

中国虫草属亚属的划分及新种报道

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虫草亦名冬虫夏草。清朝吴其濬在《植物名实图考》一书中，云：“冬在土中，身为老蚕，有毛能动，至夏则毛出土上，连身僵化为草”；故名。关于虫草的认识，我国至少早在西周至秦（即公元前1000年至200年左右），从出土的文物中，就发现有以虫草为图案的玉雕装饰品^[4, 6]。到1823年 E. M. Fries 在球壳菌类 (Sphaeria) 中建立虫草族 Trib. *Cordyceps* Fr.^[5]，至1833年，H. F. Link 正式建立虫草属 *Cordyceps*(Fr.) Link^[8]，此名称沿用至今。本属和麦角属 *Claviceps* Tul.，虫壳属 *Torrubiella* Boud.，其形态构造较相似，均归于肉座菌目 Hypocreales^[7]；其后 F. J. Seaver^[15] 建虫草菌族 (Tribe Cordycepitateae) 隶于麦角菌亚科 (Subfamily Clavicipiteae) 下。但其后所归何目，由于所持标准不同，迄今未趋统一；除有人将其置于球壳目 (Sphaeriales) 外^[11, 12]，尚见置于肉座菌目^[2]、或麦角菌目 (Clavicipitales)^[13]；由于其具线形子囊孢子、长棒形的子囊、寄生于昆虫体或其他真菌等物体上的特征，列于麦角菌目之下，似较合理。

虫草属 *Cordyceps* (Fr.) Link, Handbuch 3, 347. 1833; — *Sphaeria* trib. *Cordyceps* Fr., Syst. Myc. 2, 325. 1823; — *Cordylia* Fr. ex Ficus et Schubert, Fl. Dresden 2 ed 2, 331. 1823; non *Cordylia* Pers. 1807; — *Torrubia* Lév. ex Tul. Ann. Sci. Nat. 3(2), 43. 1853; non *Torrubia* Vell. 1825; — *Akanthomyces* Lebert, Zeit. wiss. Zool. 9, 447. 1858; — *Racemella* Ces. Com. Soc. Crit. Ital. 1(2), 65. 1861; — *Ophiocordyceps* Petch, Brit. Myc. Soc. Trans. 16, 73. 1931.

属模式：蛹虫草 *Cordyceps militaris* (Fr.) Link

本属现知约300余种^[3]，我国约30种。隶于下列四亚属中^[9, 10, 11]。

亚 属 检 索 表

1. 子囊壳突出于子座表面，不呈埋陷状。（我国多见于1500米以下的温热山地，或干热河谷。）…………… I. 凸壳虫草亚属 Subg. *Racemella*
1. 子囊壳部分或全部埋生于子座组织内，（分布不仅限于上列地区和生境。）…………… 2
2. 子囊的顶套部壁薄，不具明显帽突，寄生于蜚蠊属 (*Blatta*) 和隐喙虫属 (*Cryptorhynchus*) 昆虫体上。（多见于热带地区。）…………… II. 蛇形虫草亚属 Subg. *Ophiocordyceps*

- 2. 子囊的顶套部壁厚, 具明显帽突, 寄生于多种昆虫体上。(分布区广泛, 寄主种类多, 生境较复杂。) 3
- 3. 子囊壳外缘假组织的菌丝不规则交织, 不呈栅栏状垂轴排列, 无皮层。..... II. 虫草亚属 Subg. *Cordyceps*
- 3. 子囊壳外缘假组织的菌丝排列规则, 呈栅栏状垂轴着生, 具皮层。..... III. 隐壳虫草亚属 Subg. *Cryptocordyceps*

I. 凸壳虫草亚属 Subgenus *Racemella* (Ces.) Sacc., Syll. Fung. 2: 572. 1883; —Gen. *Racemella* Ces. Com. Soc. Crit. Ital. 2: 65. 1861.

子囊壳长卵形或圆锥形, 凸突于子座表面, 聚成天南星果序状。亚属模式: 显壳虫草 *Cordyceps memorabilis* Ces.

凉山虫草 新种 图版 I

Cordyceps liangshanensis Zang, Liu et Hu, sp. nov.

子座多分枝或单生, 细而坚硬, 常曲折, 高20—30厘米, 粗1.5—2.3毫米。头部圆柱状或棒状, 褐色、黑褐色, 顶端具不孕性角尖; 具假薄壁组织的皮层; 子囊壳椭圆形或卵圆形, 400—740×300—450微米, 黑褐色, 表面生, 凸出, 呈天南星果序状。子囊圆柱状, 260—480×8—12微米。子囊孢子透明或微黄, 线状, 多隔, 160—350×2.5—3.5微米。呈单节断裂, 每节10—20×2.5—3.5微米。

寄生于鳞翅目 Lepidoptera 之幼虫体上。

四川: 雷波县, 箬竹 *Qionzhuea tumidinoda* Hsueg et Yi 林下, 海拔1500米。25, XII. 1980. 李继源80001, KUN: 7723. (模式); 凉山, 罗汉竹 *Phyllostachys pubescens* var. *heterocycla* (Carr.) Mazel ex H. de Lehaie 丛下。10, XI, 1980, 刘道庆, 2号, KUN: 7588, 并存于凉山药品检验所标本室。

Cordyceps liangshanensis Zang, Liu et Hu, sp. nov. (Plate. I)

Stromatibus ramosis vel singularibus, gracilioribus, solidis, saepe anfractibus, 20—30 cm longis, 1.5—2.5 mm crassis. Capitulis cylindricis vel clavatis, brunneis, atrobrunneis; apice acerosis sterilibus; cortice pseudoparenchymato; peritheciis ellipsoideis vel ovoideis, 400—740×300—450 μm, strobrunneis, superficialibus, excelsis, spadiciformibus. Ascis cylindricis, 260—480×8—12 μm. Ascosporis hyalinis vel luteolis, filiformibus, multiseptatis, 160—350×2.5—3.5 μm in unicellularia fragmenta secedentibus, 10—20×2.5—3.5 μm.

In larvis Lepidopterae. In sylvis praecipue *Qionzhueae tumidionodae*. 1500 m alt. Sichuan (Szechwan Province), Leibo. 25. XII. 1980. Li Ji-yuan No. 80001. KUN 7723 (Typus); Sichuan, Liangshan, in sylvis *Phyllostachydis pubescentibus* var. *heterocyclae*. 10. XI. 1980. Liu Dao-qing No. 2. KUN: 7588.

本种近似多枝虫草 *Cordyceps arbuscula* Teng, 后者的模式存于美国国立真菌标本馆(邓叔群3480号, 18, VI. 1934, 该馆标本6027号), 作者之一所见模式其子座较小, 高仅5厘米, 子囊壳内陷。本种也近似分枝虫草 *Cordyceps ramosa* Teng, 邓叔群发表于1936年[1], 据现存于美国国立真菌标本馆的该模式, 邓叔群701号原标本采

于安徽, 寄生于大团囊菌属 *Elaphomyces* 上。子座虽也具分枝, 但橙褐色, 高仅3.5—4.5厘米。值得一提的是 *T. petch* 1937年又发表了另外一种虫草, 也取名为 *Cordyceps ramosa* Petch [14], 但其子座灰褐色, 纤细, 高7厘米, 粗1毫米, 多出分枝, 生于鞘翅目幼虫上, 见于拉丁美洲之特立尼达 (Trinidad)。后者现已被 E. B. Mains 归并为 *Cordyceps petchii* Mains [10]。

II. 虫草亚属 Subg. *Cordyceps* Mains. *Mycologia* 50(2): 176. 1958.

子囊壳全部或部分埋陷于假组织内, 假组织菌丝均呈疏松交织, 无分化的皮层。子囊顶部具半球形或短圆柱形帽突。

亚属模式: 蛹虫草 *Cordyceps militaris* (L.) Link.

III. 隐壳虫草亚属 Subg. *Cryptocordyceps* Mains. *Mycologia* 50(2): 176. 1958.

子囊壳基部 1/2 处埋陷于假组织内。子囊壳外缘菌丝呈栅栏状垂轴排列。子囊顶部具半球形帽突。

亚属模式: 栅壳虫草 *Cordyceps ravenelii* Berk. et Curt.

IV. 蛇形虫草亚属 Subg. *Ophiocordyceps* (Petch) Kobayasi, *Sci Rep. Tokyo Bun. Daig.* 5: 68. 1941; — Genus *Ophiocordyceps* Petch, *Brit. Myc. Soc. Trans.* 16: 73. 1931.

子囊壳近圆形, 几全部埋陷于假组织内, 壳缘仅有短喙突起。子囊顶部不具帽突 (ecapitata)。子囊孢子呈长纺锤形, 不呈线形。分布于热带地区。

亚属模式: 蜚蠊虫草 *Cordyceps blattae* Petch.

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NOTES CONCERNING THE SUBDIVISIONS OF *CORDYCEPS* AND A NEW SPECIES FROM CHINA

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Summary

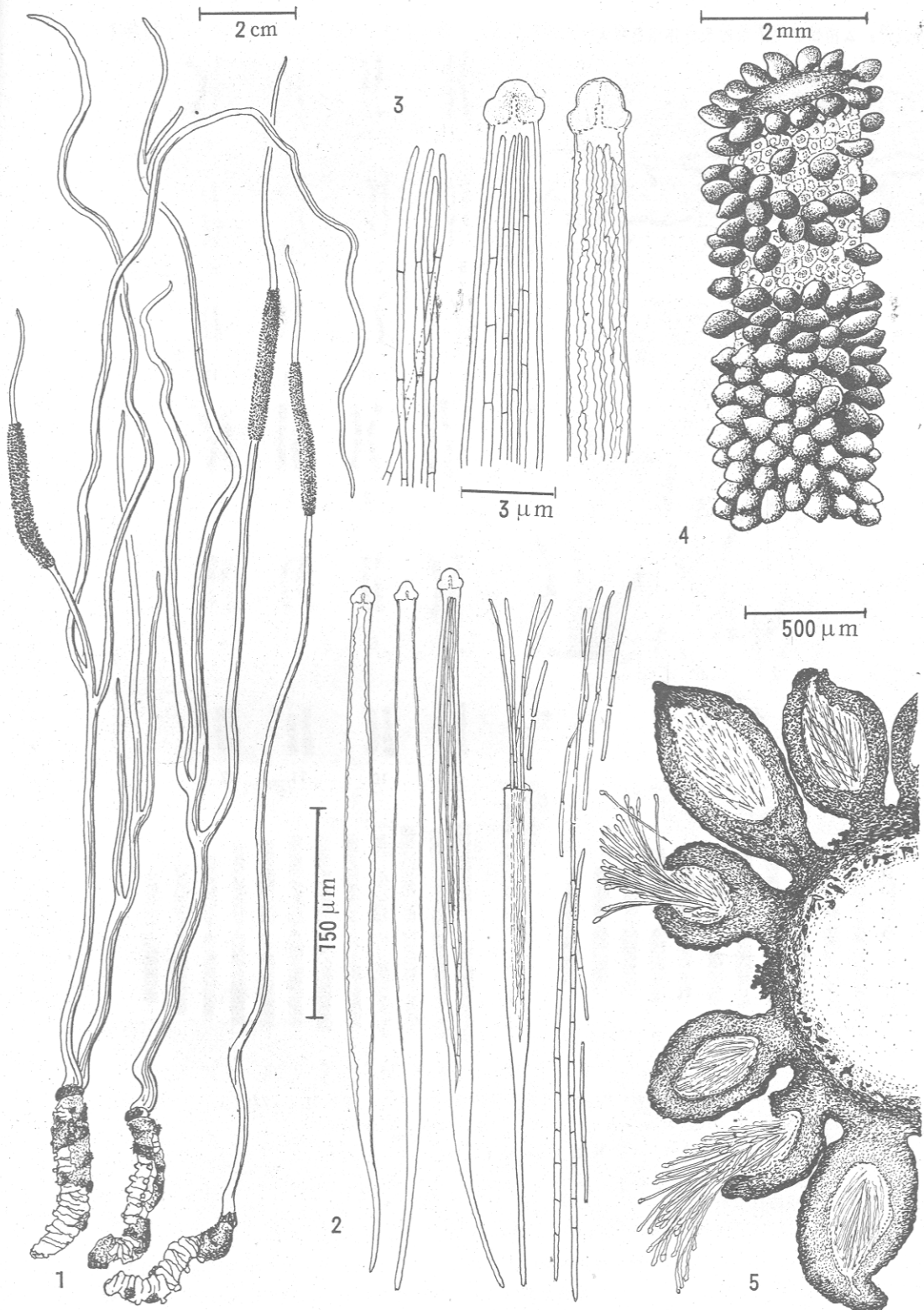
The genus *Cordyceps* has been variously divided into different subgenera, according to E. B. Mains (1958), the following subdivisions of the genus that the authors are supplemented and provided in this paper. They are Subgenus *Racemella*, Subg. *Cordyceps*, Subg. *Cryptocordyceps* and Subg. *Ophiocordyceps*.

Cordyceps liangshanensis Zang, Liu et Hu, sp. nov. is described as new Subgenus *Racemella* from Sichuan, China. It is assigned to the distribution area of this species is known only from Taliang Mountain and Chinsha River valley. The hosts of this species are usually attached to the substratum by mycelium which spreads out, forming thin yellowish or brownish crusts.

It appears to be similar to *Cordyceps arbuscula* Teng as described by Teng from Hainan Island, China, on larvae of beetles (*Scarabaeidae*). The type (Teng 3480) is deposited in the National Fungus Collections, Beltsville, Maryland, U. S. A. The latter, however, has smaller stromata (5 cm long) with embedded perithecia.

This species also is close to *Cordyceps ramosa* Teng (*Sinensia* 7: 810. 1936, non *C. ramosa* Petch in *British Myc. Soc. Trans.* 21: 42. 1937), but the *C. ramosa* Teng was described by Teng from Anhui, China on a hypogenous fungus, *Elaphomyces* sp. and the branched cinnamon-brownish stromata only 3.5—4.5 cm long and 1.5—3 mm thick. Although both *C. arbuscula* Teng and *C. ramosa* Teng have been reported as the branched stromata, yet it does not seem feasible to recognize them as distinct species. Moreover, *Cordyceps ramosa* Petch has been treated as a synonym of *C. petchii* by Mains. (*Bull. of the Torrey Botanical Club* 86(1): 47. 1959). It differs from the stromata are brownish gray, slender, 1 mm thick, up to 7 cm long and with up to 6 lateral branches, on Coleopterous larvae, collected from Trinidad.

The type specimens of *Cordyceps liangshanensis* is deposited in the Herbarium of the Kunming Institute of Botany, Academia Sinica (KUN). The isotype is deposited in Herbarium of Institute of Drug Control, Liangshan Autonomous Prefecture of Yi Nationality, Sichuan,



凉山虫草 *Cordyceps liangshanensis* Zang, Liu et Hu, sp. nov.

1. 虫体、全草外形；2—3. 子囊和子囊孢子；4. 孕性头部示子囊壳的排列情形；5. 子囊壳横切面。