

On the discovery of male *Paragonylopus sinensis* Chen & He, 1997 and the first report of *Paragonylopus plaumanni* Zompro, 2000 from China (Phasmida: Diapheromeridae: Pachymorphinae: Gratidiini)

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ABSTRACT

Males of *Paragonylopus sinensis* Chen & He, 1997 were discovered at the type-locality, Damingshan, Guangxi, China and are here described for the first time. *Paragonylopus plaumanni* Zompro, 2000 is reported for the first time from China. I give the first description of egg structure of *Paragonylopus*. A key to the species with known distribution of the genus is also provided.

Key Words: Phasmida, *Paragonylopus*, China, Thailand

中華仿圓足螞蟓 *Paragonylopus sinensis* Chen & He, 1997 雄蟲的發現及中國首次報導的缺齒仿圓足螞蟓 *Paragonylopus plaumanni* Zompro, 2000 (螞蟓目: 笛螞蟓科: 短角枝螞蟓亞科: 閣螞蟓族)

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摘要: 本文記述於中國廣西大明山發現的雄性中華仿圓足螞蟓 *Paragonylopus sinensis* Chen & He, 1997 並對其特徵作出首次的描述; 報導中國新紀錄的缺齒仿圓足螞蟓 *Paragonylopus plaumanni* Zompro, 2000; 對蟲卵的結構作出首次的描述; 提供仿圓足螞蟓屬的分類檢索表。

關鍵字: 螞蟓目, 仿圓足屬, 中國, 泰國

INTRODUCTION

The genus *Paragonylopus* Chen & He, 1997 was established based on one female described as type-species *Paragonylopus sinensis* Chen & He, 1997 collected from Damingshan in Guangxi, China (Chen and He, 1997). *Paragonylopus* was considered a Chinese endemic genus until Zompro (1999) reported it in Thailand with description of a new species and first description and illustrations of males.

During a collecting trip at Damingshan in 2012, I discovered a mating couple and several individuals of *Paragonylopus sinensis* Chen & He, 1997. The male was undescribed until this paper. By rearing two adult females, I obtained eggs which allowed me to describe for the first time the egg structure for the genus. In addition, during a visit to the insect collection at the Shanghai Normal University (SNU) in 2012, I examined a female *Paragonylopus* specimen which was collected from southern Yunnan, China. The specimen is identical to Thailand's *Paragonylopus plaumanni* Zompro, 2000 which is reported for the first time from China.

MATERIALS AND METHODS

Illustrated drawings and description for male *Paragonylopus sinensis* Chen & He, 1997 are based on material collected from the type-locality Damingshan in Guangxi, China. The specimens were dried after collecting. Ootaxonomic description is based on the eggs obtained from two adult females which laid their eggs on the surface of a rearing cage. Ootaxonomic terminology refers to Clark (1976a, 1976b, 1979, 1988, 1998), Clark-Sellick (1997) and Zompro (2004). The material mentioned in this paper is deposited in the following localities: Institute of Zoology, Chinese Academy of Sciences, Beijing (IZCAS), Shanghai Normal University, Shanghai (SNU) and private collections of George Ho Wai-Chun (GH) and Oliver Zompro (OZ). Measurement of the male and eggs are given in millimetres.

RESULTS

Genus *Paragonylopus* Chen & He, 1997

Paragonylopus Chen and He, 1997: 297. Otte and Brock, 2005: 247. Hennemann et al., 2008: 19. Chen and He, 2008: 208.

Type-species: *Paragonylopus sinensis* Chen & He, 1997: 297, by original designation.

Notes: Only two species are known from the genus.

Distribution: This genus is restricted to China and Thailand.

Key to *Paragonylopus* Chen & He, 1997:

1. Anterodorsal and posterodorsal carinae of femora distinctly armed with obtuse teeth in both sexes *P. sinensis*
- Anterodorsal and posterodorsal carinae of femora lacking distinct armature in both sexes *P. plaumanni*

sinensis Chen & He, 1997, figs. 1-3.

Paragonylopus sinensis, Chen & He, 1997: 297, figs. 1-3. Chen, 1999: 48. Otte and Brock, 2005: 247. Hennemann et al., 2008: 19. Chen and He, 2008: 208, figs. 173: A-B. Zompro, 2009: 21.

Type: Holotype ♂, Damingshan, Wuming, Guangxi, China, 23.V.1963, Yang Chi-Kun (IZCAS).

Other material examined: 6♂♂, 2♀♀, 4 eggs, Damingshan, Wuming, Guangxi, China, 28-31.VII.2012,

George Ho Wai-Chun, GH00480-487 (GH).

Description of male (Figs. 1–5): Small size. General colour of body and legs brown. Body cylindrical, slender and slim.

Head: Oval, longer than wide. Sparsely covered with minute granules. Vertex flat. A pair of light brown spines between compound eyes, triangular-shaped, pointing towards anterior margin of the vertex. Occiput flat. Median occipital furrow distinct. Posterior margin with four small swellings, median pair distinctly larger than lateral pair. Compound eyes rounded. Antennae short, not reaching middle point of protibiae, with three distinct segments, covered with short dense setae and long sparse setae; scapus oval in dorsal view, more or less triangular shaped in cross section, slightly larger than compound eyes, about five times longer than pedicellus; pedicellus minute and indistinct, knob-like, smaller than compound eyes; third segment generally cylindrical, apices blunt, tapering basally, about three times longer than scapus; inner margin elevated medially, first half of inner margin with five to eight minute spines.

Thorax: Sparsely and inconspicuously covered with minute granules; also with sparse and inconspicuous short setae, longer on mesopleurae and metapleurae. Pronotum rough, almost as long as head; moderately expanded posteriorly, anterior margin curved inwards, posterior margin rounded, lateral margins thickened; transverse and longitudinal sulci crossing behind centre of segment. Mesonotum elongate, three times longer than pronotum, shorter than mesofemora; parallel-sided, mediolongitudinal line distinct, lateral margins with minute pits. Metanotum longer than combined length of head and pronotum, with minute pits along lateral margins.

Abdomen: Cylindrical. Parallel-sided from second to seventh terga. Dorsal surface sparsely and inconspicuously covered with minute granules. Ventral surface only sparsely covered with short setae. Median segment to ninth tergum with minute pits marginally. Sixth tergum to anal segment with distinct mediolongitudinal carina. Sixth to ninth terga with a small granule-like hump increased in size medioposteriorly. Median segment shorter than head, almost as long as pronotum. Second to sixth terga almost equal in length. Seventh tergum shorter than preceding terga. Eighth tergum gently expanded posteriorly. Ninth tergum shorter than eighth tergum. Anal segment as long as ninth tergum, with small V-shaped emargination on posterior margin. Poculum cup-like, reaching anterior region of anal segment. Cerci cylindrical and short, with short setae, apices distinctly curved inwards.

Legs: Slender and long. Densely covered with short setae. Profemora curved basally, as long as protibiae. Anterodorsal and posterodorsal carinae of femora and tibiae distinctly armed with small obtuse teeth. Anteroventral and posteroventral carinae of femora and tibiae unarmed.

Description of egg (Figs. 6–7): Capsule light brown with dark brown markings; cylindrical, tapering posteriorly, with few wrinkles of irregular lengths; ventral surface grey and smooth. Operculum oval, flat, with a small median granule. Micropylar plate light brown, oblong, both ends pointed and elongate. Micropylar cup light brown, small, placed near posterior end of micropylar plate.

Measurements: See Table 1.

Notes: The male is generally similar to the female but the body is more slender and the armature on anteroventral and posteroventral carinae of femora and tibiae are smaller.

Habitats: This species favours low level of evergreen broadleaf forests at the type-locality.

Distribution: China (Guangxi).

plaumanni Zompro, 2000, figs. 1-8.

Paragonylopus plaumanni, Zompro, 2000: 50, Otte and Brock, 2005: 247. Zompro, 2009: 20.

Types: Holotype ♂, 101°19'E 14°31'N, 900–1000 m., S Khao Mai Pok, Nakhon Ratchasima, Thailand, 19–25.X.1997 (OZ); paratypes 2♂♂, 1♀, 101°19'E 14°31'N, 900–1000 m., S Khao Mai Pok, Nakhon Ratchasima, Thailand, 19–25.X.1997 (OZ); 1♂, 1♀, 1200 m., Viewpoint Khao Kheo, Khao Yai, Nakhon Ratchasima, Thailand, 15.X.1997 (OZ).

Other material examined: 1♀, Nabanhe, Xishuangbanna, Yunnan, China, 10.VII.2003, Hu Jia-Yao & Tang Li-ang (SNU).

Notes: This species is recorded in China for the first time.

Distribution: China (Yunnan) and Thailand.

DISCUSSION

Paragonylopus Chen & He, 1997 is an extraordinary genus with small body size, three-segmented antennae and armed anterodorsal and posterodorsal carinae of femora in both sexes that readily make it morphologically distinguishable from all other genera in the subfamily Pachymorphinae. The specialized antennal structure with spines on the first half of inner margin of the third antennal segment is a special character that has evolved uniquely within the genus and may have unknown functions.

Ootaxonomic morphology of the genus *Paragonylopus* was unknown until I obtained eggs from two adult females collected from the type-locality, Damingshan, Guangxi, China. The cylindrical egg capsule with

smooth ventral surface reflects close relationship with *Macellina* Uvarov, 1940 which has similar egg structure and been placed under the same subfamily. The female *Macellina souchongia* (Westwood, 1859), a widespread species in China, glues its eggs on the surface of grasses. Although no observations have been obtained of *P. sinensis* egg laying behaviour in the wild, the captive adult females were observed to glue their eggs apparently randomly on the surface of the rearing cage and foodplants. Unfortunately, the adult females died within a week of captivity and no accepted foodplants were identified in that time.

Currently, only two species, *Paragonylopus sinensis* Chen & He, 1997 and *P. plaumanni* Zompro, 2000, are recognized from China and Thailand respectively. *P. sinensis* is closely related to *P. plaumanni*, but can be differentiated by obtuse teeth on the anterodorsal and posterodorsal carinae of femora in both sexes. Geographically the genus is restricted to southwestern China and central Thailand. The discontinuous distribution suggests the potential occurrence of the genus from intervening countries such as Vietnam, Laos and Cambodia. Further collecting trips to these countries may reveal new localities for the genus.

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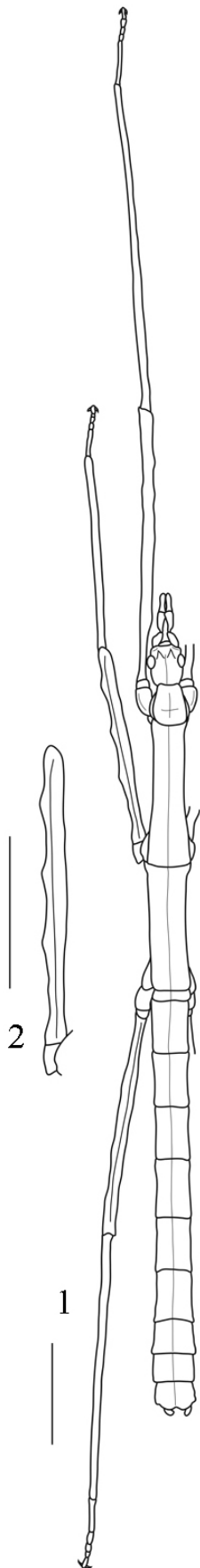
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TABLE AND FIGURES

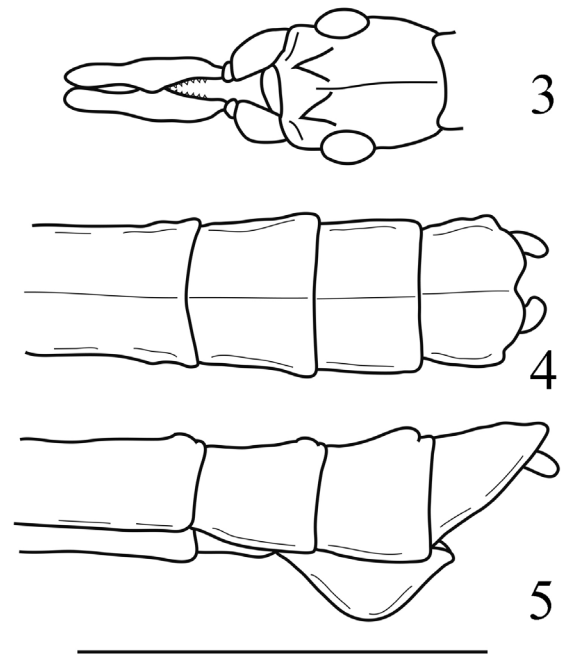
Table 1. Measurements of male *Paragonylopus sinensis* Chen & He, 1997

Body part	Length mm	Mean (n = 6)
Body	32.5–36.5	34.1
Head	2–2.5	2.2
Antennae	2.5–3	2.7
Pronotum	2	2
Mesonotum	5.5-7	6.1
Metanotum	5-5.5	5.3
Median segment	0.5	0.5
Profemora	11-13	11.7
Mesofemora	7-9	7.8
Metafemora	9-11	9.8
Protibiae	13.5-15.5	14
Mesotibiae	7-10	8.3
Metatibiae	10-12	11.3

Figures 1–2. Male *Paragonylopus sinensis* Chen & He, 1997 [scale bar 5 mm]. **1.** Male, body, dorsal view. **2.** Male, left mesofemur, dorsal view. (Drawing by author)



Figures 3–5. Male *Paragonylopus sinensis* Chen & He, 1997 [scale bar 5 mm]. **3.** Male, antennae and head, dorsal view. **4.** Male, end of abdomen, dorsal view. **5.** Male, end of abdomen, lateral view. (Drawing by author)



Figures 6–7. Egg of *Paragonylopus sinensis* Chen & He, 1997 [scale bar 1 mm]. **6.** Egg, dorsal view. **7.** Egg, lateral view. (Drawing by author)

