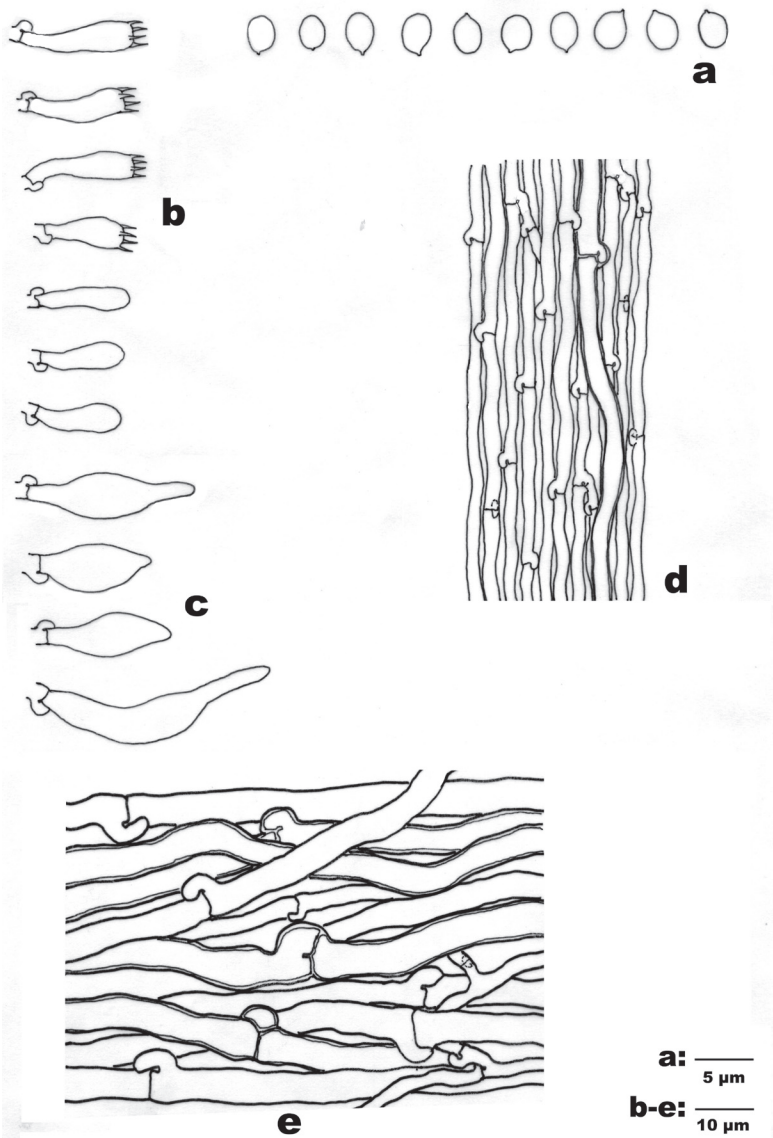

Fig. 2. Microscopic structures of *Mycoleptodonoides tropicalis* (drawn from the holotype). —a: Basidiospores. —b: Basidia and basidioles. —c: Cystidia. —d: Hyphae from spine trama. —e: Hyphae from context.

8922 (IFP); Hubei Prov., Fang County, Shennongjia Nat. Res., on angiosperm stump, 3.IX.2006 *Li 1506* (IFP); Shaanxi Prov., Baoji County, Taibaishan Nat. Res., on fallen angiosperm branch, 17.IX.2005 *Wang 504* (IFP). — *M. vassiljevae*. Russia, Primorie Reg., Suputinsky Nat. Res., on wood, 24.VIII.1946 *Vassiljeva 22496* (LE); China, Jilin Prov., Antu County, Changbai Nat. Res., on dead angiosperm tree, 19.IX.2002 *Dai 3815* (IFP); on fallen angiosperm trunk, 25.VIII.2007 *Wei 3240* (IFP).

Discussion

Five species have been described in *Mycoleptodonoides*: *M. adusta* (Schwein.) Nikol., *M. aitchisonii* (Berk.) Maas Geest., *M. pergamenea* (Yasuda) Aoshima & H. Furuk., *M. pusilla* (Brot.) K.A. Harrison and *M. vassiljevae* Nikol. Among these species, *M. adusta* and *M. pusilla* have been transferred to genus *Mycorrhaphium* Maas Geest. for having dimitic hyphal system in spine trama (Maas Geesteranus 1962) and *M. pergamenea* is considered as a synonym of *M. aitchisonii* (Imazeki & Hongo 1989). Thus, *M. aitchisonii* and *M. vassiljevae* comprise the remaining accepted species in this genus. The former species has a wide distribution from subtropical to boreal areas. It is characterized by narrowly ellipsoid basidiospores (5.4–6.3 × 1.9–2.7 μm), moderately inflated contextual hyphae (up to 15 μm), and presence of thin-walled cystidia-like elements (Maas Geesteranus 1961, 1971). The latter species has been recorded from the type species locality (Ussuri, Russia) and Northeastern China (Dai et al. 2004, Nikolaeva 1952). The main characters of *M. vassiljevae* are the cylindric, slightly curved basidiospores (4–5 × 1.5–2 μm), inflated contextual hyphae (up to 30 μm), and absence of cystidia-like elements (Nikolaeva 1952).

Mycoleptodonoides tropicalis was found in tropical forest, and is readily distinguished from the other two species by subglobose to globose basidiospores (3.2–4.1 × 2.5–3.2 μm), not inflated contextual hyphae (up to 7 μm), and fusiform cystidia.

Key to species of *Mycoleptodonoides* from China

1. Basidiospores narrowly ellipsoid to cylindric, subtropical to boreal species 2

1. Basidiospores subglobose to globose, tropical species. . . . . *M. tropicalis*

2. Hyphae of the context up to 15 μm, spores narrowly ellipsoid, 5.4–6.3 × 1.9–2.7 μm . . . . . *M. aitchisonii*

2. Hyphae of the context up to 30 μm, spores cylindric, slightly curved, 4–5 × 1.5–2 μm . . . . . *M. vassiljevae*

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Literature cited

Cui BK, Dai YC, Decock C. 2007. A new species of *Perenniporia* (*Basidiomycota, Aphyllophorales*) from eastern China. Mycotaxon 99: 175–180.

Cui BK, Dai YC, Li BD. 2009. Notes on the genus *Rigidoporus* (*Basidiomycota*, *Polyporaceae*) in China. Nova Hedwigia 88: 189–197.

Cui BK, Huang MY, Dai YC. 2006. A new species of *Oxyporus* (*Basidiomycota*) from western China. Mycotaxon 96: 207–210.

Cui BK, Wang Z, Dai YC. 2008. *Albatrellus piceiphilus* sp. nov. on the basis of morphological and molecular characters. Fungal Diversity: 28: 41–48.

Dai YC. 2004. Notes on the genus *Antrodiella* (*Basidiomycota, Aphyllophorales*) in China. Mycotaxon 89: 389–398.

Dai YC, Cui BK, Yuan HS. 2007a. Notes on polypores from Gansu and Qinghai Province, northwest China. Cryptogamie Mycologie 28: 177–187.

Dai YC, Härkönen M, Niemelä T. 2003. Wood-inhabiting fungi in southern China 1. Polypores from Hunan Province. Ann. Bot. Fennici 40: 381–393.

Dai YC, Niemelä T. 2002. Changbai wood-rotting fungi 13. *Antrodia* sensu lato. Ann. Bot. Fennici 39: 257–265.

Dai YC, Penttilä R. 2006. Polypore diversity of Fenglin Nature Reserve, northeastern China. Ann. Bot. Fennici 43: 81–96.

Dai YC, Wei YL, Yuan HS, Huang MY, Penzina T. 2007b. Polypores from Altay and Tian Mts. in Xinjiang, northwest China. Cryptogamie Mycologie 28: 269–279.

Dai YC, Wei YL, Zhang XQ. 2004. An annotated checklist of non-poroid *Aphyllophorales* in China. Ann. Bot. Fennici 41: 233–247.

Dai YC, Yuan HS. 2007. Type studies on polypores described by G.Y. Zheng and Z.S. Bi, from southern China. Sydowia 59: 25–31.

Imazeki R, Hongo T. 1989. Colored Illustrations of Mushrooms of Japan, Vol. 2. Hoikusha, Osaka, p. 120.

Kirk PM, Cannon PF, Minter DW, Stalpers JA. 2008. Ainsworth & Bisby's dictionary of the fungi, 10th edition. CAB International, Wallingford.

Maas Geesteranus RA. 1961. A hydnum from Kashmir. Persoonia 1(4): 409–413.

Maas Geesteranus RA. 1962. Hyphal structures in hydnums. Persoonia 2(3): 377–405.

Maas Geesteranus RA. 1971. Hydnaceous fungi of the eastern old world. Verhandelingen Der Koninklijke Nederlandse Akademie Van Wetenschappen, Tweede Reeks 60 (3): 1–175, 8 plates.

Nikolaeva TL. 1952. Novyi rod ezhovikovykh (sem. *Hydnaceae*) gribov (A new genus of hydnaceous fungi). Botanicheskie materialy otdela sporovykh rastenii Botanicheskogo Instituta Akademii Nauk SSSR 8: 117–121 (in Russian with Latin subheadings).

Petersen JH. 1996. Farvekort. The Danish Mycological Society´s colour-chart. - Foreningen til Svampekundskabens Fremme, Greve.

Rayner RW. 1970. A mycological colour chart. Commonwealth Mycological Institute, Kew.

Yuan HS, Dai YC. 2005. Two new species of *Steccherinum* (*Basidiomycota*) from China. Mycotaxon 93: 173–178.

Yuan HS, Dai YC. 2009. Hydnaceous fungi of China 2: *Mycorrhaphium sessileum* sp. nov. Nova Hedwigia 88: 205–209.