Cordyceps campsosterna, a new pathogen of *Campsosternus auratus*

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A new species, *Cordyceps campsosterna*, infecting adult and nymphs of *Campsosternus auratus* which was collected from Gutian Nature Reserve in Huidong County, Guangdong Province, China is described and illustrated. The species can be distinguished from other species in the subgenus *Eucordyceps* by its greenish-yellow stromata with long rhizoids, vertically immersed perithecia and filiform ascospores with multisepta, breaking into 2.9-5.9 × 1 μm fragments.

Key words: China, entomogenous fungi, *Eucordyceps*, new species.

Introduction

We are studying the entomogenous fungi in China and have published several records and descriptions of new species (Liang *et al*., 2003a,b). In June 2002 specimens of the genus *Cordyceps* were collected from Gutian Nature Reserve located in eastern Guangdong Province of China and identified as *C. nutans* Pat., *C. sphecocephala* (Kl.) Sacc., *C. oxycephala* Penz. et Sacc., *C. myrmecophila* Ces. and *C. grylli* Teng. Two unknown collections of entomogenous fungi infecting subterranean nymphs and adults of *Campsosternus auratus* (Elateridae, Coleoptera), were also collected. The two collections were from the same locality (only 50 cm far from each other) in soil of broadleaf forest and had similar morphological characteristics. They are described as a new species. Type (HMIGD 20885) is deposited in the Herbarium of Microbiology Institute of Guangdong (HMIGD).

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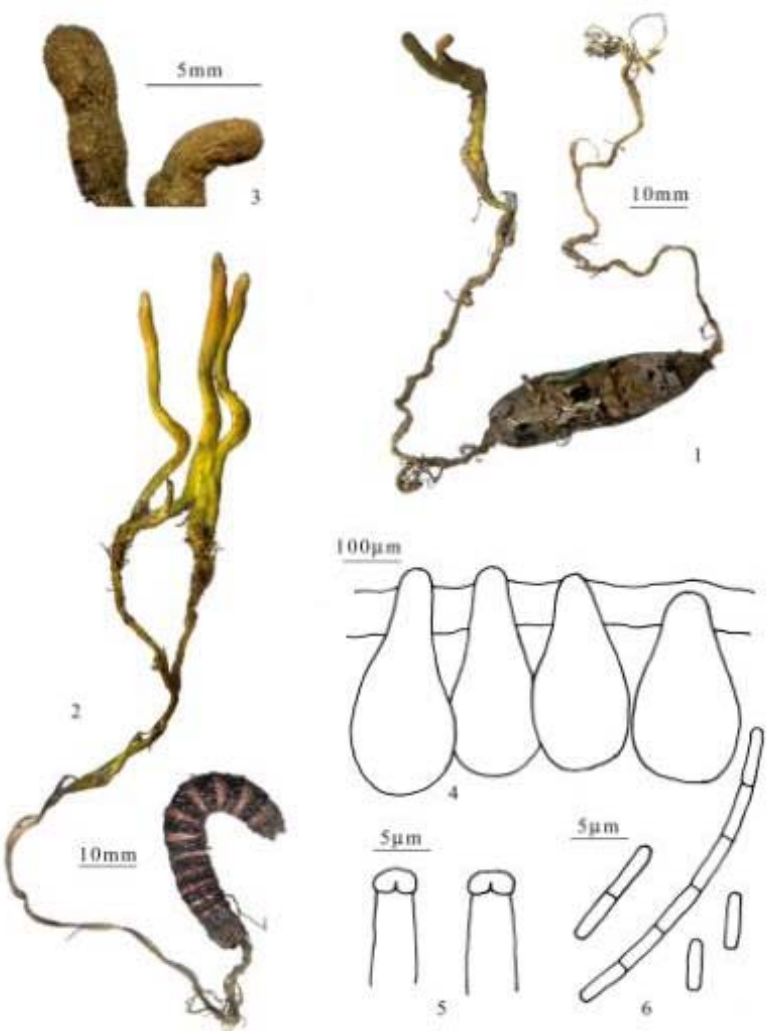
Taxonomy

Cordyceps campsosterna W.M. Zhang & T.H. Li, **sp. nov.** (Figs.1-6)

Etymology: *campsosterna*, in reference to the genus of the host, *Campsospternus*.



Figs. 1-6. *Cordyceps campsosterna* **1.** Stroma growing on adult insect. **2.** Stroma growing on nymph. **3.** Fertile parts of the stroma. **4.** Vertically immersed perithecia. **5.** Apical parts of asci. **6.** Secondary ascospores.

Stromata simplicia, fibrillose, ex capitulo adulto campsosterno aurato, 16 cm longa, viridi-flava. *Rhizoidea* flexa, 12 cm longa, 1-2 mm lata. *Stipes* cylindraceus, aliguatum complanatus, 2 cm longus, 4 mm latus. *Pars fertilis* cylindrica, 1.5-2 cm longa, 3-4 mm lata, non appendiccula sterilia terminalia, apicibus obtusis. *Perithecia* immersa, pyriformia vel obovoidea, 275-433 × 165-275 μm, apicibus prominulis. *Asci* cylindracei, 4-spori, 175-349 ×

3.9 µm, capitibus hemishpaericis, 2.9-3.9 µm crassis, 2 µm altis. *Ascosporae* filiformes, multisptatae, articulis ascosporum cylindraceis, 2.9-5.9 × 1 µm, utrinque truncatis.

Stromata simple, fibrillose, from the head of adult of *Campsosternus auratus*, 16 cm long, greenish-yellow. *Rhizoids* flexuose, gracile, 12 cm long, 1-2 mm broad, under ground. *Stipe* cylingrical, somewhat flat, 2 cm long, 4 mm broad. *Fertile part* cylindrical, 1.5-2 cm long, 3-4 mm broad, without sterile terminal part, peridial layer pseudoparenchymatic, 79-110 µm. *Perithecia* pyriform or obovoid, with protruding apices, vertically immersed, 275-433 × 165-276 µm each wall with a layer of closely arranged parallel hyphae, 23-29 µm thick. *Asci* cylindrical, 4-spored, 175-349 × 3.9 µm; cap hemispherical, 2.9-3.9 µm thick, 2 µm high. *Ascospores* filiform, multiseptate, breaking into cylindrical fragments when mature, 2.9-5.9 × 1 µm.

Anamorph: *Metarhizium* sp.

Material examined: CHINA, Huidong county, Gutian Nature Reserve, Guangdong Province, on nymph and adult of *Campsosternus auratus* buried in soil of a broadleaf forest, alt. 500 m, 25 June 2002, W.M. Zhang (HMIGD 20885, **holotype** designated here), 25 June 2002, W.M. Zhang (HMIGD 20884).

The new species belongs to the subsection *Eucystocarpon*, section *Cystocarpon*, subgenus *Eucordyceps* according to Kobayasi's taxonomic system (Kobayasi, 1982), because of its vertically immersed perithecia and cylindrical, multiseptate ascospores (finally breaking into secondary spores). In the subgenus *Eucordyceps*, there are 3 species with rhizoids similar to *C. campsosterna* including *C. brittlebankisoides* Z.Y. Liu, Z.Q. Liang, Whalley, Y.J. Yao et A.Y. Liu; *C. novoguineensis* Koboyasi et Shimizu and *C. paradoxa* Koboyasi. *Cordyceps brittlebankisoides* is a species recently reported from Sichuan Province of China by Liu *et al*. (2001). Its stromata are quite similar in size, shape and colour to those of *C. campsosterna*, but this species differs in having tapering terminal sterile parts, whitish rhizoids and larger ascospore fragment (5.7-8.1 × 0.94 µm). *C. novoguineensis* and *C. paradoxa* (Koboyasi and Shimizu, 1983) also resemble *C. campsosterna* in the appearance of stromata, but *C. novoguineensis* differs in infecting lava of Diptera and having obliquely immersed and larger perithecia (770-880 × 300-330 µm), and *C. paradoxa* differs in growing on lava of cicada and having whitish rhizoids and larger secondary ascospores (4-6 × 2-3 µm).

This is a first report that an entomogenous fungus of *Cordyceps* simultaneously attacks nymph and adult of the same insect and finally produces the stromata on them. Cultures isolated from infected lava and adult respectively was shown to be a species of *Metarhizium*.

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References

Liang, Z.Q., Wang, B. and Kang, J.C. (2003a). Several rare entopathogenic fungi from the Western Sichuan mountains. Fungal Diversity 12: 129-134.

Liang, Z.Q., Liu, A.Y., Liu, M.H. and Kang, J.C. (2003b). The genus *Cordyceps* and its allies from the Kuankuoshui Reserve in Guizhou. III. Fungal Diversity 14: 95-101.

Liu, Z.Y., Liang, Z.Q., Whalley, A.J.S., Yao, Y.J. and Liu, A.Y. (2001). *Cordyceps brittlebankisoides*, a new pathogen of grubs and its anamorph, *Metarhizium anisopilae* var. *majus*. Jounal of Invertebrate Pathology 78: 178-182.

Koboyasi, Y. (1982). Keys to the taxa of the genera *Cordyceps* and *Torrubiella*. Transactions of the Mycological Society of Japan 23: 239-364.

Koboyasi, Y. and Shimizu, D. (1983). *Iconography of vegetable wasps and plant worms*. Osaka, Hoikusha Publishing. 1-280.

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