
中国科学家发现四种全新的昆虫物种

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8月28日，来自中国的科研团队宣布，发现了四种全新的昆虫物种。该研究结果发表在国际著名分类学期刊Zookeys上。

这项研究由石探记科学团队成员，来自北京林业大学的史宏亮博士，本科生朱平舟和中国科学院动物研究所梁红斌副研究员共同完成。该研究描述了中国劫步甲属Lesticus的四个新种，提出了一个新的同物异名，提供了中国该属所有种类的名录和检索表。此次新发现的4种步甲新种体型较大，具有显著的金属光泽，对解释东洋区低海拔山区昆虫多样性具有重要的研究意义。

Four new species of *Lesticus* (Carabidae, Pterostichinae) from China and supplementary comments on the genus

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Abstract

The genus *Lesticus* in China was studied, with descriptions of four new species: *L. auripennis* sp. n. (Guangdong: Nanling, 24.93°N, 112.09°E); *L. bii* sp. n. (Xizang: Médog, 29.32°N, 95.34°E); *L. xiaodongi* sp. n. (Yunnan: Yingjiang, 24.71°N, 97.58°E); and *L. violaceus* sp. n. (Yunnan: Yingjiang, 24.71°N, 97.58°E). One new synonym is proposed: *L. dubius* Dubaut, Lassalle & Roux, is a junior synonym of *L. solidus* Roux & Shi. An improved key and a catalogue accommodating all known Chinese *Lesticus* species are provided. Species relationships and the evolution of endophallic and other characters are preliminarily discussed.

Keywords

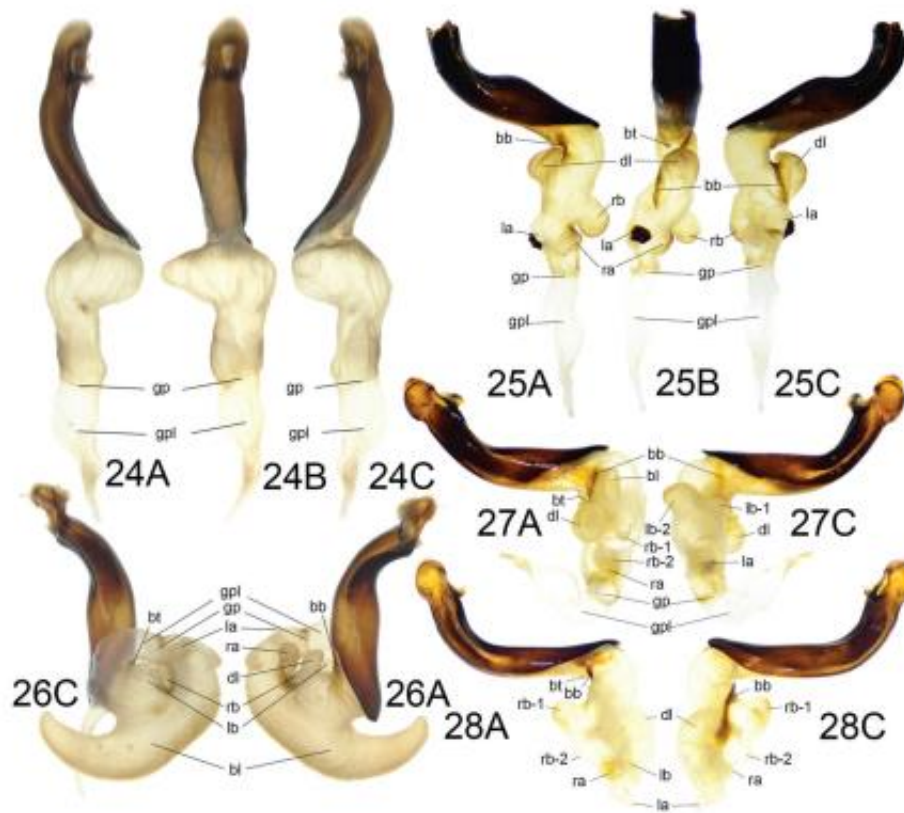
Trigonostomina, beetle, key, new species, endophallus, character evolution

Introduction

Lesticus Dejean belongs to the subtribe Trigonostomina (Carabidae: Pterostichinae) which includes six genera having an Oriental-Australasian distribution. This subtribe can be easily recognized by the very short and wide mentum tooth. *Lesticus* can be distinguished from other genera in the subtribe by the following character combination: first

较大，15-30mm，有些种类通体黑色，另一些则具有显著的金属光泽。该属主要分布于东洋区的低海拔山区，目前我国已记录18种，在南方具有较高的多样性，尤以云南、广西、广东、福建等为最，在北方则种类较为单一。

以下为本研究描述的四个新种：



Figures 24–28. Endophallus of species representatives. **A** left lateral view **B** dorsal view **C** right lateral view **24** *Trigonotoma lewisi* Bates from Yunnan (type I) **25** *Lesticus perniger* Roux & Shi from Yunnan (type I) **26** *Lesticus magnus* (Motschulsky) from Liaoning (type III) **27** *Lesticus auricollis* Tschitschérine from Fujian (type I) **28** *Lesticus insignis* Gestro from Sabah (type IV).

The remaining two species, *L. perniger* (Fig. 25) and *L. bii* (Fig. 8), are special within type I due to: **bt** less pointed than other species; **lb** completely absent; **rb** located well before midpoint of endophallus. But some other specialized differences might contradict their affinities: **bt** flat but very large and coarsely spined in *L. bii*; **bb** absent in *L. bii*, very long, reaching midpoint of endophallus in *L. perniger*; **la** with a heavily chitinized piece in *L. perniger*; **rb** divided into two separate lobes in *L. bii*.

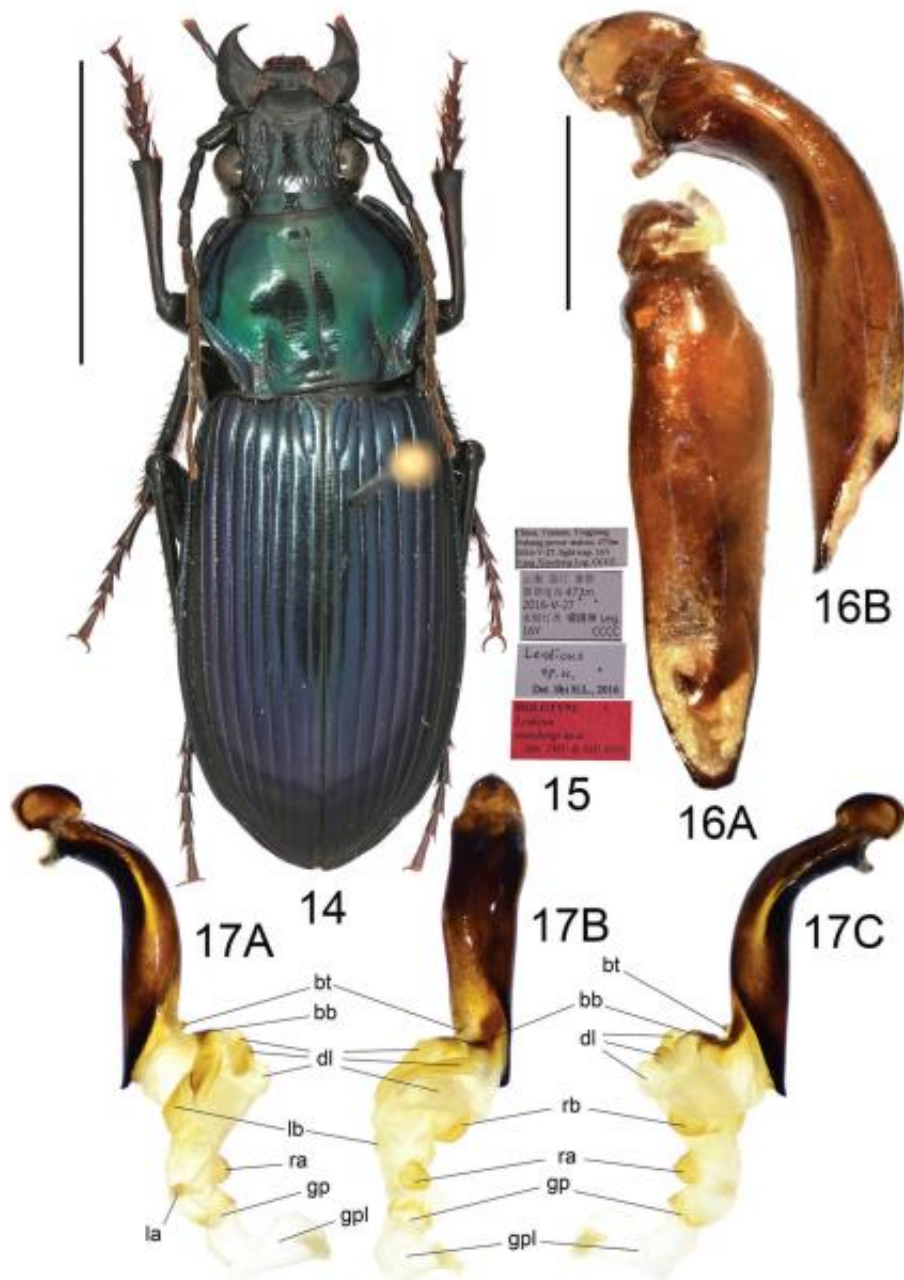
Based on the endophallus illustrations provided by Roux et al. (2016), 11 species of the Chinese fauna also have an endophallus of type I. Four of them have the auricollis-form endophallus: *L. andamanensis* (Chaudoir), *L. mouhoti* (Chaudoir), *L. nubilus* Tschitschérine and *L. waterhousei* (Chaudoir); and another four have the chalthorax-form: *L. buqueti* (Castelnau), *L. indus* (Tschitschérine), *L. kangeanensis* Dubault et al. and *L. stefanschoedli* Kirschenhofer. The remaining three species cannot be categorized as either form: *L. tricostatus* Chaudoir, *L. cupricollis* Pouillaude and

*lestickus auripennis*金鞘劫步甲

鉴别特征：头部及前胸背板黑色，鞘翅金属紫色或金属绿色。前胸侧缘在后角之前微弯，基凹光洁，几乎无刻点。后胸前侧片长宽近等。

分布：广东南岭。

词源：aur-是金色的，pennis是翅膀，指代该种金属色的鞘翅。



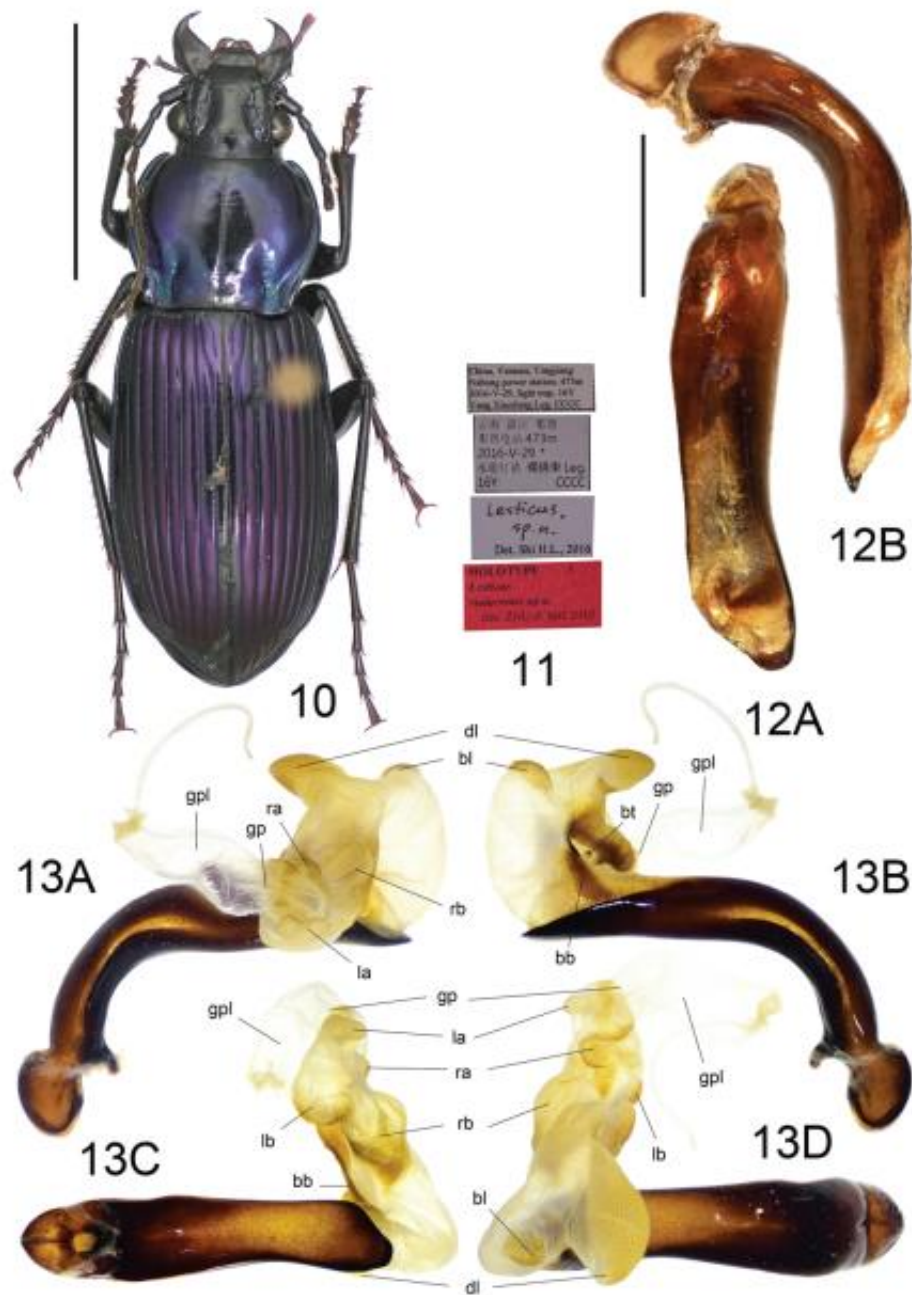
Figures 14–17. *Lesticus xiaodongi* sp. n. **14** habitus of holotype (male, Yunnan, IZAS), scale bar: 10.0 mm **15** labels of holotype **16** median lobe of aedeagus (holotype) **A** dorsal view **B** left-lateral view, scale bar: 2.0 mm **17** endophallus (holotype) **A** left lateral view **B** dorsal view **C** right lateral view.

lestichus bii 毕氏劫步甲

鉴别特征：体黑色。前胸侧缘具缺齿，基凹深，后胸前侧片长宽近等。鞘翅行距隆起，奇数行宽于偶数行，第三行距无毛穴。阳茎端片强烈截形，不呈钩状。

分布：西藏墨脱。

词源：以正模标本采集者毕文烜命名。



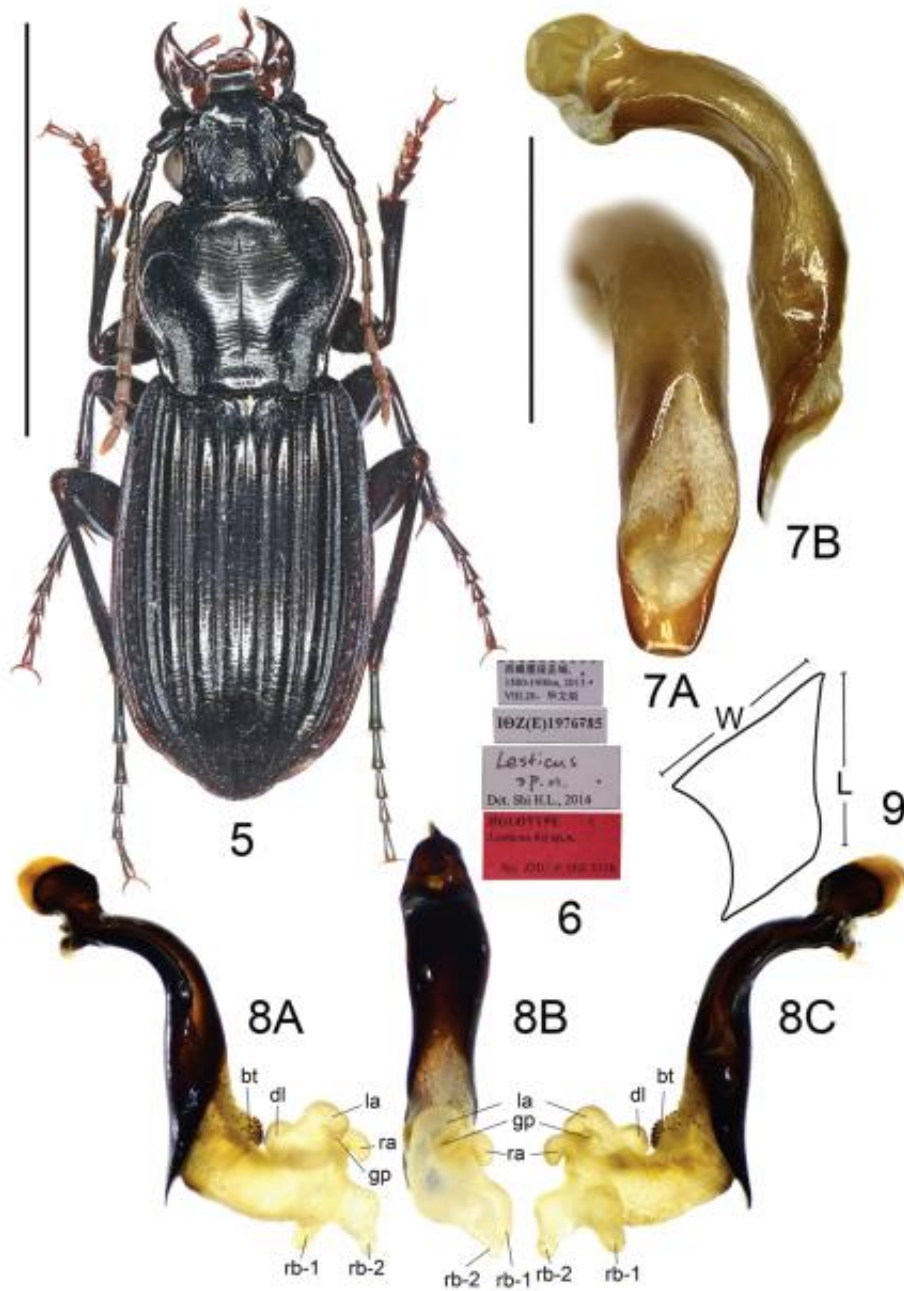
Figures 10–13. *Lesticus violaceus* sp. n. **10** habitus of holotype (male, Yunnan, IZAS), scale bar: 10.0 mm **11** labels of holotype **12** median lobe of aedeagus (holotype) **A** dorsal view **B** left-lateral view, scale bar: 2.0 mm **13** endophallus (holotype) **A** left lateral view **B** right lateral view **C** ventral view **D** dorsal view.

*lestichus violaceus*紫光劫步甲

鉴别特征：头部及前胸背板蓝紫色，鞘翅紫色。前胸侧缘在后角之前微弯，基凹光洁，几乎无刻点。后胸前侧片长显著大于宽。

分布：云南盈江。

词源：violaceous表示该种强烈的紫色光泽。



Figures 5–9. *Lesticus bii* sp. n. **5** habitus of holotype (male, Xizang, IZAS), scale bar: 10.0 mm **6** labels of holotype **7** median lobe of aedeagus (holotype) **A** dorsal view **B** left-lateral view, scale bar: 2.0 mm **8** endophallus (paratype) **A** left lateral view **B** dorsal view **C** right lateral view **9** metaepisternum.

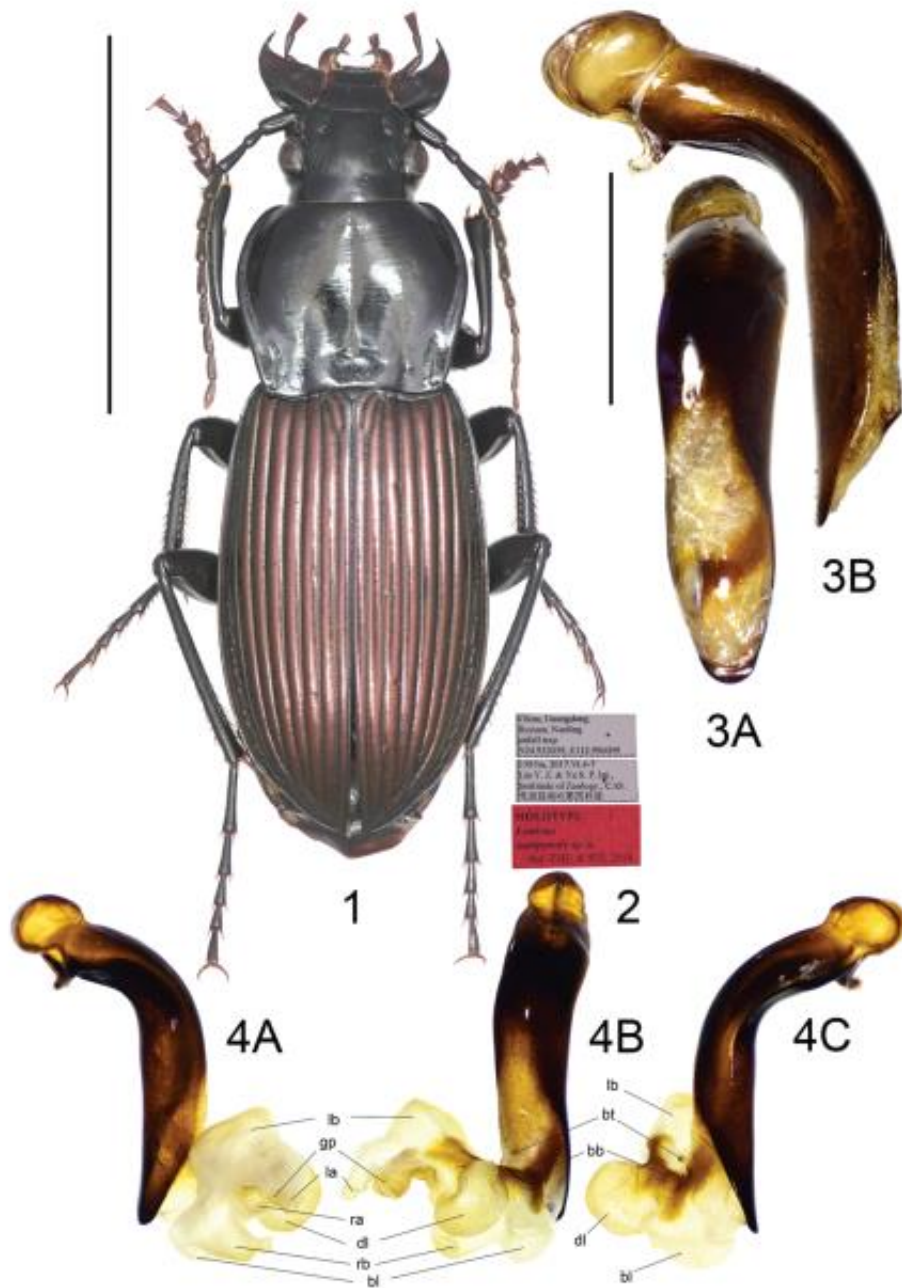
lestichus xiaodongi 晓东劫步甲

鉴别特征：头部及前胸背板蓝绿色，鞘翅暗金属蓝色。前胸侧缘在后角之前强烈弯曲，基凹较深，略具刻点和皱纹，后角略向外突出，后胸前侧片长大于宽。

分布：云南盈江。

词源：以正模标本采集者杨晓东命名。

这篇文章的一大亮点在于对步甲雄性外生殖器内囊的研究。阳茎是步甲的雄性外生殖器，其形态一般是判定种类的重要依据。但在劫步甲属中，阳茎形态差异较小，有时甚至难以区分，因此，本文深入研究了阳茎内囊的形态。在阳茎端部具有端孔，端孔处连接一个柔软膜质的内囊，平时缩入骨化的阳茎中，交配时在雌性受精囊内膨胀，内囊端部具一射精孔，精包由此排出，进入雌性生殖道中。在研究中发现内囊整体的形态走向、各个囊的大小位置形态等特征在种内稳定而种间变化极大，具有重要的分类学价值，既能作为种类鉴定的依据，也能据此推断种间关系，构建系统发育树。



Figures 1–4. *Lesticus auripennis* sp. n. **1** habitus of holotype (male, Guangdong, IZAS), scale bar: 10.0 mm **2** labels of holotype **3** median lobe of aedeagus (holotype) **A** dorsal view **B** left-lateral view, scale bar: 2.0 mm **4** endophallus (holotype) **A** left lateral view **B** dorsal view **C** right lateral view.

根据已有标本，本文研究了中国劫步甲属已知18种中14种的内囊。再加上法国学者Roux等人2016年出版的《Les Trigonotomi. Révision》中提供的19种外国劫步甲内囊图片，本文主要依据内囊的

走向和偏转角度，将其划分为4种基本类型。I型(图8、12、22、25、27)是最常见的类型，特点为内囊整体走向向前延伸，有时向背面弯曲，其他类型都可以解释为由I型变化而来。II型(图4、13)的特点是内囊整体向左弯曲;III型(图26)的特点是内囊基部出现一个额外的巨大的囊(basal lobe);IV型(图28)的特点是内囊整体强烈螺旋扭曲。

该课题研究获得了国家自然科学基金等项目的资助。(来源：科学网)

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