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中国的齿状真菌研究 3. 肉齿菌属

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摘 要: 对中国肉齿菌属的 3 个种进行了总结,其中花状肉齿菌为中国新记录种。该种采集自海南省儋州市热带植物园,主要特征:子实体花朵状、覆瓦状叠生,囊状体棒状或纺锤形,担孢子广椭圆形。根据采集的标本对该种进行了详细的描述及显微结构绘图,对该种与其它种类的联系和区别进行了讨论,并列出了附有每种简要描述的检索表。

关键词: 花状肉齿菌; 地生真菌; 分类; 热带地区

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Hydnaceous fungi of China 3. *Climacodon* (Polyporales, Basidiomycota) in China

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Abstract: Three species of hydnaceous genus *Climacodon* P. Karst. in China are summarized. *C. dubitativus*(Lloyd) Ryvarden is newly recorded from China. It is characterized by imbricate and efflorescence-like basidiocarps, clavate to fusiform cystidia, and broadly ellipsoid basidiospores. An illustrated description of the species is given based on the materials collected from Hainan Province, and a key with synoptic description of each species is provided.

Key words: *Climacodon dubitativus*; terrestrial fungi; taxonomy; tropical area

1 Introduction

Extensive studies on wood-rotting fungi of China were made during the last 20 years. A number of new species and species new to China were found including many medicinal and edible fungi(Dai & Yang, 2008; Dai *et al.*, 2010). Most of these taxa were focused on polyporoid species(Cui & Dai, 2008; Cui *et al.*, 2005, 2006; Dai, 2004, 2009; Dai & Li, 2002; Dai *et al.*, 2006, 2001; Qin *et al.*, 2010; Zhou *et al.*, 2009) and hydnaceous fungi(Yuan & Dai, 2005a, b; Yuan & Dai, 2008; Yuan *et al.*, 2006, 2009), and enriched the Chinese fungal flora(Dai & Zhuang, 2010). During the study on the hydnaceous fungi in China, two specimens were identified as *Climacodon dubitativus* (Lloyd) Ryvarden which has not been reported in China previously(Dai *et al.*, 2004; Ryvarden, 1992). An illustrated description of this species is given in the present paper based on our materials. The knowledge of *Climacodon* is summarized and a species key to the genus from China is provided.

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The genus *Climacodon* P. Karst. was established by Karsten with *Hydnum pulcherrimum* Berk. & M. A. Curtis as the type species. It is characterized by the features of pileate basidiocarps, hydnoid hymenophore, a monomitic hyphae system (generative hyphae bear clamp connections in context but simple septa in spine trama), presence or absence of cystidia, and cylindric to ellipsoid, smooth, non-amyloid basidiospores (Maas Geesteranus, 1971). The genus is closely related to *Mycoleptodonoides* M. I. Nikol. macroscopically, but the generative hyphae of latter bear clamp connections both in context and spine trama. *Mycorrhaphium* Maas Geest. and *Steccherinum* Gray resemble *Climacodon* by having pileate basidiocarps and hydnoid hymenophore, however, these two genera have a dimitic hyphae structure with plenty skeletal hyphae(Banker, 1912; Yuan & Dai, 2005a, 2009).

2 Materials and methods

The studied specimens are deposited at the herbarium of the Institute of Applied Ecology, Chinese Academy of Sciences (IFP). The microscopic methods employed in the series studies are same as that described by Yuan & Dai(2008). In the text the following abbreviations are used: CB− = acyanophilous, IKI− = neither amyloid nor dextrinoid, L = mean spore length (arithmetical mean of all spores), W = mean spore width(arithmetical mean of all spores), Q = extreme values of the length/width ratios among the studied specimens, and n = the number of spores measured from given number of specimens. Special color terms are from Rayner(1970)and Petersen(1996).

3 Results

Climacodon dubitativus (Lloyd) Ryvarden, Mycotaxon 44:129, 1992(Fig. 1-2).

——*C. efflorescens* Maas Geest., *Verh. K. Ned. Akad. Wet.*, Afd. Natuurkunde, Tweede Reeks 60: 135, 1971.

——*Polystictus dubitativus* Lloyd, *Mycol. Writ.* 7:1111, 1922.

Fruitbody——Basidiocarps annual, sessile or with short central rooting stipe, often in large imbricate clusters and efflorescence-like, leathery when fresh, without odour or taste, becoming bone hard and light in weight when dry. Pilei flabelliform, semicircular to circular, up to 25 cm wide and 1 cm thick; margin obtuse when fresh, thinning out and undulate when dry. Upper surface cream to pale buff, tomentose to velutinate, indistinctly concentrically zoned when fresh, becoming ochraceous to orange-brown, strigose, distinctly zonate when dry; margin darker than center. Hymenophore hydnoid, hymenophore between the spines smooth; spines waxy when fresh, crowded in centre, sparse at margin, white to cream when fresh, cinnamon to yellowish brown upon drying, subulate, terete, straight to flexuous, up to 1.5 mm long, 3−4 per mm. Context homogenous, fibrillose, zonate, white when fresh, cream to pale buff when dry, up to 5 mm thick. Stipe concolorous with pileal surface, up to 1 cm wide and 3 cm long, spines slightly decurrent.

Hyphal structure——Hyphal system monomitic; generative hyphae bearing clamp connections in context and simple septa in spine trama; IKI−, CB−; tissues unchanged in KOH.

Context——Generative hyphae hyaline, thin- to thick-walled, bearing clamp connections, occasionally branched, semi-gelatinous, 3.5−5.5 μm diam, regularly arranged.

Spines——Generative hyphae hyaline, thin- to slightly thick-walled, bearing simple septa, seldom branched, 1.8 − 3 μm diam, subparallel along the spines. Cystidia clavate to fusiform, thin- to slightly thick-walled, originated from trama, embedded or projecting out of the hymenium, 37−45×5.5−7 μm; basidia clavate, with a basal simple septum and four sterigmata, 20−23×4.5−6 μm; basidioles in shape similar to basidia, but slightly smaller.

Spores——Basidiospores broadly ellipsoid, hyaline, thin-walled, smooth, with a distinct guttule, IKI−, CB−, 4.2−5.1(−5.2)×3.1−3.6(−4)μm, L = 4.65 μm, W = 3.39 μm, Q = 1.37(n = 30/1).

Specimens examined——China, Hainan Prov., Danzhou County, Tropical Botanical Garden, on

ground, 2. VI. 2008 Dai 10028 & 10039.

Other Specimens examined——*Climacodon pulcherrimus*. China, Hainan Prov., Bawangling Nat. Res., on rotten angiosperm trunk, 2. IX. 2006 Dai 7845; Henan Prov., Neixiang County, Baotianman Nat. Res., on rotten angiosperm wood, 30. VIII. 2005 Li 438; Heilongjiang Prov., Jiagedaqi, on wood of *Quercus*, 20. XIII. 2003 Dai 4880; Hunan Prov., Nanyue County, Hengshan Forest Park, on fallen angiosperm trunk, 29. VI. 2007 Dai 8185; on fallen trunk of *Pinus*, 29. VI. 2007 Li 1846; Yunnan Prov., Mengla County, Wangtianshu Forest Park, on rotten angiosperm wood, 25. IV. 2008 Yuan 5401; on fallen angiosperm trunk, 25. IV. 2008 Yuan 5416. ——*C. septentrionalis*. China, Heilongjiang Prov., Hegang, Lianying Forest Farm, on living tree of Acer, 29. VIII. 2008 Yuan 5111 & Yuan 5134.

Fig. 1　Fruitbodies of *Climacodon dubitativus* (Lloyd) Ryvarden

4　Discussions

Two species in *Climacodon* were recorded before in China (Dai *et al.*, 2004): *Climacodon pulcherrimus* (Berk. & M. A. Curtis) Nikol. and *C. septentrionalis* (Fr.) P. Karst. *C. pulcherrimus* (Berk. & M. A. Curtis) Nikol. is unique because its contextual generative hyphae have one to four clamps connections per septum. *C. septentrionalis* (Fr.) P. Karst. and *C. chlamydocystis* Maas Geest. are the two species closely related to *C. dubitativus* by having distinct cystidia. However, *C. chlamydocystis* has encrusted cystidia, while they smooth in *C. dubitativus*. *C. septentrionalis* differs from *C. dubitativus* by cylindric to narrowly ellipsoid basidiospores. Moreover, the fruitbody of *C. dubitativus* usually bear a short central rooting stipe.

A key to the accepted species with synoptic description of *Climacodon* from China:

1. Generative hyphae with one clamp connection per septum in context, cystidia present …… 2
1. Generative hyphae with one to four clamp connections per septum in context, cystidia absent …… *C. pulcherrimus* (Berk. & M. A. Curtis) Nikol. Frb. annual, effused-reflexed to sessile, upper surface cream to pale buff when fresh, yellowish brown when dry, tomentose to strigose, azonate; spine subulate, 1.5－2 mm long, 3－5 per mm. Generative hyphae in context with one to four clamp connections per septum; generative hyphae in spine trama with simple septa. Cystidia absent; basidiospores short cylindric to ellipsoid, IKI－, CB－, (4－)4.1－5.1(－5.5)×(2－)2.1－2.5(－2.6) μm, L=4.53 μm, W=2.23 μm, Q=2.03(n=30/1).
2. Basidiospores cylindric to narrowly ellipsoid, cystidia distinctly thick-walled …… *C. septentrionalis* (Fr.) P. Karst Frb. annual, sessile, usually imbricate, upper surface white to cream when fresh, buff to pale brown when dry, tuberculate to strigose, indistinct zonate; spine subulate, up to 7 mm long, 3－4 per mm. Generative hyphae in context with one clamp connection per septum; generative hyphae in spine trama with simple septa. Cystidia tubular to ventricose, thin- to thick-walled (up to 2 μm thick); basidiospores short cylindric to narrowly ellipsoid, IKI－, CB－, (4－)4.1－4.6(－5)×2－2.3(－2.7) μm, L=4.29 μm, W=2.19 μm, Q=1.96(n=30/1).
2. Basidiospores broadly ellipsoid, cystidia thin- to slightly thick-walled …… *C. dubitativus* (Lloyd) Ryvarden Frb. annual, sessile or with a short central stipe, upper surface cream to pale buff, tomentose to velutinate, indistinctly concentrically zoned when fresh, becoming ochraceous to orange-brown, strigose, distinctly zonate when dry; spine subulate, up to 1.5

mm long, 3—4 per mm. Generative hyphae in context with one clamp connection per septum; generative hyphae in spine trama with simple septa. Cystidia clavate to fusiform, thin- to slightly thick-walled; basidiospores broadly ellipsoid, IKI—, CB—, 4.2—5.1(—5.2)×3.1—3.6(—4) μm, L=4.65 μm, W=3.39 μm, Q=1.37(n=30/1).

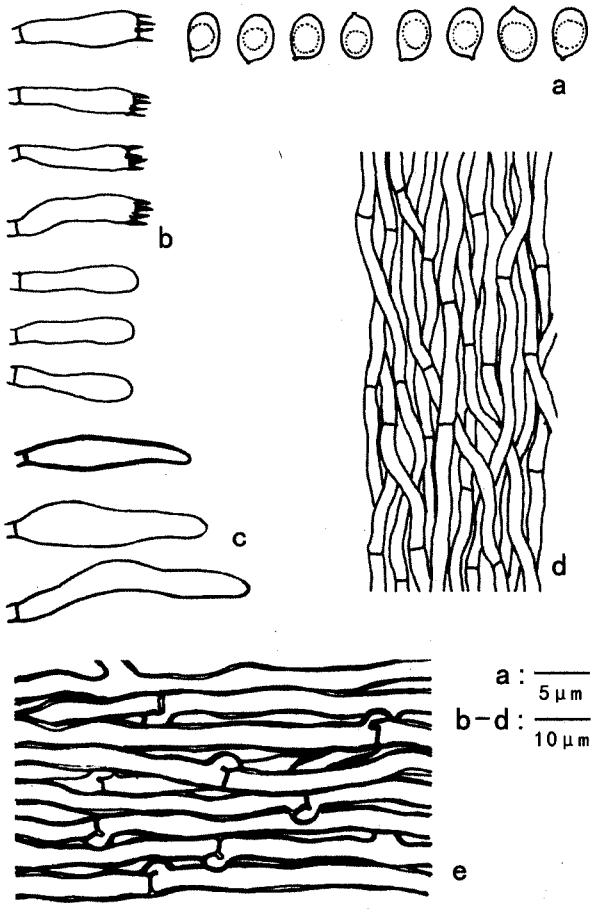

Fig. 2 Microscopic structures of *Climacodon dubitativus* (Lloyd) Ryvarden (drawn from Dai 10028)

a. Basidiospores; **b.** Basidia and basidioles; **c.** Cystidia; **d.** Hyphae from spine trama; **e.** Hyphae from context.

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