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Full Length Research Paper

Three new species of *Macropelopia* Thienemann from China (Diptera: Chironomidae: Tanypodinae)

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Males of three new species, *Macropelopia galbina* sp. n., *Macropelopia grandivolsella* sp. . and *Macropelopia rotunda* sp. n are described and figured on the basis of specimens collected from Oriental China.

Key words: Taxonomy, Chironomidae, Tanypodinae*, Macropelopia*, new species, Oriental China.

INTRODUCTION

The genus *Macropelopia* was erected by Thienemann in 1916 and has a nearly worldwide distribution. This genus belongs to the tribe *Macropelopiini* within the subfamily Tanypodinae. In general, the larvae live in a wide variety of habitats, rivers, lakes, ponds and marshes, and are often found in cold habitats (Murray and Fittkau, 1989). For example, *Macropelopia decedens* was reared from a cold spring with a water temperature of 9℃ (Roback, 1971). *Macropelopia nebulosa* tolerates a range from 0.1 to about 20℃ (Rossaro et al., 2006). The genera *Alotanypus, Apsectrotanypus, Bethbilbeckia, Bilyjomyia, Brundiniella, Derotanypus, Macropelopia, Psectrotanypus* and *Radotanypus* have been grouped into the tribe Macropelopiini (Niitsuma, 2003; Niitsuma and Watson, 2009; Roback and Moss, 1977). These genera have common characteristic: wings are often marked; M–Cu vein intersects Cu after fork; costa generally extends past the last branch of R. The genus of *Macropelopia* can be distinguished from other aforementioned genera except *Alotanypus* in having a tibial comb on the foreleg. It can be separated *Alotanypus* in having a scutal tubercle and postnotal setae.

According to Ashe and O'Connor (2009), fourteen species of these genera have been recorded in the world, and the following six species had been so far recorded from the Oriental region: *Macropelopia adaucta* Kieffer, *Macropelopia amplituberculata* Hazra & Chaudhuri, *Macropelopia kibunensis* (Tokunaga), *M. nebulosa* (Meigen), *Macropelopia nipponotata* Sasa & Suzuki and *Macropelopia ogasasextdecima* Sasa & Suzuki. According to Wang (2000), only *M. nebulosa* (Meigen) has been previously recorded from China as adult male. Four taxa of *Macropelopia* have been found as larvae in rivers at northern latitudes of China, including *M. decedens* (Walker) in Ningxia Province, *Macropelopia johannseni* Roback in Gansu Province, and M. nebulosa (Meigen) and *Macropelopia notata* (Meigen) in Liaojing Province. Up to now, only the state of *M. nebulosa* has been confirmed (Wang and Wang, 2011). The other 3 larval species are still dubious records. In this paper, three species are described and figured as new members of this genus, based on material collected in Oriental China.

MATERIALS AND METHODS

The material was initially mounted on slides in Canada balsam, following the procedure outlined by Sæther (1969). The morphological nomenclature is adopted from Sæther (1980). The measurements are given as ranges followed by a mean value when three or more measurements are made, followed by the number measured in parentheses (n). The types and other materials are deposited in the College of Life Sciences, Nankai University, Tianjin, China (BDN).

RESULTS AND DICUSSION

Macropelopia galbina sp. n.

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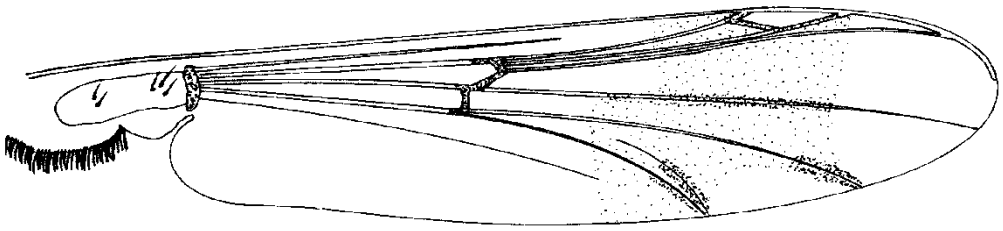

Figure 1. *Macropelpia galbina* sp. n. adult male. Wing.

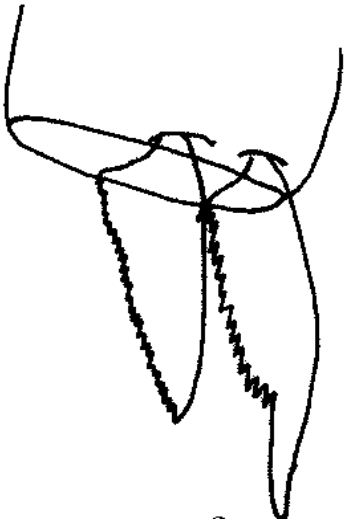

Figure 2. *Macropelpia galbina* sp. n. Adult male. Mid tibia apex.

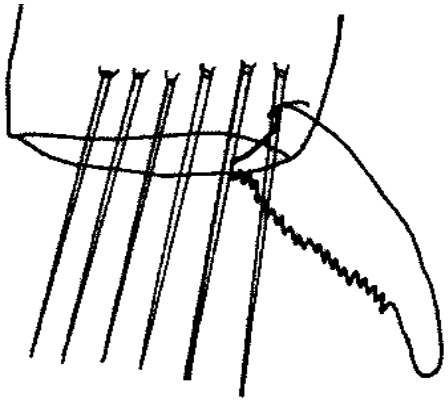

Figure 3. *Macropelpia galbina* sp. n. Adult male. Front tibia apex.

Type material: Holotype male (BDN No. 09874), CHINA: Yunnan Province, Eryuan City, Meici River, 16. V.1995, light trap, Beixin Wang and Lianfang Yang *legit* (Figures 1–6).

Etymology: From Latin *galbinus* (yellow), referring to the uniformly yellow body.

Diagnostic characters: The new species can be distinguished from other members of the genus by the triangular inferior volsella and the body is uniformly yellow.

Adult male (n = 1): Total length 4.50 mm. Wing length 3.03. Total length / wing length 1.49. Wing length / length

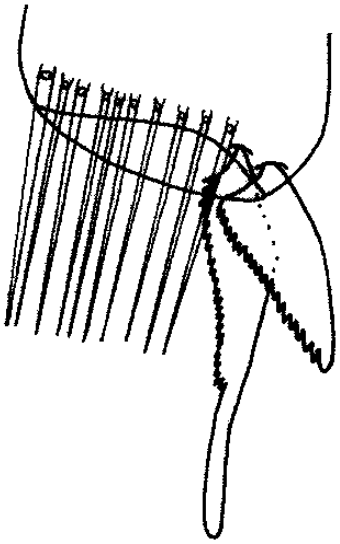

Figure 4. *Macropelpia galbina* sp.n. Adult male. Hind tibia apex.

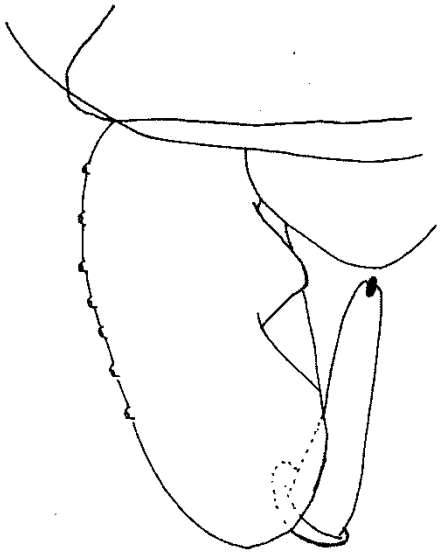

Figure 5. *Macropelpia galbina* sp. n. Adult male. Hypopygium, ventral aspect.

of profemur 2.37.

Colouration: Head yellow. Femur and tibia yellow, each with brown ring apically. Thorax and abdomen uniformly yellow. Wing with brown clouds on the distal third of membrane. Cross-veins RM and MCu brown (Figure 1).

Head: Antenna lost. Temporal setae composed of 6 inner verticals, 12 outer verticals and 6 postorbitals. Clypeus with 14 setae. Tentorium 160 µm long, 45 µm wide. Palpomere 1 to 5 lengths (in µm): 50, 90, 145, 230, 330. Palpomere 5/3: 2.28.

Wing: Brachiolum with 5 long setae. Squama with 40 setae. Costal extension 90 µm long; VR 0.93. Anal lobe rounded (Figure 1).

Thorax: Antepronotum with 14 setae on each lobe. Acrostichals 42, dorsocentrals 40, prealars 34, scutellars 18, preepisternals 5. Postnotum with 4 setae.

Legs: Spur of foretibia 63 µm long, with 19 lateral teeth (Figures 2 to 4). Spurs of mid tibiae 73 and 55 µm long, with 15 and 25 lateral teeth, respectively. Spurs of hind tibiae 90 and 55 µm long, with 22 and 18 lateral teeth, respectively. Fore and hind tibial combs with 6 and 10 spines, respectively. Claws curved slightly and distally

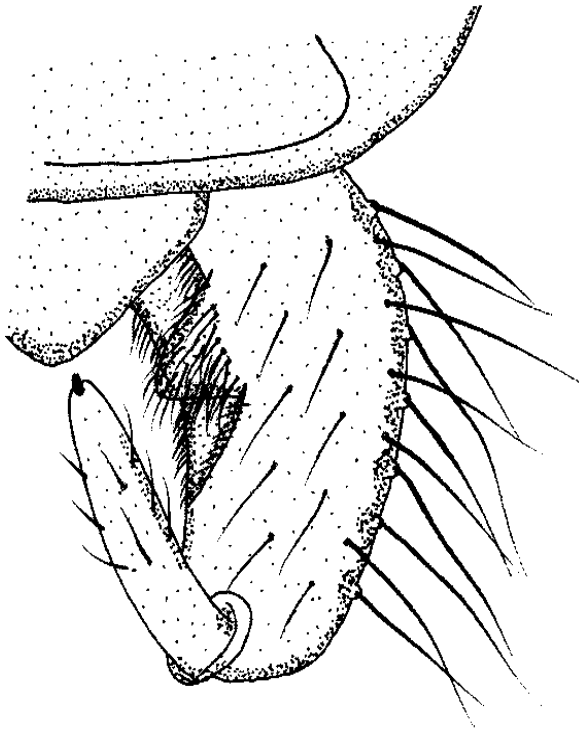

Figure 6. *Macropelpia galbina* sp. n. Adult male. Hypopygium, dorsal aspect.

Table 1. Lengths (in µm) and proportions of legs of *Macropelopia galbina* new species, male (n = 1).

	Fe	Ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR
P_1	1275	1700	1300	640	450	280	155	0.76
P_2	1475	1675	1025	450	330	230	130	0.61
P_3	1325	1700	1350	700	510	300	150	0.79

pointed. Lengths and proportions of legs are as in Table 1.

Hypopygium: Tergite VIII developed, partially covering tergite IX (Figures 5 and 6).. Anal point conical, 50 µm long, 175 µm wide at base, 40 µm wide at apex. Gonocoxite 205 µm long, cylindrical. Gonostylus 115 µm long. Megaseta 5 µm long. Inferior volsella triangular. HR 1.78. HV 3.91.

Female, pupa and larva: unknown.

This new species is considered as belonging to the genus *Macropelopia*, since wing with macrotrichia on entire surface, with brown marks and cross vein R-M brown, Costa extending beyond tip of R4+5, cross vein MCu is distal to FCu, the apex of femora dark brown. According to the known species of this genus, the new species can be distinguished from other members of the genus by having triangular inferior volsella and the body color is uniformly yellow.

***Macropelopia grandivolsella* sp. n.**

Type material: Holotype male (BDN No. 11883), China: Hubei Province, Hefeng County Watershed, 17. VII.1999, light trap, Bingchun Ji *legit*. Paratypes 1 male (BDN No. 13779), China: Hubei Province, Xianfen City, Gong River, 25.VII.1999, light trap, Bingchun Ji *legit* (Figures 7 to 10).

Etymology: The species name is from latin *grandis* (large) and volsella, referring to the large inferior volsella.

Diagnostic characters: The new species can be distinguished from other members of the genus by having remarkable inferior volsella and the color pattern of abdominal tergites as in Figure 8.

Adult males (n = 2): Total length 6.26 to 6.45 mm. Wing length 3.35 to 3.73. Total length / wing length 1.73 to 1.87. Wing length / length of profemur 2.23 to 2.33.

Colouration: Head brown. Thorax predominantly brown. Legs yellow, femora brown in the caudal margins, tibiae brown at base and apex. Wing with brown markings on

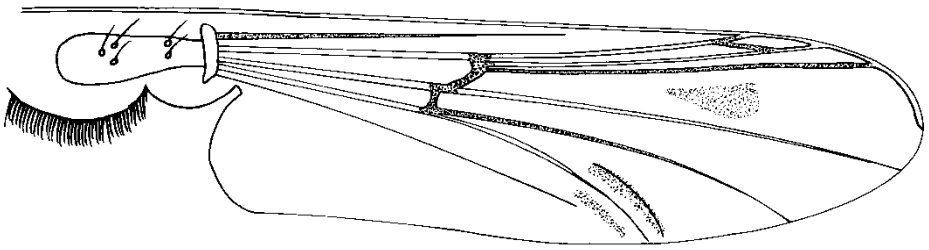

Figure 7. *Macropelpia grandivolsella* sp. n. Adult male. Wing.

Figure 8. *Macropelpia grandivolsella* sp. n. Adult male. Abdomen.

basal of Cu1 and cell r4+5 (Figure 7). Abdominal tergites I to IV each with a pair of lengthways brown marks in the margin and median part with an oval brown mark; tergites V to VII brown; tergites VIII light brown. Hypopygium brown (Figure 8).

Head: AR 1.65–1.78. Temporal with 26 setae, including 8 inner verticals, 10 outer verticals and 8 postorbitals. Clypeus with 15 to 18 setae. Tentorium 160 µm long, 50 to 60 µm wide. Palpomere 1 to 5 lengths (in µm): 75 to 80, 105 to 105, 200 to 205, 275 to 310, 400 to 455. Palpomere 5/3: 1.95 to 2.28.

Wing: VR 0.90 to 0.92 (Figure 7). Brachiolum with 5 long setae. Squama with 50 setae. Costal extension 120 µm long. Anal lobe rounded distinctly.

Thorax: Antepronotals with 16 to 20 setae on each lobe; acrostichals 54 to 58; dorsocentrals 32 to 36; prealars 42 to 50; scutellars 22 to 26; preepisternals 8 to 9; postnotals 6 to 12.

Legs: Spur on fore tibiae 113 to 115 µm long, with 16 lateral teeth. Spurs on mid tibiae 100 to 100 and 60 to 70 µm long, with 20 and 22 lateral teeth, respectively. Spurs on hind tibiae 90 to 95 and 68 to 70 µm long, with 20 and 22 lateral teeth, respectively. Fore and hind tibial comb with 10 and 14 setae. Claws distally pointed. Lengths (in µm) and proportions of legs are given in Table 2.

Hypopygium: Tergite IX developed, without setae (Figures 9 and 10). Anal point invisible. Gonocoxite cylindrical, 250 to 270 µm long. Gonostylus 150 to 155 µm long, and broadened at basal distinctly. Megaseta 10 to 13 µm long. Inferior volsella conspicuous, large and strong. HR 1.61 to 1.80. HV 3.18 to 4.18.

Female, pupa and larva: unknown.

Among the known species of this genus, the new species is closely related to *Macropelopia geotghebueri* Kieffer (Sasa, 1990) in lacking anal point; the color of legs and the closed antennal ratio, but it differs from the present new species in having large and strong inferior volsella.

Macropelopia rotunda sp. n.

Type of material: Holotype male (BDN No. 20789), China: Fujian Province, Nanping City, Mangdang Mountain. 23. IX.2002, light trap, Zheng Liu *legit* Paratypes: 1 male (BDN No. 20791), same data as holotype; Fujian Province, Daiyun Mountain, 13. IX. 2002, 3 males (BDN No. 20177–20179) light trap, Zheng Liu legit (Figures 11, 12, 13 and 14).

Etymology: The species name is from latin, *rotundus*, round, referring to the round marks in the middle of tergum II to V.

Table 2. Lengths (in µm) and proportions of legs of *Macropelopia grandivolsella* new species, male (n = 2).

	Fe	Ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR
P_1	1500-1600	1950-2075	1450	840	580	370	230	0.74
P_2	1700-1700	1875-2050	1150	620	470	300	200	0.61
P_3	1700-1725	2525-2300	1525	850	570	350	220	0.66

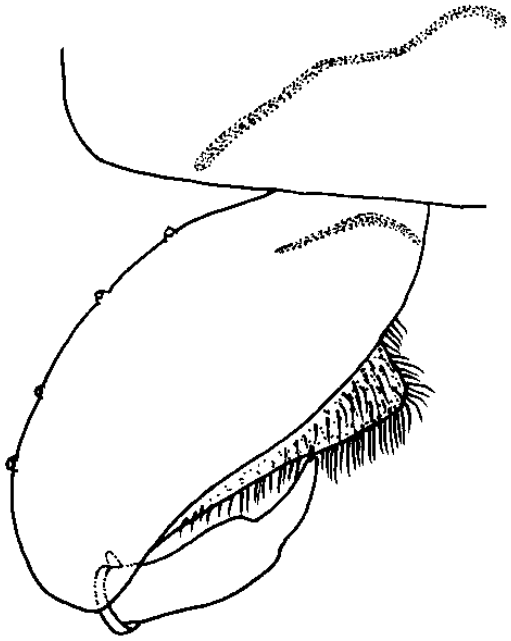

Figure 9. *Macropelpia grandivolsella* sp. n. Adult male. Hypopygium, ventral aspect.

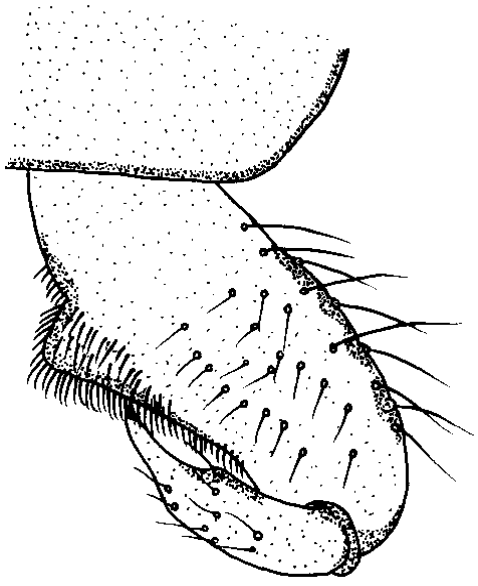

Figure 10., *Macropelpia grandivolsella* sp. n. Adult male. Hypopygium, dorsal aspect.

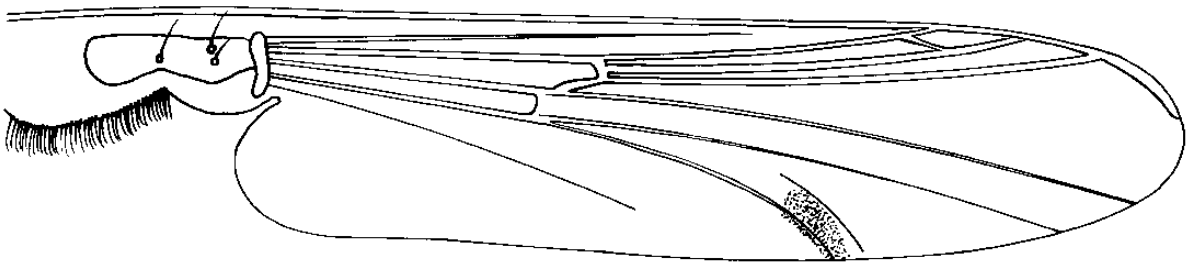

Figure 11. *Macropelpia rotunda* sp. n. Adult male. Wing.

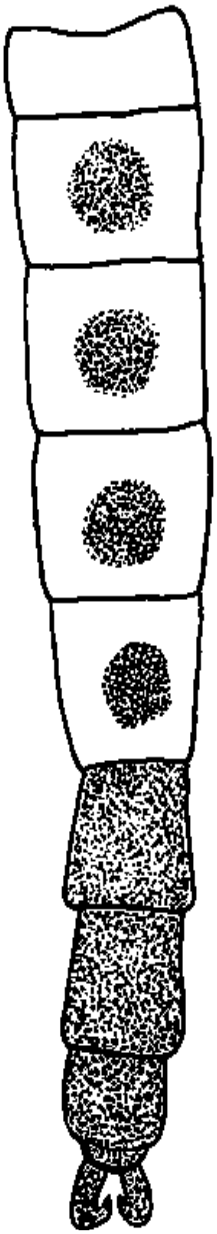

Figure 12. *Macropelpia rotunda* sp. n. Adult male. Abdomen.

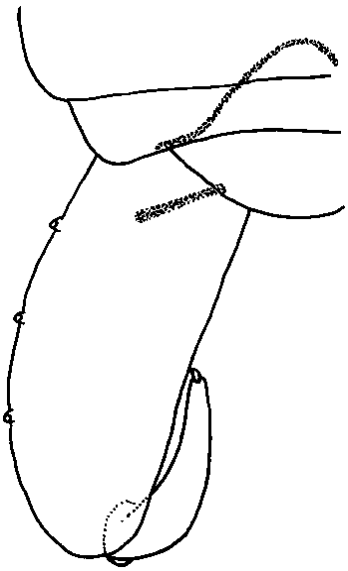

Figure 13. *Macropelpia rotunda* sp. n. Adult male. Hypopygium, ventral aspect.

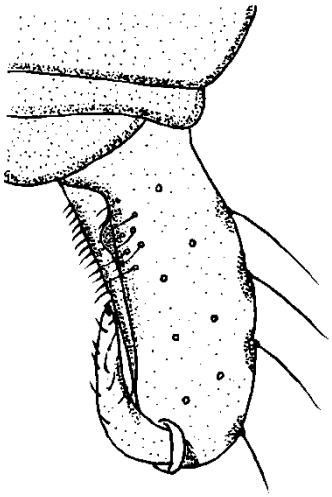

Figure 14. *Macropelpia rotunda* sp. n. Adult male. Hypopygium, dorsal aspect.

Table 3. Lengths (in µm) and proportions of legs of *Macropelopia rotunda* new species, male (n = 5).

	Fe	Ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR
P_1	1175-1375, 1245	1475-1725, 1559	1150-1350, 1213	600-700, 633	400-470, 420	270-330, 290	180-210, 193	0.78-0.79, 0.78
P_2	1250-1475, 1340	1400-1675, 1515	850-1000, 925	410-480, 444	290-350, 318	200-240, 218	140-180, 160	0.59-0.63, 0.61
P_3	1150-1300, 1200	1650-2000, 1750	1025-1300, 1160	570-680, 612	390-500, 428	250-320, 278	160-200, 178	0.62-0.69, 0.66

Diagnostic characters: The new species can be distinguished from other members of the genus by comparative characters: abdominal tergites II to V each with a round mark in the middle; inferior volsella is small; gonostylus short and strong; at the middle and proximal outer margin of gonostylus with tuberculum and setae.

Adult males (n = 5): Total length 5.13 to 5.85, 5.34 mm. Wing length 2.58 to 3.25, 2.77. Total length / wing length 1.80 to 1.99, 193. Wing length / length of profemur 2.14 to 2.36, 2.23.

Colouration: Head brown. Thorax predominantly brown. Legs yellow, femora dark brown, tibiae brown at base. Abdominal tergites I pale; tergites II to V each with a oval brown mark in the median; tergites VI to VIII brown. Hypopygium brown (Figure 12). Wing without brown mark except the distally of Cu1 is brown (Figure 11).

Head: AR 2.09 to 2.23, 2.16. Temporal with 30 setae, including, 8 inner verticals, 16 outer verticals and 6 postorbitals. Clypeus with 16 to 23, 19 setae. Tentorium 190 to 210, 199 µm long, 55 to 70, 62 µm wide. Palpomere 1 to 5 lengths (in µm): 50 to 65, 58; 100 to 105, 101; 145 to 190, 169; 210 to 250, 228; 310 to 390, 352. Palpomere 5/3: 1.74 to 2.36, 2.04.

Wing: VR 0.88 to 0.95, 0.91 (Figure 11). Brachiolum with 3 to 3, 3 long setae. Squama with 44 to 46, 45 setae. Costal extension 120 µm long. Anal lobe strongly round.

Thorax: Antepronotals with 20 setae on each lobe; acrostichals 40 to 58, 49; dorsocentrals 44 to 50, 49; prealars 40 to 44, 42; scutellars 28 to 42, 32. preepisternals 5 to 5, 5; postnotals 12 to 12, 12.

Legs: Spur of foretibia 93 to 110, 105 µm long, with 16 lateral teeth. Spurs of mid tibia 85 to 100, 95 and 53 to 65, 57 µm long, with 18 and 22 lateral teeth, respectively. Spurs of hind tibia 85 to 95, 93 and 50 to 55, 51 µm long, with 20 and 18 lateral teeth, respectively. Fore and hind tibial comb with 6 and 8 setae. Claws distally pointed. Lengths and proportions of legs as in Table 3.

Hypopygium: Tergite IX developed, without setae (Figures 13 and 14). Anal point conical. Gonocoxite 213 to 245, 226 µm long; gonostylus 118 to 130, 125 µm long, simple and with setae. Megaseta 10 to 15, 13 µm long. Inferior volsella small. HR 1.69 to 1.91, 1.80. HV 4.06 to 4.36, 4.27.

Female, pupa and larva: unknown.

The male of new species closely resemble *M. oyaberobusta* Sasa, Kawai & Ueno (Sasa and Okazawa, 1992) in the shape of gonostylus, the color of abdomen and legs. The species can be separated according to the anal point, which is absent in *M. oyaberobusta,* present and conical in the new species.

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