

Description of a new species in the genus *Tipulodina* Enderlein (Diptera: Tipulidae) from China

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Abstract: A new species in the genus *Tipulodina* Enderlein, 1912, *Tipulodina bispina* **sp. nov.** (Guangxi, South China), is described and illustrated. The description, illustrations and drawings for this new species are provided. It is distinguished from related species by the shapes of the gonostylus.

Key words: Nematocera; Tipuloidea; crane flies; semen pump

中国白环大蚊属一新种记述（双翅目：大蚊科）

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摘要：记述来自中国广西的白环大蚊属 *Tipulodina* Enderlein, 1912 一新种：双刺白环大蚊 *Tipulodina bispina* **sp. nov.**。提供了新种的形态描述和特征插图。该新种与近缘种的主要区别在于生殖突形状不同。

关键词：长角亚目；大蚊总科；大蚊；精子泵

Introduction

Tipulodina Enderlein, 1912 was established by Enderlein (1912) with the type species *Tipulodina magnicornis* Enderlein, 1912 from Indonesia by original designation. The world fauna of the genus *Tipulodina* includes 52 described species, mainly distributed in Oriental and Palaearctic regions (Oosterbroek 2018). Recently, two species of this genus were discovered, *Tipulodina simianshanensis* Men, 2019 (Men *et al.* 2019) and *T. bifurcata* Xue & Men, 2019 (Xue *et al.* 2019). The genus *Tipulodina* is characterized by a slender leg with white ring, transparent wing with a short Rs and a dark pattern on apex, R₃ absent, gonocoxite generally with elongate appendage (Young 1999).

Material and methods

The specimens were collected with insect nets in Guangxi. Photos were taken with an Olympus SZ61 stereomicroscope (Olympus, Philippines) equipped with a KuyNice industrial digital camera U3ISPM (KuyNice, China), and edited with software ImageView (×64, 3.7.11330). All drawings were drawn with a Rotring needle pen. The hypopygium of the male

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and ovipositor of the female were dissected with sharp tweezers and syringe needles and immersed in 10% NaOH at 50°C for 20 minutes, preserved in glycerol and observed under an Olympus SZ61 stereomicroscope (Olympus, Philippines). The measurement of body length is from the vertex of head to the tip of the hypopygium. All data were measured in millimeters (mm) with a digital caliper. The description method for morphological features and the terms of description follow Alexander & Byers (1981), de Jong (2017), and Cumming & Wood (2017). The materials mentioned in this study are deposited in the Systematics and Evolution Laboratory, School of Life Sciences, Anqing Normal University, Anhui, China.

Taxonomy

Tipulodina bispina sp. nov. (Figs 1–21)

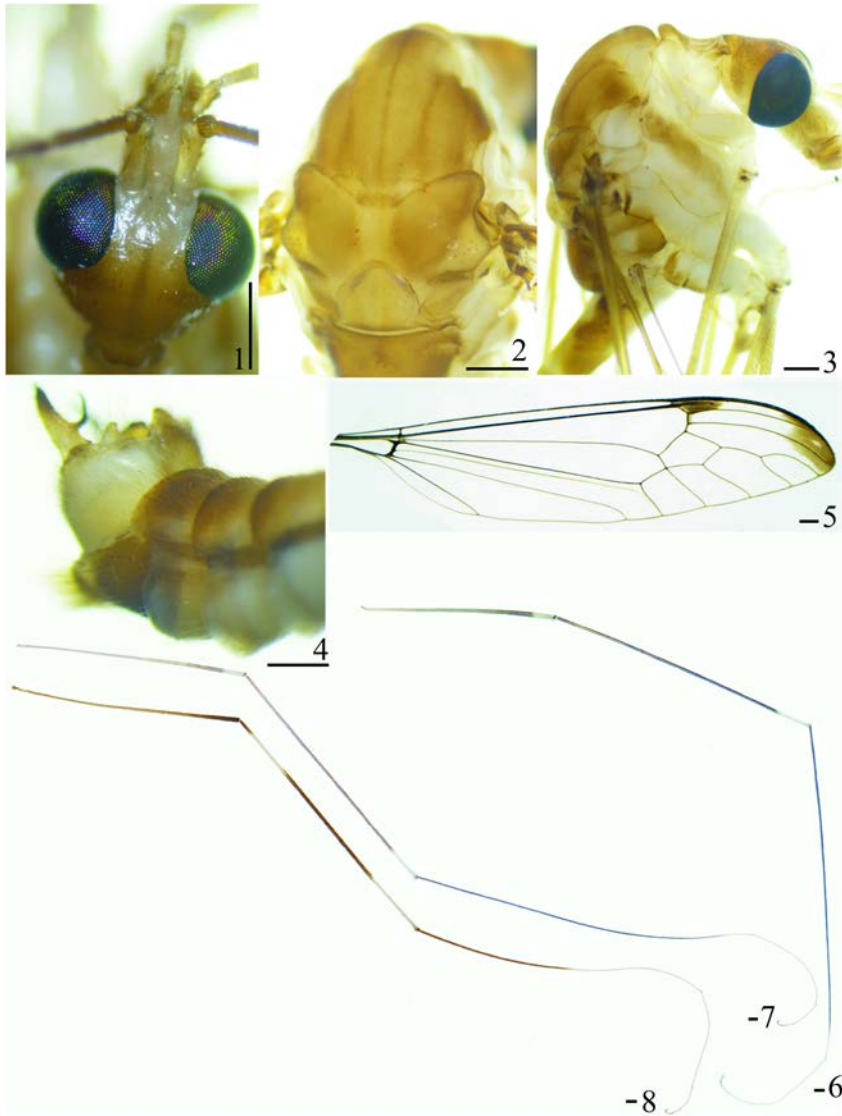
Male. Adult, body 13.2–14.8 mm (excluding antenna, $n = 2$), wing 13–14.3 mm ($n = 2$), antenna 5.2–6.1 mm ($n = 2$).

Head. Occiput and vertex brownish yellow. Eye black. Rostrum light brown, densely covered with black setae (Fig. 1). Antenna with scape yellowish white, cylindrical, slightly narrowed at base; pedicel light brown, very short; flagellum brown, cylindrical and slightly expanded at base, first flagellomere longest, remaining flagellomeres progressively shortened, each with five black verticils at base and densely covered with short white setae.

Thorax. Pronotum light brown. Prescutum and presutural scutum light brown with three dark brown stripes. Scutum light brown, scutular lobe brown, middle region of the two scutular lobes yellowish white. Scutellum yellowish white. Mediotergite brown (Figs 2, 3). Pleura mainly yellowish white. Katepisternum with a brown area and anepisternum with a light brown area. Leg thin and long, coxa and trochanter yellowish white. Fore leg with femur yellowish white to brown, a white ring at apex, tibia light brown with a white ring at apex, basitarsus almost light brown, the apex of basitarsus and rest of tarsus white. Middle leg same as fore leg. Hind leg with femur brown to black, tibia light brown with two white rings, one near base and another near apex, the basal one significantly shorter than apical one; basitarsus with basal half light brown, apical half white, rest of tarsus white (Figs 6–8). Haltere with stem light brown, knob yellowish white. Wing transparent colorless, stigma dark brown; veins brown to black; outer ends of cells r_1 , r_4 and r_5 light brown, medially with a transparent spot in the dark area of cell r_4 ; discal cell transparent. Venation. Rs extremely short, R_3 shortened; petiole of m_1 cell slightly shorter than discal cell, discal cell almost same length as cell m_1 (Fig. 5).

Abdomen. Abdominal tergites light brown, and sternites narrowly suffused with brown at posterior margin. Hypopygium with tergite nine and sternite nine only fused at base (Figs 4, 17). Tergite nine with a smooth V-shaped notch at posterior margin and densely covered with black setae (Figs 9, 16). Appendage of gonocoxite a yellow thorn, tip black and curved inward, with two black thorns on the inner side, the bigger one one-sixth the length of appendage, the smaller one near the base very short, surface of appendage densely covered with long setae (Figs 12, 13, 18). Outer gonostylus an oval and flattened lobe, light brown, dorsal margin covered with setae (Figs 12, 13). Inner gonostylus curved inward, wide at base, narrow medially, terminating into a fan-shaped end (Figs 12, 13). Aedeagal guide widened basally, gradually narrowed to apex, curved ventrally in lateral view, laterally with a pair of flat arms,

ventral surface of both arms densely covered with setae (Figs 10, 11).



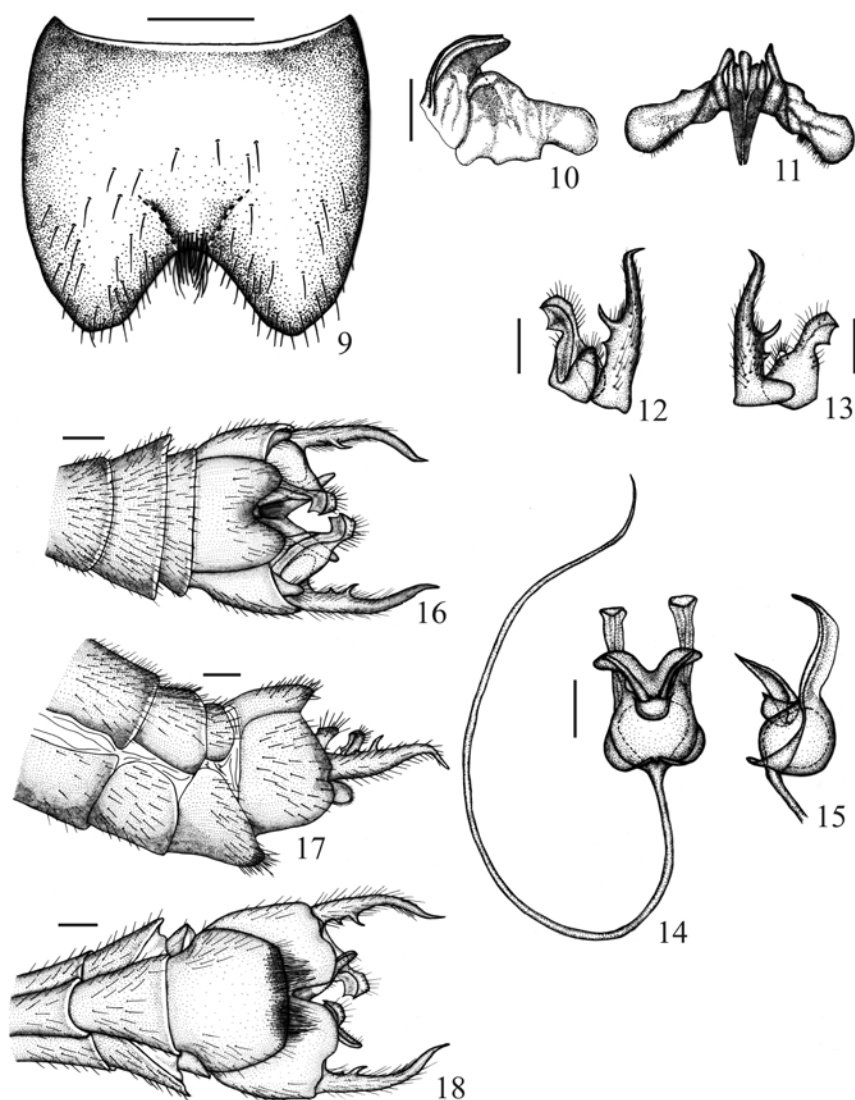
Figures 1–8. *Tipulodina bispina* sp. nov. 1. Head, dorsal view; 2. Thorax, dorsal view; 3. Thorax, lateral view; 4. Hypopygium, lateral view; 5. Wing; 6. Fore leg; 7. Middle leg; 8. Hind leg. Scale bars = 0.5 mm.

Semen pump. Semen pump with compressor apodeme symmetrical in two lobes, the tip slightly wider than the base, with a raised ridge in the middle of each lobe. Posterior immovable apodemes longer than compressor apodeme, curved dorsally. Anterior immovable apodemes very short, appearing as rounded lobe in dorsal view. Aedeagus, a slender tube, gradually narrowed to the tip, 4 times longer than semen pump (Figs 14, 15).

Female. Adult, body 16.5–16.8 mm (excluding antenna, $n = 2$), wing 14–14.5 mm ($n = 2$), antenna 6.2–6.5 mm ($n = 2$).

The body color and wing venation same as that of the male. Ovipositor light brown.

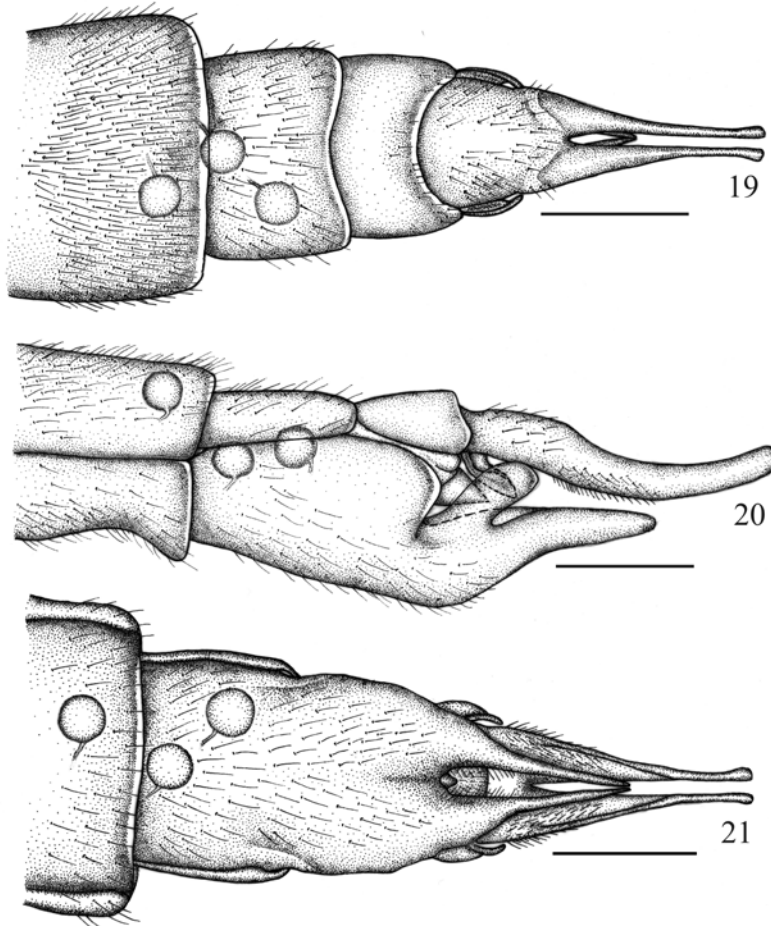
Sternite nine with a conical protrusion (Fig. 20); tergite nine depressed inward at apex and covered with small setae (Fig. 19); sternite ten fan-shaped, ventral surface densely covered with small setae (Figs 20, 21); tergite ten broad at base, the apex slightly narrower than base, densely covered with black setae. Cercus gradually tapered from the base to the tip, distinctly curved directed dorsad. Hypogynial valve, significantly wider and shorter than the cercus, gradually narrowing to apex, an oval lobe arising from its dorsal edge (Figs 19–21). Spermatheca spherical, black (Figs 19–21).



Figures 9–18. *Tipulodina bispina* **sp. nov.** 9. Tergite nine, dorsal view; 10. Aedeagal guide, lateral view; 11. Aedeagal guide, dorsal view; 12. Gonocoxite, inner gonostylus and outer gonostylus, dorsal view; 13. Gonocoxite, inner gonostylus and outer gonostylus, ventral view; 14. Semen pump, dorsal view; 15. Semen pump, lateral view; 16. Hypopygium, dorsal view; 17. Hypopygium, lateral view; 18. Hypopygium, ventral view. Scale bars = 0.25 mm.

Holotype. ♂, **China**, Guangxi, Longzhou County, 25-IX-2020, Guoxi XUE leg.
Paratypes. 7♂2♀, same data as holotype.

Etymology. The specific epithet is from the Latin “spina” and the Latin prefix “bi” describing two small spines on the appendage of gonocoxite.



Figures 19–21. *Tipulodina bispina* **sp. nov.** 19. Ovipositor, dorsal view; 20. Ovipositor, lateral view; 21. Ovipositor, ventral view. Scale bars = 0.5 mm.

Diagnosis. Antenna with scape light yellow, remaining segments brown. Two white rings of different lengths on the tibia of the hind leg; wing transparent colorless, except the wing tip, some cells with light brown area. Tergite nine with V-shaped notch at the back edge; gonocoxite appendage extending into a distinct thorn, densely covered with black setae.

Remarks. This new species is most similar to *Tipulodina bifurcate* (Xue & Men, 2019) in the structure of hypopygium and wing venation, but distinguished by appendage of gonocoxite having two spines (absent in *T. bifurcate*) and by inner gonostylus being narrower in the middle than at both ends (fusiform in shape in *T. bifurcate*). Females of both species have a lobe on hypogynial valve, but the lobe of this new species is distinctly longer and narrower.

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