



The Genus *Prosopistoma* from China, with Descriptions of Two New Species (Ephemeroptera: Prosopistomatidae)

Chang-Fa Zhou¹, Le-Yi Zheng²

¹Nanjing Normal University, Nanjing, P.R. China; ²Nankai University, Tianjin, P.R. China

Abstract

Two mayfly species *Prosopistoma trispinum* sp.n. and *P. unicolor* sp.n. collected from southwestern China are described as new to science, their main diagnostic larval characters are illustrated. The larvae of *P. trispinum* sp. n. can be differentiated by the large number of mandibular bristles, fewer spines on the inner margins of fore tibiae and mesonotal color pattern. The larva of *P. unicolor* sp. n. can be distinguished by its uniform reddish brown mesothoracic carapace which has no median ridge, and by more tiny serrated foretibial bristles. New distributional records for *P. annamense* Soldán et Braasch in China are first provided. The habitats of Chinese Prosopistomatidae show they can live in lotic water from stream to large river.

Keywords: mayfly, Ephemeroptera, Prosopistomatidae, new species, China.

Introduction

The Prosopistomatidae, which includes only genus *Prosopistoma* Latreille, is a small family of Ephemeroptera. Up to present, 16 named species have been reported from the Oriental region (nine species), Europe and the Middle East (two species), Africa and Madagascar (five species, one of them also found in Europe) and Australia (one species) (Gillies, 1954; Peters, 1967; Hubbard, 1979; Soldán & Braasch, 1984; Koch, 1988; Campbell & Hubbard, 1998; Tong & Dudgeon, 2000). Unfortunately, only the adults of *Prosopistoma africanum* Gillies (1954), *P. pennigerum* (Müller, 1785) and *P. pearsonorum* Campbell & Hubbard (1998) are known so far.

In China, although larvae of the genus *Prosopistoma* have been found in 1980 (Liu et al., 1984), only one named species of this genus (*P. sinense* Tong & Dudgeon, 2000) was reported and described. In 2001, larvae of two prosopistomatid species were collected in Yunnan Province, China, and some specimens studied by Liu et al. (1984)

and Tong and Dudgeon (2000) were loaned to the authors for study. We therefore had an opportunity to review this family in China. The Chinese fauna comprises four prosopistomatid species but their imaginal stages are not known.

***Prosopistoma annamense* Soldán et Braasch, 1984**

Prosopistoma sp. Liu, Wang and Hu, 1984: 227.

Material examined

Three Larvae, China, Hunan Province, Xiangjiang River, He-Jiang-Tao, VII.1980; 1 larva, China, Hunan Province, Xiangjiang River, Lao-Bu-Tou, VII.1980. leg. Liu Bao-yuang, Wang Shi-da & Hu De-nian (in Insects Collection, College of Life Sciences, Nanjing Normal University, Nanjing 210097, China).

***Prosopistoma trispinum* sp. n. (Figs. 1–3, 7)**

Material

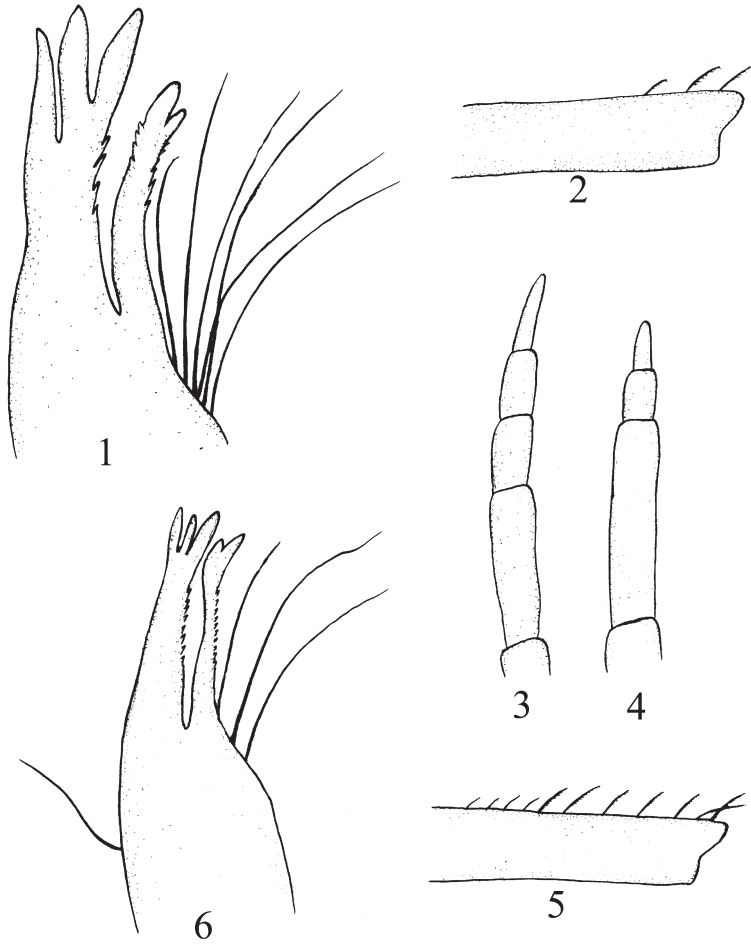
Larva (Holotype), China, Yunnan Province, Jinggu County (23°30'N, 100°41'E), Fengshan, 8.IV.2001, leg. ZHOU Chang-Fa. Paratypes: 30 larvae, same data as holotype. All specimens are deposited in Insects Collection, College of Life Sciences, Nanjing Normal University, Nanjing 210097, China.

Description of the holotype larva

Body length 3.6 mm, length of caudal filaments 0.35 mm. Head relatively wide, yellowish with two brown spots on clypeus and transverse recessed dark marking over median ocellus. Compound eyes and bases of lateral ocelli black. Antennae five-segmented, segment 2 shorter than combined length of segments 3–5 (11 : 15), apical segment narrow and relatively longer (Fig. 3). Labrum narrow, anterior margin with sparse fine setae. The two mandibles resemble each other. Outer canine with three apical teeth, inner margin serrated; inner canine with two apical teeth, both inner and outer margins serrated. Six long sharp bristles located near base of inner canine (Fig. 1). Length ratio of maxillary palpus segments from basal one to apical is 2 : 3 : 1, segment 2 curved significantly, apex of segment 3 pointed; three long fine bristles proximal to three apical spines on galea-lacinia, inner margin of maxilla with one additional sharp bristle as in *P. sedlaceki* Peters. Basal segment of labial palpi longer than other two segments. Hypopharynx simple, membranous, lobe-like.

Mesonotum light yellowish-brown with a median ridge; mesonotum with deep brown, or a dark color pattern with two pairs of lighter spots as in Figure 7. The brown mesothoracic area can be separated into anterior and posterior parts, or the two can be connected by two brown stripes (in all younger larvae, the two brown bands are completely separate). Maximum width of mesonotum exceeds length of median line a little. Apex of inner margin of fore tibiae with three serrated spines (Fig. 2). Middle tibiae with one spine, hind tibiae without spines. Femora and tarsi of all legs without spines. Claws slender, sharpened apically.

Six pairs of gills, gill 1 large, heavily branched, apex of main portion projected, its body with 10 branches, three tracheal veins and one thickened line visible. Gill 2



Figures 1–6. Larval characters of two new *Prosopistoma* species, *P. trispinum* sp. n. (1, mandible; 2, fore tibia; 3, antenna) and *P. unicolor* sp. n. (4, antenna; 5, fore tibia; 6, mandible).

largest, rectangular, membranous and lamella-like, covering gills 3–5. Gills 3–5 similar to each other, branched. Gill 6 turning inward, membranous and furred. Posterolateral projections of abdominal segments 7–9 broad, apex pointed and bent inward to body axis. Three caudal filaments with dense long hairs (in some specimens, caudal filaments retracted into 10th segment, only hair is visible in dorsal view).

Adult: Unknown.

Remarks

In the Oriental *Prosopistoma* species, only *P. boreus* Peters, *P. sedlaceki* Peters and *P. trispinum* sp. n. have six or more bristles beside the canines of the mandible, five-

segmented antennae and only three or 3–4 serrated spines on inner fore-tibial margin. *P. sedlaceki* Peters can be distinguished from both former species by broad and truncated posterolateral projections of abdominal segments 7–9. *P. trispinum* sp. n. can be separated from *P. boreus* Peters by the color pattern of mesonotum (without median yellowish marks), and by more bristles on maxillae (with four bristles, while *P. boreus* Peters has only one).

This species was collected in an unpolluted lotic river (width between 5 and 10 m) in the dry season. Substratum was composed of boulders and rubble with dense aquatic plants. Depth of water was about 40 cm at the collection time. Mayflies collected in the same habitat include *Serratella*, *Torleya* (Ephemerelellidae), some Baetidae and *Chypeocaenis* (Caenidae).

Etymology

The name *trispinum* is derived from Latin *tri-* (three) and *spina* (spine), and refers to the three spines on inner margin of fore tibia of this new species.

Prosopistoma unicolor sp. n. (Figs. 4–6, 8)

Material

Larva (Holotype), China, Yunnan Province, Jingdong County (24°26' N, 100°50' E), 15.IV.2001, leg. ZHOU Chang-Fa. Paratype: one larva, same data as the holotype. Deposited in Insects Collection, College of Life Sciences, Nanjing Normal University, Nanjing 210097, China.

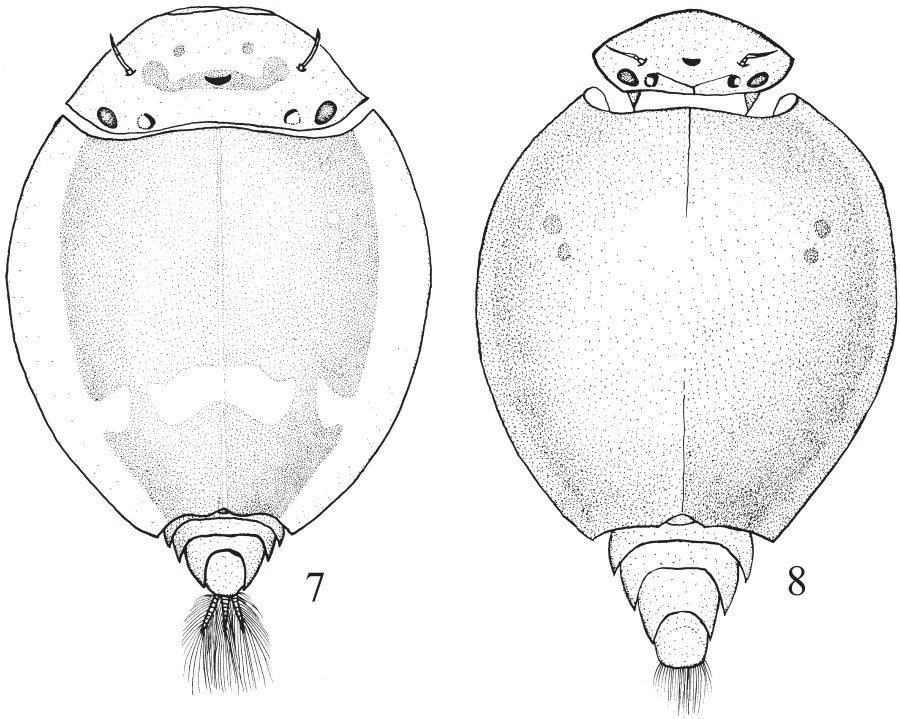
Description of the holotype larva

This new species is similar to the preceding species except for the following characters. Body length 3.36 mm, width 2.31 mm. Antennae four-segmented, segment 2 two times longer than combined length of segments 3–4 (Fig. 4). Outer and inner canine of mandibles with three apical teeth, inner margins finely serrated; three fine bristles next to inner canine and one additional one on lateral margin of mandible (Fig. 6). Length ratio of maxillary palpus segments from basal to apical is 5 : 10 : 3. Mesonotum uniformly deep reddish-brown with two pairs of darker spots as in Figure 8, without median ridge, maximum width a little shorter than length of median line (Fig. 8). Apex of inner margin of fore tibiae with 11 spines, outer 8–9 spines serrated (Fig. 5).

Adult: Unknown.

Remarks

Gillies (1954) reported the larval mesonotum of *Prosopistoma* to have a narrow median ridge and flattened lateral flanges which was not doubted by later researchers. However, *P. unicolor* sp. n. has a completely convex mesonotum without median ridge. In addition, the mesonotum of *P. unicolor* sp. n. is uniform reddish brown while the other known species in the genus *Prosopistoma* have some distinct color pattern on the mesonotum. Furthermore, three bristles next to the inner canine on the mandible and 11 spines on inner margin of fore tibiae are good distinctive characters of this new species.



Figures 7–8. Larval habitus of *Prosopistoma trispinum* sp. n. (7) and *P. unicolor* sp. n. (8).

Etymology

Unicolor is the Latin adjective meaning ‘of a single colour’, referring to the uniform reddish brown mesonotum of this new species.

This species was collected from lotic water of a stream whose streambed was 5–7 m, but only 1–3 m were covered by water at the time of collection, in the dry season. Depth of water was 30–50 cm. Substrate consisted of gravel and rubble, mostly of reddish colour. Other mayflies collected in the same habitat include *Serratella*, *Drunella*, *Cincticostella* (Ephemerellidae) and *Epeorus* (Heptageniidae).

The available collections indicate that Chinese species of *Prosopistoma* can live in large rivers like the Xiangjiang as *P. annamense* does (Liu et al., 1984), or in small rivers (*P. trispinum* sp. n.), or also in streams, like *P. unicolor* sp. n.

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