

# A proscoliine wasp (Insecta: Hymenoptera: Scoliidae) from Shandong peninsula, East Asia

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## Abstract

A new species of wasp from the Laiyang Formation in Shandong, China is described and named *Cretaproscolia asiatica* sp. nov. It is the second record of the genus *Cretaproscolia* Rasnitsyn and Martínez-Delclòs, 1999, and extends the distribution of the genus from the Lower Cretaceous of South America into the upper Mesozoic of East Asia. The diagnosis of *Cretaproscolia* is emended based on the new material. © 2006 Elsevier Ltd. All rights reserved.

**Keywords:** Palaeoentomology; Hymenoptera; Scoliidae; *Cretaproscolia*; New species; Laiyang Formation; Upper Mesozoic; China

## 1. Introduction

Scoliidae is a small family that comprises some 300 extant species (Brothers, 1975, 1999; Rasnitsyn, 1977, 1993; Brothers and Carpenter, 1993), and 16 extinct species (Heer, 1865; Day et al., 1981; Osten, 1987; Zhang, 1989; Rasnitsyn, 1993; Rasnitsyn and Martínez-Delclòs, 1999, 2000; Zhang et al., 2002; Zhang, 2004). The subfamily Proscoliinae includes only two living species attributed to a single genus (Rasnitsyn, 1977; Day et al., 1981) and one fossil species placed in an extinct genus (Rasnitsyn and Martínez-Delclòs, 1999).

Recently, I have collected many hymenopteran specimens from the Laiyang Formation near the villages of Nanligezhuang and Tuanwan in the vicinity of Laiyang City, Shandong Province, China. Among them, a single specimen can be assigned to *Cretaproscolia* Rasnitsyn and Martínez-Delclòs, 1999. The new species described herein is the first record of the genus in Asia, and extends its geographic and chronostratigraphic distribution from the Aptian–Albian in South America to the late Mesozoic of East Asia. Unfortunately the age of the

Laiyang Formation is disputed. Various palaeontologists have claimed that it is Late Jurassic (Ren and Hong, 1998), latest Jurassic–earliest Cretaceous (Zhang, 2003), Early Cretaceous (Lin, 1995), Hauterivian–Barremian (Hong, 1998) and Barremian (Grimaldi and Engel, 2005). Zhang and Rasnitsyn (2006) have stated that they see no reason to consider the Laiyang, Yixian and Zaza formations in Shandong, Liaoning and Transbaikal respectively as appreciably differing in age and currently consider the matter unresolved.

The diagnosis of *Cretaproscolia* is refined on the basis of this new material. The nomenclature of wing venation used follows that of Rasnitsyn (1980) and adopted subsequently by Rasnitsyn and Martínez-Delclòs (1999, 2000), Zhang et al. (2002) and Zhang (2004).

## 2. Systematic paleontology

Order: Hymenoptera Linnaeus, 1758  
Suborder: Apocrita Gerstacker, 1867  
Superfamily: Vespoidea, Latreille, 1802  
Family: Scoliidae Latreille, 1802  
Subfamily: Proscoliinae Rasnitsyn, 1977  
Genus *Cretaproscolia* Rasnitsyn and Martínez-Delclòs, 1999

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*Type species. Cretaproscolia josai* Rasnitsyn and Martínez-Delclòs, 1999.

*Species included. Cretaproscolia josai* Rasnitsyn and Martínez-Delclòs, 1999, Aptian–Albian Crato Formation, Brazil, and the new species described herein.

*Emended diagnosis.* Clypeus narrow, with outer margin concave medially. Adantennal tubercles absent. Mesonotum with wide, brown bands in place of notauli, medial and adlateral lines. Propodeum with key-like area medially. Legs with femora and tibiae relatively short and stout, tarsi quite slender and long. Forewing with cell 3r (marginal cell) and cell 2 + 3rm (second submarginal) elongate, each distinctly longer than pterostigma; a 1r-rs rudiment and angulation at its position absent; cell 3r acuminate at outer margin of forewing; 2 m-cu present; cu-a just distad basal vein, obliquely angled toward posterior wing margin. Hindwing with first abscissa Rs nearly three times as long as r-m; cu-a meeting M at fork of M + Cu (when Cu absent) or postfurcal (when Cu present).

*Remarks.* Owing to the excellent preservation of the new female, the generic diagnosis, especially the structure of the body, can be further described. This Mesozoic genus is easily separated from the extant genus *Proscolia* by the above combination of characters.

*Cretaproscolia asiatica* sp. nov.

Figs. 1–2

*Derivation of name.* After Asia, the region in which the fossil was discovered.

*Material.* Holotype NIGP L91311, a single complete impression of a female, from the Laiyang Formation in the

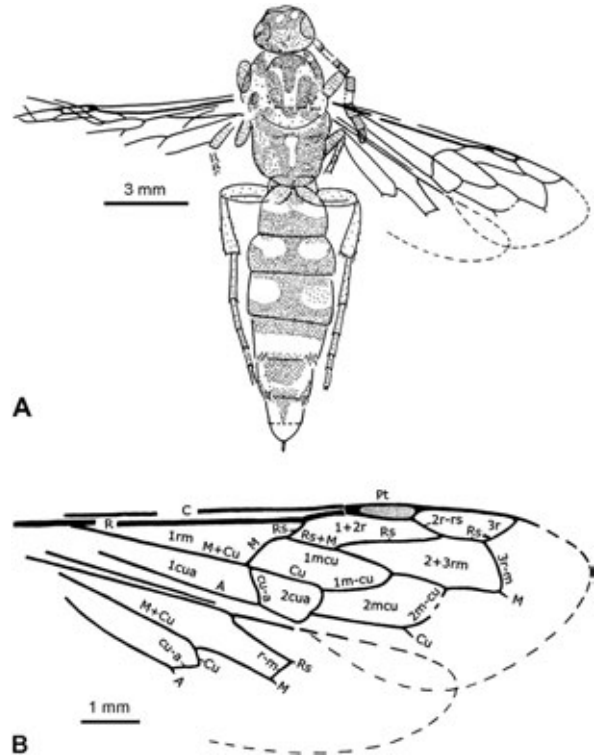


Fig. 2. *Cretaproscolia asiatica* sp. nov. A, female, dorsoventral aspect. B, fore- and hindwings; camera lucida drawing of specimen L91311.

vicinity of Nanligezhuang, Tuanwan Town, Laiyang City, Shandong Province, China; deposited in the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences.

*Diagnosis.* Unlike the type species, body relatively slender and long, fore- and hindwings with corrugation of wing outer membrane not visible; in forewing basal section of Rs bent apically, cell 3r relatively elongate, cell 2 + 3r longer than

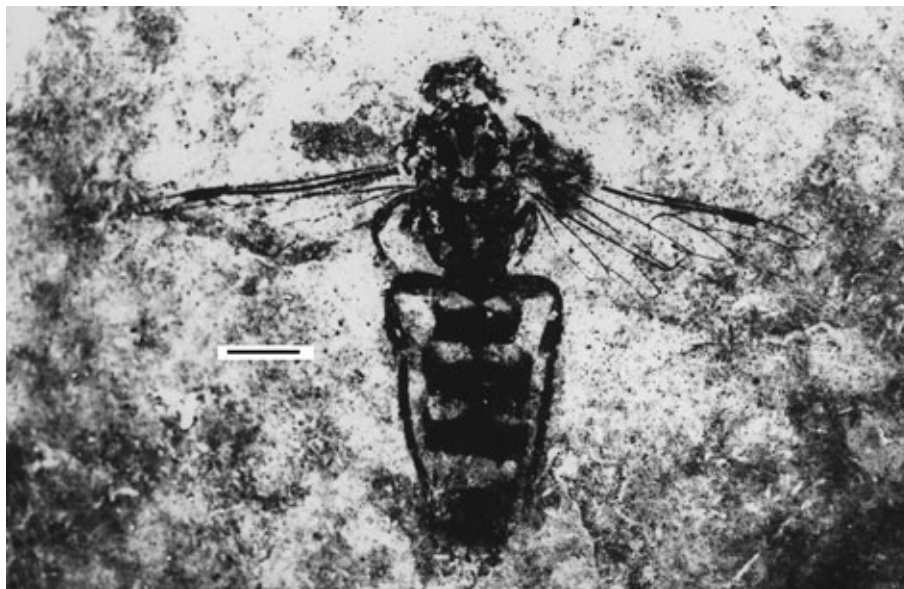


Fig. 1. *Cretaproscolia asiatica* sp. nov., female, holotype, L91311. Scale bar represents 2 mm.

cell 1 + 2r (first marginal cell), 2 m-cu bent apically and shorter than 1m-cu; in hindwing basal section of Rs three times as long as r-m, Cu present as a free vein and short, cu-a oblique.

**Description.** Female (male unknown): Body dorsoventral aspect, brown, metasoma with transverse, pale bands. Head relatively small, transversely oval; clypeus quite short, slightly concave medially; eyes large, suboval, not reaching hind margin of head; antenna with about seven basal flagellomeres preserved, tubular, each longer than wide, last? one conical. Mesosoma elongate-oval; pronotum short medially; mesonotum with medial line percurrent and widened apically, adlateral lines almost percurrent; scutellum large; metanotum distinctly short; propodeum large, with pale, key-like area medially. Femora of fore- and midlegs short, slightly clavate; hindleg with femora clavate, tibia thinner basally than apically, barely longer and narrower than femora, with long setae; tarsi slender, tubular, with short and sparse setae, longer than femora and tibiae combined, basitarsus less than 1.5 times as long as second tarsomere, and nearly twice as long as third, fourth shortest, a little shorter than fifth. Forewing with pterostigma long and narrow, widened apically, normally sclerotised; basal section of Rs slightly bent apically, about half as long as that of first abscissa M which is bent basally; cell 3r more than three times as long as wide, distant from wing apex by less than its own length; cell 2 + 3rm obviously longer than cell 1 + 2r, with Rs abruptly bent anterior to wing margin (viz. cell 3r acuminate apically), which is about three times as long as wide, 1.3 times as long as pterostigma, less than two-thirds as long as cell 2 + 3rm, which is slightly longer than cell 1 + 2r; 2r-rs distant from 3r-m by slightly more than its own length; both 1 m-cu and 2 m-cu within middle one-third of cell 2 + 3rm, 2 m-cu bent apically, and not vertical to Cu, distant from outer wing margin by more than its own length and somewhat shorter than 1m-cu; cu-a obliquely meeting Cu slightly beyond fork of M + Cu. Hindwing with Rs abruptly bent near its base, basal section of Rs about three times as long as r-m; Cu present as a free vein, cu-a oblique, almost vertical to, and a little longer than Cu. Metasoma relatively narrow and long, clearly longer than head and mesosoma combined, first metasomal segment nearly semicircular, as long as third, distinctly longer than second, which is slightly shorter than fourth, fifth somewhat shorter than fourth, sixth clearly shorter than fifth, and slightly longer than seventh; fourth and fifth with stout setae at least near hind margins. Sting slender, conical; sheaths not visible.

Length of head 1.6 mm, mesosoma 4.7 mm, metasoma 8.8 mm; hindleg 9.0 mm; forewing ca. 9.8 mm; width of forewing ca. 3.2 mm; length of hindwing ca. 7.6 mm.

### 3. Discussion

Certain features of this new species should be explained further. The notauli, medial and adlateral lines would be very weak if present. I failed to identify them on the

specimen. Instead, three strongly developed brown bands occupy their position (see Fig. 1) and I interpret these as their remnants.

Only four species referred to two genera belong to Proscoliinae. Among these, both relict, extant species, *Proscolia archaica* Rasnitsyn, 1977 and *P. spectator* Day, 1981, are from the eastern Mediterranean. The Early Cretaceous species *Cretaproscolia josai* is known from Brazil whereas *C. asiatica* extends the distribution of the subfamily, like the primitive Archaeoscoliinae (Zhang et al., 2002), into the upper Mesozoic of East Asia. This suggests that *Cretaproscolia* was widespread during the late Mesozoic. On the other hand, it is interesting that *C. asiatica* has some distinct autapomorphies: a larger body (15.1 mm long vs. 5.5–11.5 mm in the other three species), a more elongate cell 3r (three times as long as wide), and no visible corrugation of the outer membrane of the wing (probably weakly developed or poorly preserved). Unfortunately, a cladistic analysis of this subfamily is currently difficult to undertake because only a few representatives of the extant and extinct proscoliine wasps have been described; hence pleisomorphies in the evolutionary lineage of the Proscoliinae cannot be determined at present.

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