

Notes on the Group of *Malthinus mucoreus* (Coleoptera, Cantharidae, Malthininae) from the Ryukyu Islands, Southwestern Japan

Kazuhiro TAKAHASHI

239–11, Nagamochi, Hiratsuka City, Kanagawa, 259–1217 Japan

Abstract The group of *Malthinus mucoreus* is provisionally proposed. Four species and two subspecies of the species group from the Ryukyu Islands are recognized, of which *M. (Malthinus) takakuwai* sp. nov. and *M. (M.) takakuwai miyakoanus* ssp. nov. are newly described. *Malthinus (Malthinus) kumejimensis* M. SATÔ, 1986 is downgraded to a subspecies of *M. (M.) okinawanus* WITTMER, 1970. A key to the species group from the Ryukyu Islands is given.

Introduction

TAKAHASHI (2010) examined *Malthinus mucoreus* KIESENWETTER, 1879, and described two new species. After his study, it has so far been known four related species of *M. mucoreus* from the Ryukyu Islands; viz. *M. (Malthinus) okinawanus* WITTMER, 1970 from Okinawa Is., *M. (M.) kumejimensis* M. SATÔ, 1986 from Kume-jima Is., *M. (M.) orbiculatus* N. TAKAHASHI, 2010 from Yonaguni-jima Is., Ishigaki-jima Is. and Iriomote-jima Is., and *M. (M.) serrulatus* N. TAKAHASHI, 2010 from Amami-Ôshima Is. and Tokuno-shima Is.

Through my taxonomic study of *Malthinus* species from the Ryukyu Islands, I found an unknown species of the genus from Iriomote-jima Is. It is externally similar to *M. (M.) orbiculatus* N. TAKAHASHI, however apparently different in the structure of male genitalia from the latter at least in that of the population of type locality, Yonaguni-jima Is. After a careful examination, it became clear that the Iriomote-jima specimens are judged new to science, and I also found a new subspecies belonging to the new species from Miyako-jima Is. Furthermore, after the comparative study to the male genitalia, *M. (M.) kumejimensis* M. SATÔ had better to be treated as a subspecies of *M. (M.) okinawanus* WITTMER.

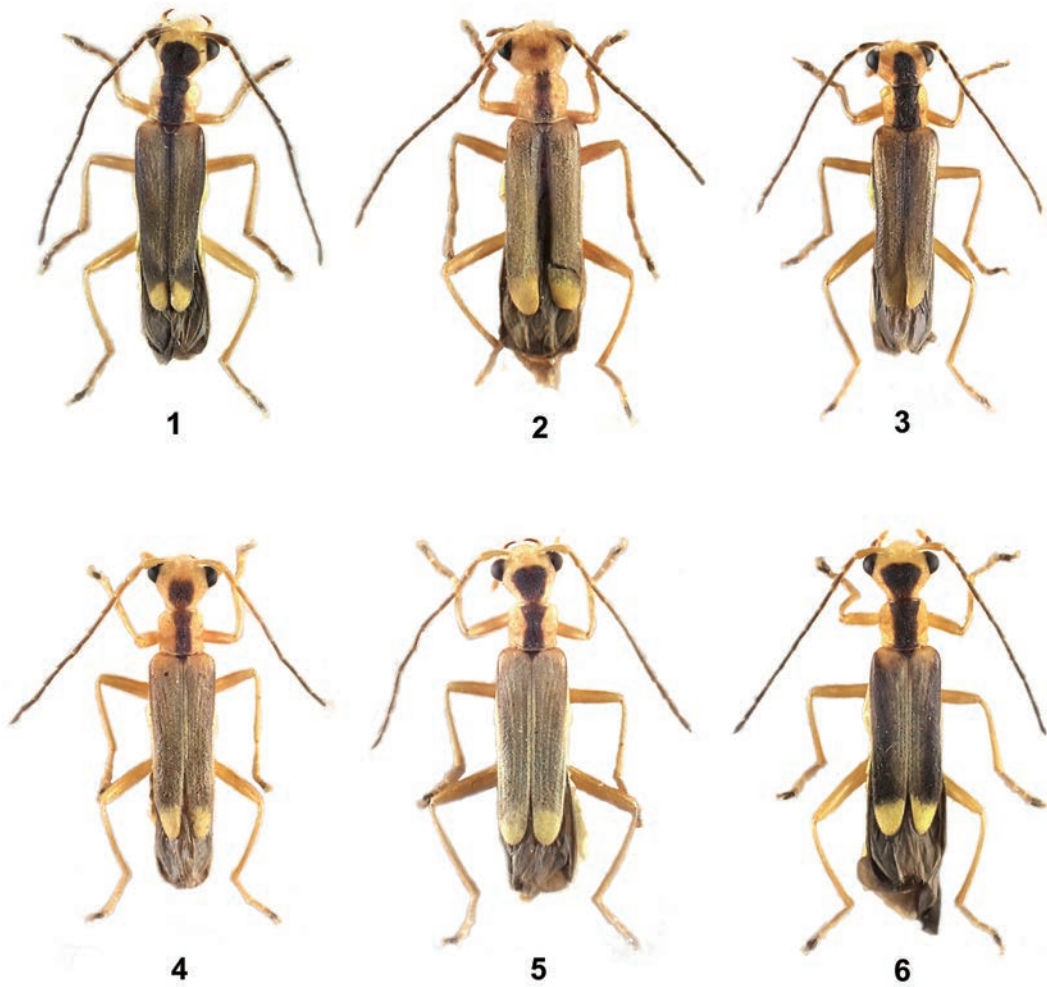
In this paper, I provisionally propose the group of *M. mucoreus*, and recognize four species and two subspecies from the Ryukyu Islands. This species group is characterized by the male genitalia with dorsally projected anterior portion of the inner basal piece and two dorsal lobes of the centrophyse.

This paper is dedicated to the memory of the late Dr. Masatoshi TAKAKUWA with my acknowledgement for his continuous guidance on the entomology for me and critically reading many manuscripts of my papers. I wish to express my cordial thanks to Dr. Takashi TSUCHIDA of the Hamamatsu University School of Medicine for his kind help in providing me with valuable materials.

Materials and Methods

The male and female genitalia examined were treated with 10 % KOH solution at 90°C for about 10 minutes, and sketched in 50 % glycerin.

Terminology of genitalia is basically followed BRANCUCCI (1980) except for the two terms because of his inappropriate naming. “Lateral lobe” is renamed “inner basal piece” because this appa-



Figs. 1–6. Male habitus of *Malthinus* (*Malthinus*) spp. — 1, *M. (M.) takakuwai* sp. nov. (holotype); 2, *M. (M.) takakuwai miyakoanus* ssp. nov. (holotype); 3, *M. (M.) orbiculatus* N. TAKAHASHI; 4, *M. (M.) okinawanus okinawanus* WITTMER; 5, *M. (M.) okinawanus kumejimensis* M. SATÔ; 6, *M. (M.) serrulatus* N. TAKAHASHI.

tus is originated from the eleventh sternite. “One of coxites” is renamed “stylus” because BRANCUCCI (1980) used the same term for obviously different two apparatuses.

The abbreviations used in the text are as follows: HW — width of head; PW — width of pronotum; PL — length of pronotum; EW — width of elytra; EL — length of elytra.

The holotypes to be designated in this paper are deposited in the collection of the Kanagawa Prefectural Museum of Natural History, Odawara, and the paratypes are preserved in my private collection.

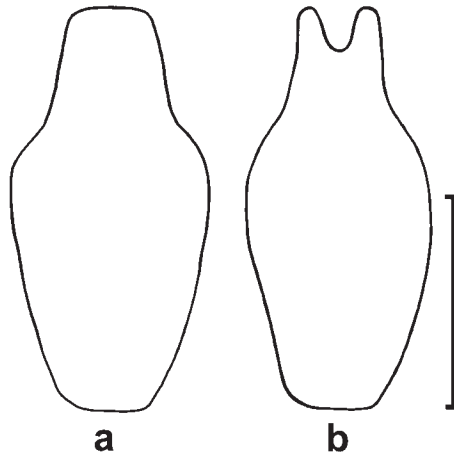


Fig. 7. Male ninth sternite of *Malthinus (Malthinus) takakuwai* sp. nov. — a, Regular type; b, emarginate type (rare). Scale: 0.5 mm.

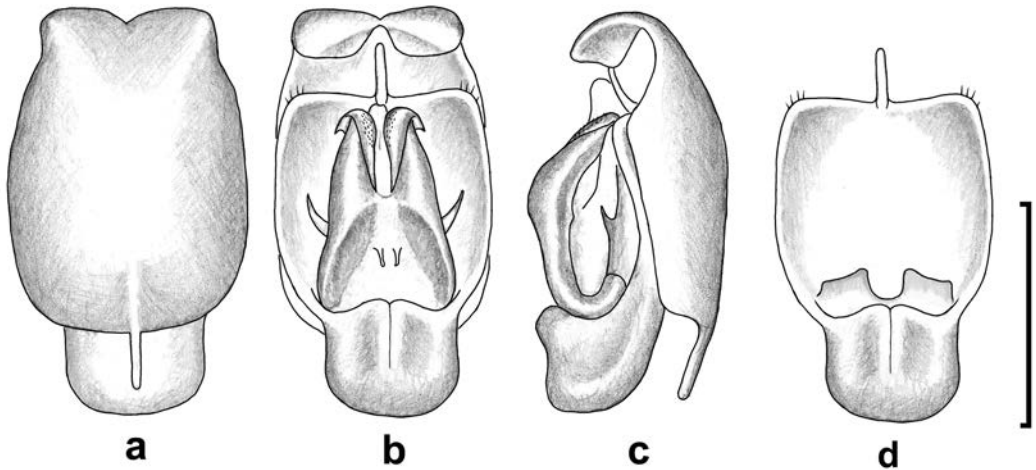


Fig. 8. Male genitalia of *Malthinus (Malthinus) takakuwai* sp. nov. — a, Ventral vein; b, dorsal view; c, lateral view; d, inner basal piece in dorsal view. — bp, Basal piece; ce, centrophysis; ibp, inner basal piece. Scale: 0.5 mm.

Descriptions

Malthinus (Malthinus) takakuwai sp. nov.

[Japanese name: Takakuwa-tsumaki-jōkai]

(Figs. 1 & 7–9)

M a 1 e. Body mainly lemon yellow, brownish black on a large macula on head behind eyes and pronotum excepting both sides; apical half of mandible dark brown; antenna almost brownish black though yellowish brown on the inner sides of 1st and 2nd segments; elytron largely yellowish brown except for the posterior portion, though infuscate along suture and dark brown on lateral side, the dark

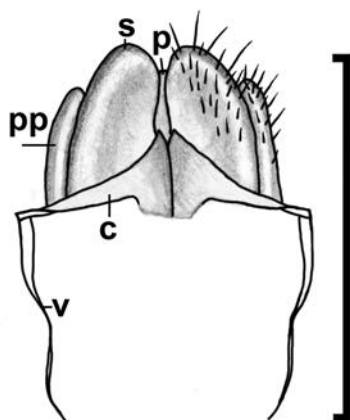


Fig. 9. Female genitalia of *Malthinus* (*Malthinus*) *takakuwai* sp. nov. in ventral view. — c, Coxite; p, proctiger; pp, paraproct; s, stylus; v, valvifer. Scale: 0.5 mm.

brown part is gradually broadened posteriad; all tarsi dark testaceous excepting dark brown 4th segments; middle parts of sternites 2nd to 7th slightly infuscate.

Head rather convex in dorsal aspect, slightly concaved behind eyes, distinctly raised around antennal pore, densely covered with fine hairs and punctures, though the hairs are relatively long on clypeus; neck gradually constricted posteriad. Antennae filiform, reaching apical four-fifths of elytra; comparative lengths of each segment as follows: 1.89 : 1.00 : 1.19 : 1.38 : 1.47 : 1.49 : 1.49 : 1.36 : 1.24 : 1.08 : 1.14. Eyes prominent; inter-ocular distance 2.85 (holotype; range 2.70–2.97) times as wide as an eye. Mandible provided with a distinct inner tooth. Terminal segments of maxillary and labial palpi nearly spindle-shaped. Gula very narrow and concave; gular suture distinct.

Pronotum very slightly broader than long, widest at middle or base; lateral margin slightly sinuate, anterior angle truncate, posterior one weakly prominent; PW/HW 0.66 (0.59–0.66), PW/PL 1.04 (1.02–1.05), PW/PA 1.46 (1.46–1.54), PW/PB 1.05 (1.00–1.05); disc well elevated except for lateral sides, slightly concaved on posterior half, entirely covered with small punctures. Legs slender; each claw simple. Elytron slightly abbreviated, densely covered with small punctures though impunctate on posterior lemon yellow portion; each puncture somewhat lined longitudinally; EW/PW 1.45 (1.43–1.57), EL/EW 2.64 (2.29–2.64).

Abdomen with one or two segments visible in dorsal view. Ninth sternite rather gradually constricted posteriad; posterior margin usually truncated including in the holotype, though rarely emarginated (Fig. 7). Genitalia rather elongate, having complicate structure, consisted of three parts. Basal piece nearly rectangular in ventral view; posterior margin abruptly curved inward in lateral view, very slightly emarginated in ventral view; anterior margin having rather short shaft. Inner basal piece overlapping on basal piece in dorsal view, almost flattened though slightly concaved and anterior portion rather projected dorsally, having distinct thin projection on posterior margin. Centrophyse elongated trapezoidal in dorsal view, furnished with two dorsal lobes and two distinct lateral hooks on a little posterior to middle; dorsal lobe nearly reaching the posterior margin of inner basal piece, gradually constricted posteriad (Fig. 8).

Length: 4.20 mm (holotype), 3.50–4.20 mm (paratypes); breadth: 1.00 mm (holotype), 0.90–1.00 mm (paratypes).

F e m a l e. Similar to male though wider and larger; pronotum widest at base; PW/HW 0.69–0.75, PW/PL 0.99–1.07, PW/PA 1.43–1.52, PW/PB 1.0, EW/PW 1.44–1.54, EL/EW 2.45–2.64; eyes smaller, with inter-ocular distance 3.15–4.12 times as wide as an eye; antennae shorter.

Genitalia as shown in Fig. 9. Coxite elongated triangular, connected at middle. Stylus large; pos-

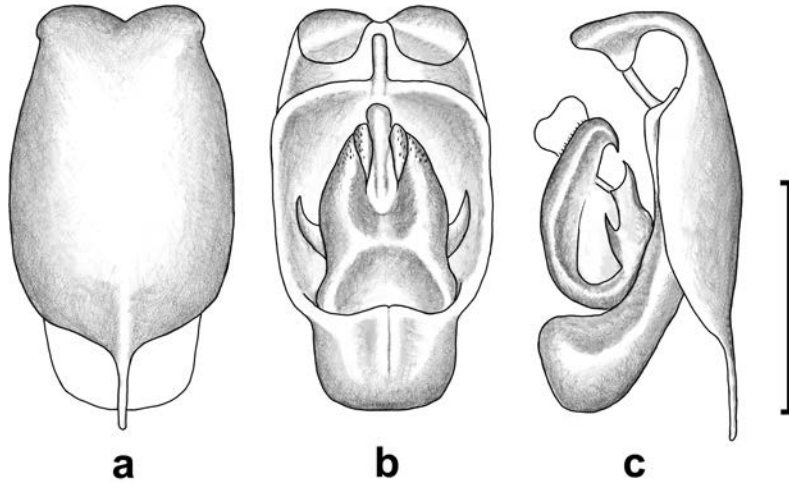


Fig. 10. Male genitalia of *Malthinus (Malthinus) takakuwai miyakoanus* ssp. nov. — a, Ventral view; b, dorsal view; c, lateral view. Scale: 0.5 mm.

terior margin rounded; ventral aspect slightly concaved and furnished with many relatively long hairs. Paraproct slender, furnished with many relatively long hairs. Valvifer thin and slender.

Length: 3.70–5.20 mm; breadth: 0.90–1.20 mm.

Type series. Holotype: ♂, Ôtomi-rindô, Iriomote-jima Is., Okinawa Pref., 22.II.2014, K. TAKAHASHI leg. Paratypes: 1 ♂, 1 ♀, same data as for the holotype; same place as for the holotype: 2 ♀♀, 18.III.2016, T. TSUCHIDA leg.; 7 ♂♂, 11 ♀♀, 6.II.2016, K. TAKAHASHI leg.; 2 ♂♂, 1 ♀, the entrance of Ôtomi-rindô, Iriomote-jima Is., Okinawa Pref., 5.II.2016, K. TAKAHASHI leg.; 3 ♂♂, 2 ♀♀, Komi-rindô, Iriomote-jima Is., Okinawa Pref., 4.II.2016, K. TAKAHASHI leg.

Distribution. Ryukyu Islands, southwestern Japan (Iriomote-jima Is.).

***Malthinus (Malthinus) takakuwai miyakoanus* ssp. nov.**

(Figs. 2 & 10)

M a l e. Body mainly lemon yellow, dark brown on a small macula on head behind eyes and pronotum excepting both sides; apical half of mandible dark brown; antenna dark testaceous; elytron largely pale yellowish brown excepting lemon yellow apical portion, though slightly infuscate along suture and lateral margin; all tarsi testaceous excepting dark testaceous 4th segment.

Comparative lengths of each antennal segment as follows: 1.95 : 1.00 : 1.24 : 1.33 : 1.50 : 1.47 : 1.39 : 1.26 : 1.10 : 1.05 : 1.13. Eyes with inter-ocular distance 2.59 (holotype; paratype 2.67) times as wide as an eye. PW/HW 0.69 (0.67), PW/PL 1.07 (1.04), PW/PA 1.46 (1.44), PW/PB 1.03 (0.7), EW/PW 1.46 (1.49), EL/EW 2.58 (2.52).

Genitalia resembles the nominotypical subspecies, though dorsal lobe of centrophyse not reaching the posterior margin of inner basal piece, and rather abruptly constricted posteriad (Fig. 4). Other fundamental body structure is almost same as the nominotypical subspecies.

Length: 4.10 mm (holotype), 4.00 mm (paratype); breadth: 1.00 mm (holotype), 1.00 mm (paratype).

F e m a l e. Similar to male though wider and larger; pronotum widest at base; PW/HW 0.74–0.78, PW/PL 0.99–1.06, PW/PA 1.55–1.62, PW/PB 1.0–1.01, EW/PW 1.47–1.52, EL/EW 2.41–2.73;

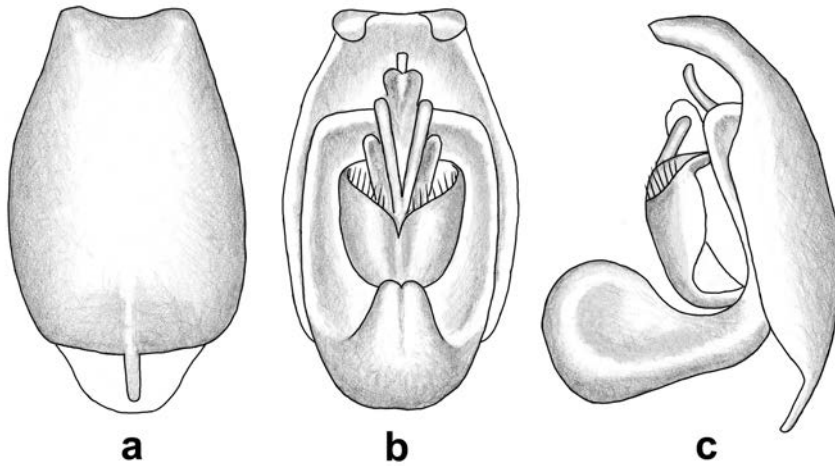


Fig. 11. Male genitalia of *Malthinus (Malthinus) orbiculatus* N. TAKAHASHI. — a, Ventral view; b, dorsal view; c, lateral view. Scale: 0.5 mm.

eyes smaller, with inter-ocular distance 3.21–3.56 times as wide as an eye; antennae shorter.

Length: 4.20–5.70 mm; breadth: 1.00–1.20 mm.

Type series. Holotype: ♂, Mt. Nohara-dake, Miyako-jima Is., Okinawa Pref., 17.III.2013, K. TAKAHASHI leg. Paratypes: 1 ♂, 3 ♀♀, same data as for the holotype.

Distribution. Ryukyu Islands, southwestern Japan (Miyako-jima Is.).

***Malthinus (Malthinus) orbiculatus* N. TAKAHASHI, 2010**

(Fig. 3 & 11)

Malthinus orbiculatus N. TAKAHASHI, 2010: 64.

Specimens examined. 15 ♂♂, 10 ♀♀, Mt. Donan-dake, Yonaguni-jima Is., Okinawa Pref., 2. II.2017, K. TAKAHASHI leg.

Distribution. Ryukyu Islands, SW. Japan (Yonaguni-jima Is., Ishigaki-jima Is. and Iriomote-jima Is.).

Remarks. Male genitalia of this species has the shortened dorsal lobe of the centrophyse which is a distinctly specialized feature among the group of *M. mucoreus* from the Ryukyu Islands.

***Malthinus (Malthinus) okinawanus okinawanus* WITTMER, 1970**

(Figs. 4 & 12)

Malthinus okinawanus WITTMER, 1970: 23.

Specimens examined. 4 ♂♂, 2 ♀♀, Okuma-rindô, Okinawa Is., Okinawa Pref., 24.III.2003, K. TAKAHASHI leg.; 3 ♂♂, 5 ♀♀, the upper stream of Yona-River, Okinawa Is., Okinawa Pref., 24. III.2003, K. TAKAHASHI leg.

Distribution. Ryukyu Islands, southwestern Japan (Okinawa Is.).

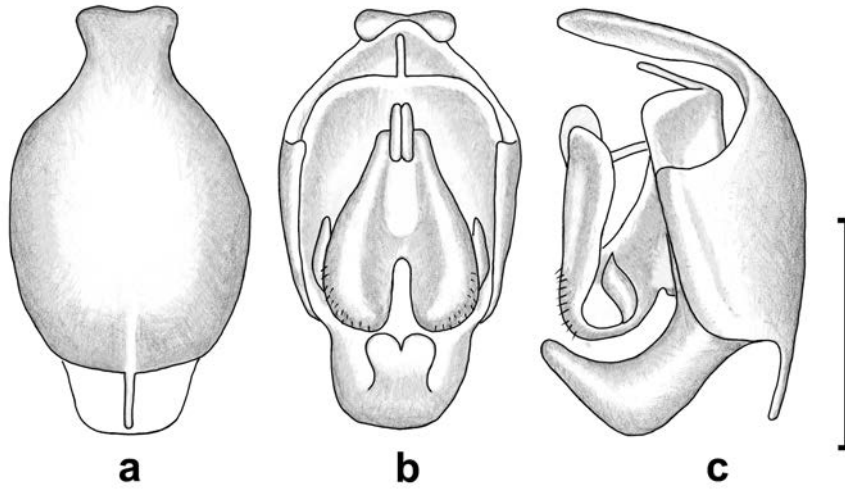


Fig. 12. Male genitalia of *Malthinus (Malthinus) okinawanus okinawanus* WITTMER. — a, Ventral view; b, dorsal view; c, lateral view. Scale: 0.5 mm.

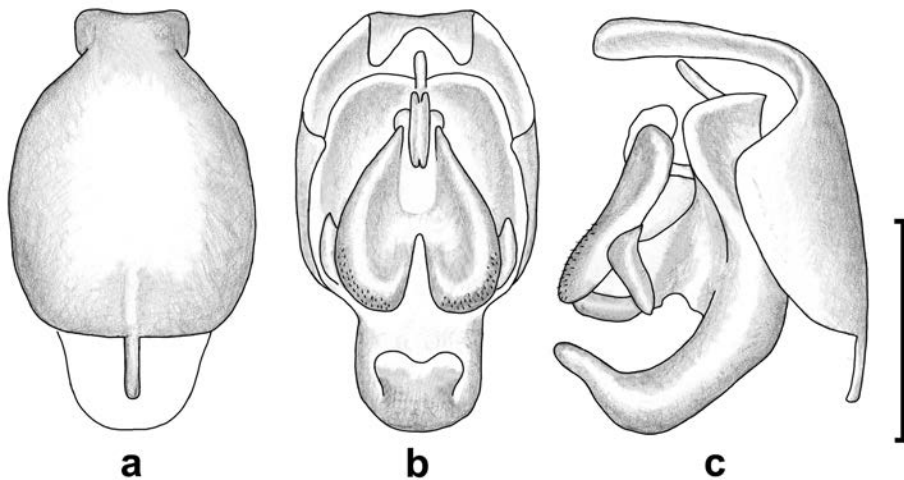


Fig. 13. Male genitalia of *Malthinus (Malthinus) okinawanus kumejimensis* M. SATÔ. — a, Ventral view; b, dorsal view; c, lateral view. Scale: 0.5 mm.

Malthinus (Malthinus) okinawanus kumejimensis M. SATÔ, 1986

(Fig. 5 & 13)

Malthinus kumejimensis M. SATÔ, 1985: 116. (Invalid according to ICZN Art. 16.1 and 16.4.)

Malthinus kumejimensis M. SATÔ, 1986: 258.

The external morphology and the male genitalia of *Malthinus (Malthinus) kumejimensis* M. SATÔ, 1986 closely resembles those of *M. (M.) okinawanus* WITTMER, 1970. The difference between these two taxa can only be observed from the anterior portion of inner basal piece of male genitalia, and this status is judged not to reach the specific level. Thus, I deal with *M. (M.) kumejimensis* to a

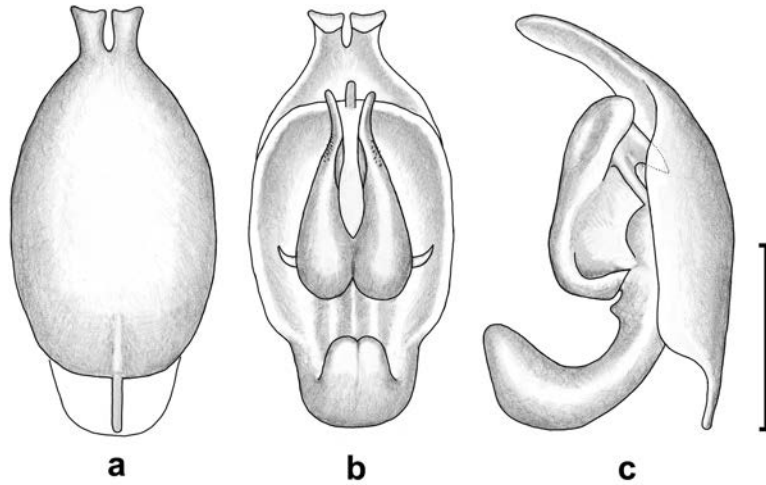


Fig. 14. Male genitalia of *Malthinus (Malthinus) serrulatus* N. TAKAHASHI. — a, Ventral view; b, dorsal view; c, lateral view. Scale: 0.5 mm.

subspecies of *M. (M.) okinawanus*.

Specimens examined. 5 ♂♂, 3 ♀♀, Mt. Uegusuku-dake, Kume-jima Is., Okinawa Pref., 18.III.2012, K. TAKAHASHI leg.; 4 ♂♂, 3 ♀♀, Ara-rindô, Kume-jima Is., Okinawa Pref., 18.III.2012, K. TAKAHASHI leg.

Distribution. Ryukyu Islands, southwestern Japan (Kume-jima Is.).

***Malthinus (Malthinus) serrulatus* N. TAKAHASHI, 2010**

(Fig. 6 & 14)

Malthinus serrulatus N. TAKAHASHI, 2010: 61.

Specimens examined. 9 ♂♂, 11 ♀♀, Akatsuchiyama-rindô, Uken-son, Amami-Ôshima Is., Kagoshima Pref., 5.IV.2014, K. TAKAHASHI leg.; 5 ♂♂, 6 ♀♀, Imazato, Yamato-son, Amami-Ôshima Is., Kagoshima Pref., 6.IV.2014, K. TAKAHASHI leg.

Distribution. Ryukyu Islands, southwestern Japan (Amami-Ôshima Is. and Tokuno-shima Is.).

Remarks. Regarding the structure of male genitalia, the present species is closely related to *M. (M.) mucoreus* KIESENWETTER, 1879. The differences between these two species are seemed relatively small which can be seen among other species of the Ryukyu Islands.

A Key to the Group of *Malthinus mucoreus* from the Ryukyu Islands Based on Male

1. Male genitalia with anterior portion of inner basal piece obviously projected in lateral view. 2
- Male genitalia with anterior portion of inner basal piece not so projected in lateral view. 5
2. Male genitalia with dorsal lobe of centrophyse relatively long, gradually constricted posteriad. 3

- Male genitalia with dorsal lobe of centrophyse short, distinctly dilated posteriad. Elytra relatively darkened. A macula on head and pronotum developed. *M. (M.) orbiculatus* N. TAKAHASHI, 2010
- 3. Male genitalia with dorsal lobe of centrophyse not so long, with apex not reaching the posterior margin of inner basal piece, posterior portion of basal piece distinctly curved dorsally. A macula on head and pronotum relatively small. Elytra lightened. 4
- Male genitalia with dorsal lobe of centrophyse long, with apex reaching beyond the posterior margin of inner basal piece, posterior portion of basal piece slightly curved dorsally. A macula on head and pronotum relatively large. Elytra darkened. *M. (M.) serrulatus* N. TAKAHASHI, 2010
- 4. Anterior portion of inner basal piece of male genitalia relatively projected in lateral view, with apex widely emarginate in dorsal view. *M. (M.) okinawanus kumejimensis* M. SATÔ
- Anterior portion of inner basal piece of male genitalia not projected in lateral view, with apex narrowly emarginate in dorsal view. *M. (M.) okinawanus okinawanus* WITTMER, 1970
- 5. Dorsal lobe of centrophyse of male genitalia relatively long, with apex nearly reaching the posterior margin of inner basal piece. A macula on head and pronotum relatively large. Elytra darkened. *M. (M.) takakuwai takakuwai* sp. nov.
- Dorsal lobe of centrophyse of male genitalia relatively short, with apex obviously not reaching the posterior margin of inner basal piece. A macula on head and pronotum relatively small. Elytra lightened. *M. (M.) takakuwai miyakoanus* ssp. nov.

要 約

高橋和弘：琉球列島産の *Malthinus mucoreus* 種群について（鞘翅目ジョウカイボン科）。———琉球列島産の *Malthinus mucoreus* 種群について検討した結果、4種2亜種を認め、検索表を作成した。西表島産の標本に基づき、タカクワツマキジョウカイ（新称）*Malthinus (Malthinus) takakuwai* sp. nov. を、宮古島産の標本に基づき、その新亜種 *M. (M.) takakuwai miyakoanus* ssp. nov. をそれぞれ記載した。また、交尾器の形態比較等により、*M. (M.) kumejimensis* M. SATÔ を *M. (M.) okinawanus* WITTMER の亜種とした。

References

- BRANCUCCI, M., 1980. Morphologie comparée, évolution et systématique des Cantharidae (Insecta: Coleoptera). *Entomologica basiliensis*, **5**: 215–388.
- KIESENWETTER, H., 1879. Coleoptera Japoniae collecta a Domino LEWIS et aliis. *Deutsche entomologische Zeitschrift*, **23**: 305–320.
- SATÔ, M., 1985. Cantharidae. Pp. 107–118, pls. 17–19. In KUROSAWA, Y., S. HISAMATSU & H. SASAJI (eds.), *Colored Illustrations of the Coleoptera of Japan*, **3**. 500 pp. Hoikusha, Osaka. (In Japanese, with English title.)
- SATÔ, M., 1986. New Cantharoidea from Japan, II (Coleoptera). *Transactions of the Shikoku Entomological Society*, **17**: 255–261.
- TAKAHASHI, N., 2010. Notes on *Malthinus mucoreus* (Coleoptera: Cantharidae), with descriptions of two new related species from the Ryukyus, southwest Japan. *Zootaxa*, **2563**: 53–68.
- WITTMER, W., 1970. Coleoptera of the Loo-Choo Archipelago (II). 17. Families Cantharidae and Malachiidae. *Memoirs of the Faculty of Education Kagawa University*, Part 2, (192): 22–27.

Manuscript received 6 August 2017;
revised and accepted 24 September 2017.