Notes on the genus *Microtachycines* Gorochov, 1992 and establishment of a new genus from China (Rhaphidophoridae: Aemodogryllinae)

Qi-Di ZHU 1, Fu-Ming SHI 2 & Zhi-Jun ZHOU 1,3,*

1,2,3 Key Laboratory of Zoological Systematics and Application of Hebei Province, College of Life Sciences, Hebei University, 071002, Baoding, P. R. China.
1,2,3 Institute of Life Sciences and Green Development, Hebei University, Baoding 071002, P. R. China.

* Corresponding author: zhijunzhou@hbu.edu.cn
1 Email: qidizhu0323@163.com
2 Email: shif_m@126.com

Abstract. This paper reviews the genus *Microtachycines* and establishes a new genus, *Megatachycines* gen. nov. One new species and two new combinations of the genus *Megatachycines* are recorded, i.e., *Megatachycines pentus* gen. et sp. nov., *Megatachycines elongatus* (Qin, Liu & Li, 2017) comb. nov., and *Megatachycines trispinosus* (Qin & Li, 2020) comb. nov. Images illustrating the morphology of all species of the genera *Microtachycines* and *Megatachycines* are provided.

Keywords. Rhaphidophoridae, *Microtachycines*, *Megatachycines*, new genus, China.


Introduction

The genus *Microtachycines* Gorochov, 1992 was first described from Vietnam and *M. tamdaonensis* Gorochov, 1992 was assigned as type species (Gorochov & Storozhenko 1992). The genus differs from the other known genera of Aemodogryllini by the shapes of the male genitalia and tenth abdominal tergite. Dorso-lateral lobes of the male genitalia are semi-sclerotized and have distinctly sclerotized hooks in the apical area. The male tenth abdominal tergite has a large outgrowth in the middle.

Qin *et al.* (2017a) described two new species of the genus *Microtachycines*, i.e., *M. elongatus* Qin, Liu & Li, 2017 and *M. fallax* Qin, Liu & Li, 2017. Moreover, they revised part of the generic diagnosis into “male epiproct distinctly prolonging and lateral lobes of the male genitalia sclerotized” (Qin *et al.* 2017a). However, the revised generic diagnosis is inconsistent with the original description of the genus *Microtachycines*. Later, Qin *et al.* (2020) published one new species *M. trispinosus* Qin, Liu & Li, 2020, and regarded *M. fallax* as a junior synonym of *M. elongatus.*
Up to now, the genus *Microtachycines* has included three species, i.e., *M. tamdaonensis*, *M. elongatus* and *M. trispinosus* (Gorochov & Storozhenko 1992; Qin et al. 2017a; Qin et al. 2020). However, the characteristics of *M. elongatus* and *M. trispinosus* are inconsistent with the type species *M. tamdaonensis* Gorochov, 1992. Therefore, we establish a new genus *Megatachycines* gen. nov. and transfer *M. elongatus* and *M. trispinosus* to it.

**Material and methods**

Morphological structures were examined using a Leica M205A stereo microscope and a Leica DFC450 digital imaging system was used to acquire morphological images. The photos were edited with Adobe Photoshop CC 2018.

Specimens were measured with Vernier calipers. The following conventions were adopted for specimen measurements: body length from tip of fastigium verticis to posterior margin of the last abdominal tergite; pronotum length from anterior margin of pronotum to posterior margin along midline; fore femur length from base of fore femur to apex of genicular lobe; hind femur length from base of hind femur to apex of genicular lobe; hind tibia length from base of hind tibia to apex; hind basitarsus length from base of hind basitarsus to apex; ovipositor length from base of subgenital plate to apex of ovipositor.

**Abbreviation for locations of type specimens**

HBU = Museum of Hebei University, Baoding, China
SEMCAS = Shanghai Entomological Museum, Chinese Academy of Sciences, Shanghai, China
ZIN = Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia

**Results**

Class Insecta Linnaeus, 1758
Order Orthoptera Latreille, 1793
Superfamily Rhaphidophoroidea Walker, 1869
Family Rhaphidophoridae Walker, 1869
Subfamily Aemodogryllinae Jacobson, 1905
Tribe Aemodogryllini Jacobson, 1905

Genus *Microtachycines* Gorochov, 1992

*Microtachycines tamdaonensis* Gorochov, 1992, by original designation.

**Diagnosis**

Fastigium verticis with well separated tubercles. Male tenth abdominal tergite with large outgrowth in the middle, which forms a bifurcated plate in the apical area. Dorso-lateral lobes of male genitalia semi-sclerotized, apical areas with distinctly sclerotized hooks. Female tenth abdominal tergite with outgrowth.

*Microtachycines tamdaonensis* Gorochov, 1992

Fig. 1


**Material examined**

**Holotype**

VIETNAM • ♂; Vinh Phuc Province, Tamdao; 9–18 Nov. 1990; A.V. Gorochov leg.; ZIN.
Paratype
VIETNAM • 1 ♀; same collection data as for holotype; ZIN.

Distribution
Vietnam (Tamdao).

Remarks
We examined the type specimens of *Microtachycines tamdaonensis* in ZIN and discussed with Dr A.V. Gorochov. We are sure that the male tenth abdominal tergite has a large outgrowth in the middle and the male epiproct is semicircular. Moreover, we examined the type specimens of *M. elongatus* and *M. trispinosus* in SEMCAS. All abdominal tergites of the two species have no outgrowths, but they have

an extended epiproct. Therefore, we establish a new genus, *Megatachycines* gen. nov., and transfer *M. elongatus* and *M. trispinosus* to it.

**Genus *Megatachycines* gen. nov.**

urn:lsid:zoobank.org:act:C46D40D4-C6B3-4B4A-988A-FD485EF01907

**Type species**

*Megatachycines pentus* gen. et sp. nov., here designated.

**Diagnosis**


**Remarks**

The new genus can easily be distinguished from other known genera of Aemodogryllini by the shapes of the male epiproct, dorso-lateral lobes of the male genitalia, and the male subgenital plate.

**Megatachycines pentus** gen. et sp. nov.

urn:lsid:zoobank.org:act:F6759369-13C7-49F8-8652-9D554EBCBA23

Figs 2, 5A–B

**Diagnosis**

The new species is characterized by the shapes of the male epiproct and genitalia. Male epiproct pentagonal with concave posterior margin and dorsal sclerite of male genitalia stilliform.

**Etymology**

The name of the new species derives from the Greek word ‘*pent*’ (‘pentagonal’), referring to the male epiproct being pentagonal.

**Material examined**

**Holotype**

CHINA • ♂; Chongqing, Wushan, Dangyang; 3 Oct. 2020; L.Y. Wang leg.; HBU.

**Paratypes**

CHINA • 1 ♀; same collection data as for holotype; HBU • 2 ♂♂, 2 ♀♀; Chongqing, Wushan, Zhuxian; 19 Jul. 2021; L.Y. Wang leg.; HBU.

**Other Material**

CHINA • 1 ♂, 1 ♀; Chongqing, Wushan, Zhuxian; 18 Jul. 2021; L.Y. Wang leg.; HBU.

**Description**

**Body.** Medium-sized.

**Head.** Fastigium verticis with two conical tubercles, apices obtusely rounded, pointing forward (Fig. 2C). Eyes ovoid, protruding forward; median ocellus oval, located between antennal sockets;
lateral ocelli circular, situated on lateral margins of basal fastigium verticis (Fig. 2A–B). Apical segment of maxillary palpus distinctly longer than subapical segment, apex inflated, globular.

Thorax. Pronotum long, anterior margin straight, posterior margin arcuate; lateral lobe longer than high, ventral margin arc-shaped (Fig. 2B–C). Mesonotum and metanotum short, posterior margin of mesonotum arcuate, posterior margin of metanotum straight. Fore coxa with one small spine; inner margin of fore femur with 11–12 spines on ventral surface, internal genicular lobe with one small spine, external genicular lobe with one long spine; fore tibia with one inner spine and two outer spines on ventral surface, apex with one pair of dorsal spines and one pair of ventral spines, between paired ventral spines with one small spine. Middle femur unarmed on ventral surface, internal and external

genicular lobes each with one long spine; middle tibia with one inner spine and one outer spine on ventral surface, apex with one pair of dorsal spines and one pair of ventral spines, between paired ventral spines with one small spine. Hind femur with 7–10 inner spines on ventral surface, internal genicular lobe with one spine, external genicular lobe unarmed; hind tibia with 72–83 inner spines and 70–80 outer spines on dorsal surface, with one pair of dorsal spines in subapical area, and at apex with one pair of dorsal spines and two pairs of ventral spines, interno-dorsal spine markedly longer than hind basitarsus; hind basitarsus with one apical spine on dorsal surface.

**Male abdomen.** Posterior margins of all abdominal tergites without processes. Epiproct extended, pentagonal, posterior margin concave; paraproct simple, quadrangular in lateral view (Fig. 2D–E).

---

ZHU Q.D. et al., A new genus of Rhaphidophoridae

Cercus slender, conical, apex acute (Fig. 2D). Dorsal sclerite of genitalia stilliform; dorso-lateral lobes distinctly sclerotized (Fig. 5A–B). Subgenital plate transverse and broad, apical area bilobed (Fig. 2F).

**Female abdomen.** Ovipositor longer than half length of hind femur, slightly curved upward. Subgenital plate nearly trapezoid, basal area broad, narrowing to apex, posterior margin with a concavity.

**Coloration.** Body light brown, with black spots. Face with four longitudinal black stripes, inner margin of antennal socket black. Eyes black, ocelli yellow. All femora with two black rings.

**Measurements (mm)**


**Distribution**

China (Chongqing).

*Megatachycines elongatus* (Qin, Liu & Li, 2017) comb. nov.

Figs 3, 5C–D


*Microtachycines fallax*, Qin, Liu & Li 2017a: 600.

---

**Fig. 4.** *Megatachycines trispinosus* (Qin & Li, 2020) comb. nov. ♂. A–C. Head and pronotum. A. Frontal view. B. Lateral view. C. Dorsal view. D–F. Apex of abdomen. D. Lateral view. E. Dorsal view. F. Ventral view. Abbreviations: e = epiproct; g = dorso-lateral lobes of genitalia.
Material examined

Holotype
CHINA • ♂; Zhejiang Prov., Lin’an, Qingliangfeng; alt. 1000 m; 20 Jul. 2009; Feng & Yin leg.; SEMCAS.

Paratypes
CHINA • 1♂, 2 ♀; same collection data as for holotype; SEMCAS.

Other material
CHINA – Zhejiang Prov. • 1 ♂, 1 ♀; Lin’an, Qingliangfeng; 4 Oct. 2019; Q.D. Zhu leg.; HBU • 1 ♂, 3 ♀; Kaihua, Gutianshan; 8 Oct. 2018; T. Wang leg.; HBU. – Anhui Prov. • 1 ♂, 7 ♀; Yuexi,

Distribution
China (Anhui, Chongqing, Fujian, Hubei, Hunan, Jiangxi, Zhejiang).

Megatachycines trispinosus (Qin & Li, 2020) comb. nov.
Figs 4, 5E–F

Microtachycines trispinosus Qin, Liu & Li, 2020: 575.

Material examined

Holotype

Paratype
CHINA • 1 ♂; same collection data as for holotype; SEMCAS.

Other material
CHINA • 1 ♂; Jiangxi Prov., Lushan, Dayueshan; 3 Aug. 2018; T. Wang leg.; HBU.

Distribution
China (Jiangxi).

Discussion
The tribe Aemodogryllini is characterized by the sclerotized dorsal plate of the male genitalia, the absence of outgrowths on the male abdominal tergites, and having only one dorso-apical spine on the hind basitarsus. It might be a younger tribe deriving from Diestramimini (Gorochov 1998). In Aemodogryllini, the male genitalia differ between genera. Some genera have only the dorsal plate sclerotized, while the dorso-lateral lobes of the genera Gymnaetoides, Pseudotachycines, Microtachycines and Megatachycines are also sclerotized (Storozhenko 1990; Gorochov & Storozhenko 1992; Gorochov 1998, 2010; Qin et al. 2017b, 2017c). In addition, there are some specialized structures, such as the outgrowth on the male tenth abdominal tergite (Microtachycines), and the extended male epiproct (Megatachycines) and paraproct (some species of Pseudotachycines). So, which trait is the main common basic character to identify the genus? What's more, the phylogenetic relationship among genera is still unclear. More evidence is needed for further study.

Acknowledgments
We are grateful to all collectors for collecting the specimens. We are also grateful to Dr A.V. Gorochov and Dr Han-Qiang Wang for their help during examination of the type specimens. We thank two anonymous reviewers for their helpful comments to improve the manuscript. The project is supported by the National Natural Science Foundation of China (no. 31872268, 31750002, 31672259) and a comprehensive scientific investigation (background investigation) project of Chongqing Wulipo National Nature Reserve (Purchase Item no. 20C01210).
References


