

Cantharid Beetles of the Genus *Prothemus* (Coleoptera, Cantharidae) of the Ryukyu Islands, Southwest Japan

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Abstract A new species of the genus *Prothemus* is described and illustrated from Ishigaki-jima and Iriomote-jima of the Ryukyu Islands, under the name of *P. nigrihumeralis*. *Prothemus kanoi* WITTMER, which was originally described from Taiwan, is newly recorded from the Ryukyus. A key is provided to all the *Prothemus* species from the Ryukyus.

Forty-seven species of the genus *Prothemus* have hitherto been known from the Oriental and the Eastern Palearctic Regions. Of these, six species are recorded from Taiwan by WITTMER (1984) and two species from Japan excluding the Ryukyu Islands by TAKAHASHI (1992, 1995) and NAKANE (1993).

As regards the cantharid fauna of the Ryukyu Islands, WITTMER (1975) described *Prothemus ryukyuanus* from Amami-ôshima Island for the first time. After that, IMASAKA and YAMAJI (1989) and OKUSHIMA (1997) recorded the same species from Okinawa-hontô Island and Toku-no-shima Island, respectively. However no other species of the genus have been known from the archipelago.

Recently, we had an opportunity to examine two remarkable *Prothemus* species from Ishigaki-jima and Iriomote-jima of the Ryukyu Islands. After a careful examination, it has become clear that one of them must be new to science, and that the other agrees with *P. kanoi* WITTMER, 1984, which was originally described from Taiwan. They will be either described or recorded in the present paper.

All the three species of the genus *Prothemus* hitherto known from the Ryukyu Islands, including the new species, are summarized in a key.

We wish to express our hearty thanks to Dr. Shun-Ichi UENO of the National Science Museum (Nat. Hist.), Tokyo, for his critical reading of the original manuscript, to

Dr. Walter WITTMER of the Naturhistorisches Museum Basel, Dr. Junichi YUKAWA and Mr. Naoki TAKAHASHI of Kyushu University, Fukuoka, and Dr. Yutaka ARITA of Meijo University, Nagoya, for their kind support of the present study in many ways, and to all the collectors who supported us with valuable specimens.

Genus *Prothemus* CHAMPION

Prothemus CHAMPION, 1926, Entomologist's mon. Mag., **62**: 195.

Type species: *Prothemus neglectus* CHAMPION, 1926, by original designation.

In the Ryukyu Islands, only one species of the genus is previously recorded. Two additional species are dealt with in the present paper.

Prothemus ryukyuanus WITTMER

[Japanese name: Ryûkyû-marumune-joukai]

Prothemus ryukyuanus WITTMER, 1975, Mitt. schweiz. ent. Ges., **48**: 260, figs. 2–3. — IMASAKA & YAMAJI, 1989, Gekkan-Mushi, Tokyo, (226): 15. — OKUSHIMA, 1997, Elytra, Tokyo, **25**: 91, fig. 2.

Notes. This species was described by WITTMER (1975) from Amami-ôshima Is. based on three specimens. After that, IMASAKA and YAMAJI (1989) recorded it from Okinawa-hontô Is. and OKUSHIMA (1997) from Toku-no-shima Is., respectively.

In the present paper, we will newly report this species from Kume-jima Is. which is situated to the west of Okinawa-hontô Is.

The individuals from Okinawa-hontô Is. and Kume-jima Is. seem to be somewhat smaller in body length than those from the other areas. In the coloration of the body, specimens of Kume-jima Is. tend to become paler than those of the other areas. However, these variations are not peculiar to a population of an island but overlap within single populations. Though a difference in trend can be observed between populations of different islands, we prefer to regard them as mere geographical variation within the same species.

Length of body: 6.88–12.39 mm in male, 8.22–15.32 mm in female.

Specimens examined. [Amami-ôshima Is., Ryukyus] 1 ♂, Mt. Miyama, 24–III–1990, T. UENO leg.; 1 ♂, Chûô-rindô, 25–III–1990, S. OKAJIMA leg.; 1 ♂, Fureai-no-mori, 27–III–1990, Y. OKUSHIMA leg.; 1 ♂, Fureai-no-mori, 28–III–1990, Y. OKUSHIMA leg.; 2 ♂♂, 1 ♀, Naze-shi, 29–III–1990, Y. OKUSHIMA leg.; 2 ♂♂, Fureai-no-mori, 1–IV–1991, T. UENO leg.; 7 ♂♂, 4 ♀♀, Akatsuchiyama-kôen, Uken-son, 2–IV–1991, T. UENO leg.; 1 ♂, Mt. Yuwan-dake, 2–IV–1991, T. UENO leg.; 6 ♂♂, 1 ♀, Mt. Miyama, Setouchi-chô, 3–IV–1991, T. UENO leg.; 4 ♂♂, 2 ♀♀, Mt. Yui-dake, 6–IV–1991, K. MATSUMOTO leg.; 4 ♂♂, Hatsuno, 7–IV–1991, K. MATSUMOTO leg.; 1 ♀, Asato-tôge, Naze-shi, 7–IV–1991, T. UENO leg.; 2 ♂♂, Annegachi, Naze-shi, 7–IV–1991, T. UENO leg.; 5 ♂♂, 1 ♀, Nangawa-rindô, 8–IV–1991, K. MATSUMOTO leg.; 2 ♂♂, 1 ♀, Mt. Yuwan-dake, 9–IV–1991, K. MATSUMOTO leg.; 1 ♀, Nangawa-rindô, 11–IV–1991, K. MATSUMOTO leg.; 1 ♀, Mt. Yuwan-dake, 12–IV–1991, 1 ♂, 2 ♀♀, Mt. Yuwan-dake, 13–IV–1991, K. MA-

TSUMOTO leg.; 1 ♂, 1 ♀, Mt. Yuwan-dake, 26-IV-1993, K. TOYODA leg.; 2 ♂♂, 1 ♀, Mt. Yuwan-dake, 30-IV-1994, H. ÔHIRA leg.; 2 ♂♂, 2 ♀♀, Uken-son, 2-V-1994, H. ÔHIRA leg.; 2 ♂♂, 5 ♀♀, Kinsakubaru, 1-V-1996, R. MATSUMOTO leg. [Toku-no-shima Is., Ryukyus] 1 ♂, 3 ♀♀, Mt. Inokawa-dake, 28-IV-1996, R. MATSUMOTO leg. [Okinawa-hontô Is., Ryukyus] 1 ♀, Mt. Yonaha-dake, Kunigami-son, 29-III-1974, K. SUGINO leg.; 1 ♂, Oku, Kunigami-son, 28-III-1977, N. NISHIKAWA leg.; 2 ♂♂, 1 ♀, Yona, 12~14-III-1988, T. UENO leg.; 1 ♂, Yona, 18-III-1988, T. UENO leg.; 1 ♂, Kijoka, 5-IV-1988, T. UENO leg.; 1 ♀, Mt. Oppa-dake, 28-IV-1989, T. UENO leg.; 2 ♂♂, 1 ♀, Mt. Oppa-dake, 3-IV-1990, Y. OKUSHIMA leg.; 1 ♂, 2 ♀♀, Mt. Yonaha-dake, 4-IV-1990, Y. OKUSHIMA leg.; 1 ♀, Mt. Yonaha-dake, 5-IV-1990, T. UENO leg.; 2 ♂♂, 4 ♀♀, Mt. Yonaha-dake, 6-IV-1990, Y. OKUSHIMA leg.; 1 ♂, Fukugawa-dam, 2-V-1990, T. UENO leg.; 1 ♀, Yona, 18-III-1991, T. UENO leg.; 1 ♂, Benoki-dam, 20-III-1991, M. HIRADATE leg.; 2 ♂♂, Fukugawa-dam, 20-III-1991, T. UENO leg.; 1 ♂, Mt. Yonaha-dake, 6-III-1991, C. KUWABARA leg.; 2 ♀♀, Yona, 15-IV-1991, Y. OKUSHIMA leg.; 1 ♂, 3 ♀♀, Mt. Yonaha-dake, 16-IV-1991, Y. OKUSHIMA leg.; 1 ♀, Kenmin-no-mori, 5-III-1995, K. MATSUMOTO leg. [Kume-jima Is., Ryukyus] 1 ♂, Mt. Daruma-yama, 8-IV-1990, T. UENO leg.; 2 ♂♂, 1 ♀, nr. Mt. Daruma-yama, 3-IV-1996, Y. OKUSHIMA leg.; 5 ♂♂, 6 ♀♀, nr. Mt. Aara-dake, 4-IV-1996, Y. OKUSHIMA leg.; 3 ♂♂, 2 ♀♀, nr. Mt. Daruma-yama, 5-IV-1996, Y. OKUSHIMA leg.; 1 ♂, nr. Mt. Aara-dake, 6-IV-1996, Y. OKUSHIMA leg.; 3 ♂♂, 3 ♀♀, nr. Mt. Daruma-yama, 6-IV-1996, Y. OKUSHIMA leg.; 6 ♂♂, 5 ♀♀, nr. Mt. Daruma-yama, 7-IV-1996, Y. OKUSHIMA leg.

Depository of the specimens examined. The specimens recorded above are preserved in the collections of the Kurashiki Museum of Natural History and the Biological Laboratory, Nagoya Women's University.

Distribution. Ryukyu Islands (Amami-ôshima Is., Toku-no-shima Is., Okinawa-hontô Is., Kume-jima Is. — new record).

***Prothemus nigrihumeralis* OKUSHIMA et M. SATÔ, sp. nov.**

[Japanese name: Kataguro-marumune-joukai]

(Figs. 1-5)

Male. Colour mostly orange yellow; apical parts of mandibles reddish yellow; antennae dark brown except for yellowish brown basal part of 1st segment; elytra yellowish brown; eyes and longitudinal stripes of elytra black; tips of femora, some parts of tibiae and tarsi slightly blackened. Body closely covered with fine pale pubescence; antennae intermingled with some brown bristles in addition to primary pubescence; elytra intermingled sparsely with yellowish bristles in addition to primary pubescence; apical margin of clypeus fringed with yellowish bristles; legs covered with yellowish bristles.

Head slightly shorter than width; disc almost flattened between eyes and depressed along the apical margin of clypeus and lateral areas before eyes; apical margin of clypeus arcuate; eyes large, globular and strongly prominent; antennae attaining to

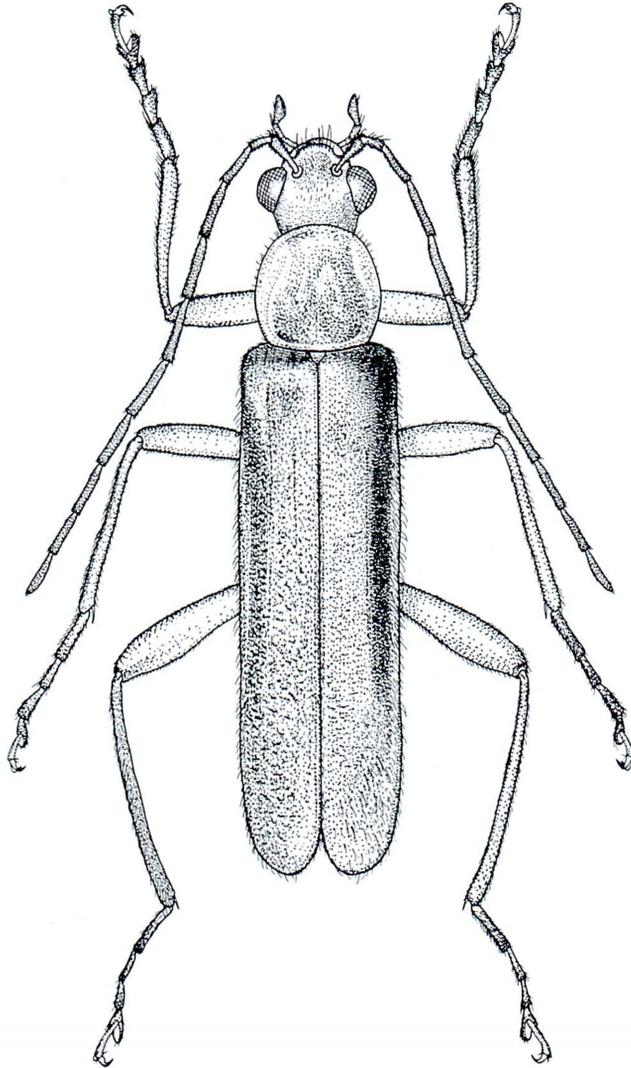
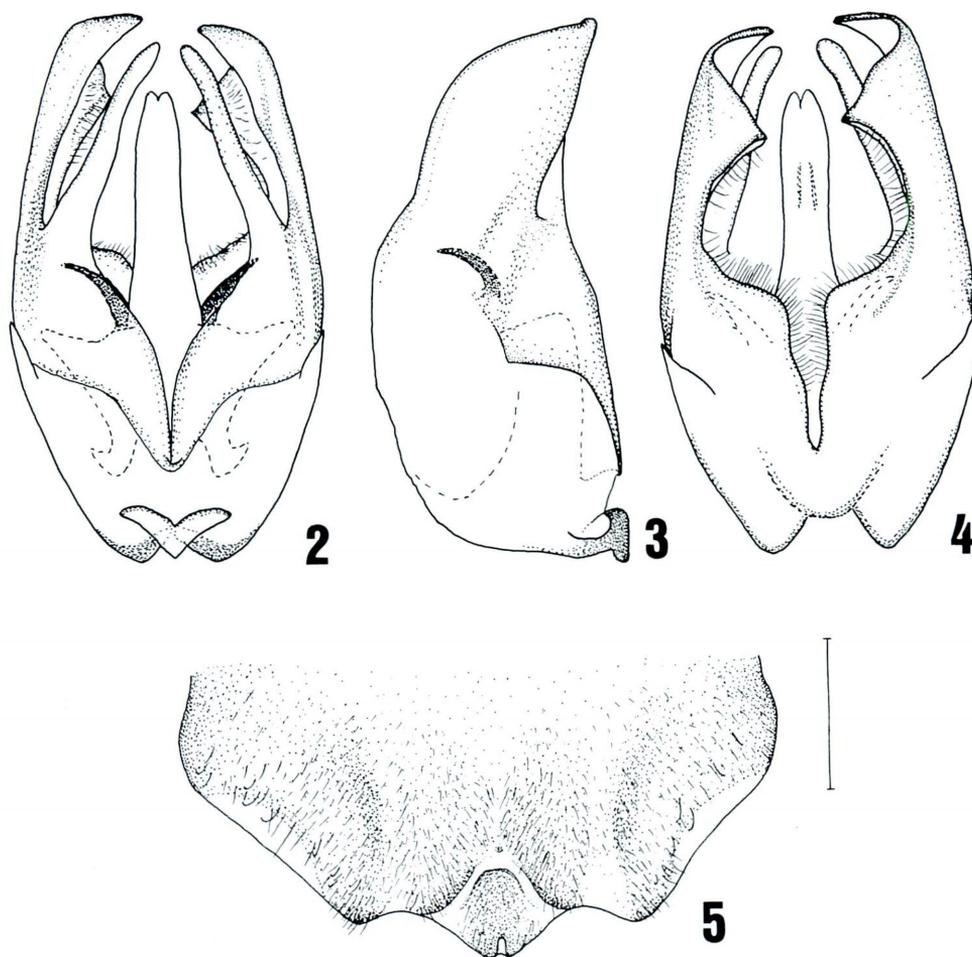


Fig. 1. *Prothemus nigrihumeralis* OKUSHIMA et M. SATŌ, sp. nov., from Ishigaki-jima of the Ryukyus, ♂.
(Scale: 2.0 mm.)

apical third of elytra; 1st segment clavate, 2nd short, 3rd to 11th subcylindrical, each segment of 4th to 11th (or to 10th in some individuals) with a short groove on inner side, relative lengths of antennal segments as follows:— 20: 10: 17.5: 24: 23.5: 24: 23: 21: 19.5: 17.5: 20.

Pronotum almost semicircular, especially in anterior margin, 1.01 times as wide as head in the holotype (range 0.97–1.07), 0.99 (0.92–1.04) times as long as wide; disc



Figs. 2-5. *Prothemus nigrihumeralis* OKUSHIMA et M. SATÔ, sp. nov., from Ishigaki-jima of the Ryukyus. — 2-4, Male genitalia (2, ventral view; 3, lateral view; 4, dorsal view); 5, 8th abdominal sternite in female. (Scale: 0.5 mm.)

swollen, especially so in the posterior area, slightly depressed along the anterior margin, and strongly depressed along the posterior margin, antero-lateral areas hollowed; medio-longitudinal furrow distinct in posterior half and disappearing in anterior half. Scutellum triangular with rounded apex.

Elytra conjointly 1.24 (1.17-1.30) times as wide as pronotum, 3.24 (3.20-3.55) times as long as wide, the sides subparallel; disc distinctly, closely and rugosely punctate, each elytron provided with two vague costae.

Apex of prosternal process concave. Mesosternum slightly convex along the median line. Each outer claw of fore and middle legs provided with a lobe at the base; rel-

ative lengths of hind tarsal segments as follows:—54: 34: 31: 30: 31.

Male genitalia: ventral process of each lateral lobe twisted and feebly sinuate; each laterophysus long and remarkably bent dorsad, with pointed apex; dorsal plate of each lateral lobe provided with a large simple tooth with pointed tip on the inner side, and widely and roundly emarginate both in front and behind of the tooth (Figs. 2–4).

Length of body: 9.51 mm in the holotype (range 8.12–10.15); length of hind tibia: 3.12 (2.70–3.34) mm.

Female. Body somewhat longer and wider than in the male. Eyes not so prominent as in the male. Antennae a little shorter and devoid of groove on each segment. Pronotum 1.10–1.27 times as wide as head, 0.86–0.97 times as long as wide. Elytra conjointly 1.23–1.35 times as wide as pronotum, 2.92–3.27 times as long as wide. Each claw of all legs lacking a lobe. Eighth abdominal sternite with a plate at the centre of terminal margin, which has a small notch at the tip; this median plate more prominent posteriorly than the level of the lateral sides of terminal margin (Fig. 5).

Length of body: 8.32–12.05 mm; length of hind tibia: 2.66–3.51 mm.

Type series. Holotype: ♂, Mt. Omoto-dake, Ishigaki-jima Is., Ryukyus, 6–III–1995, K. MATSUMOTO leg. Allotype: ♀, same locality as for the holotype, 7–III–1995, K. MATSUMOTO leg. Paratypes: [Ishigaki-jima Is., Ryukyus] 1 ♀, Mt. Omoto-dake, 20–II–1990, Y. OKUSHIMA leg.; 1 ♂, 1 ♀, Urasoko, 14–III–1990, Y. OKUSHIMA leg.; 1 ♂, Takeda-rindô, 15–III–1990, Y. OKUSHIMA leg.; 1 ♂, Mt. Omoto-dake, 17–III–1990, Y. OKUSHIMA leg.; 1 ♂, Takeda-rindô, 15–III–1991, Y. OKUSHIMA leg.; 1 ♂, Mt. Omoto-dake, 28–II–1992, S. NIRASAWA leg.; 1 ♀, Mt. Omoto-dake, 28–III–1992, T. HANATANI leg.; 2 ♂♂, 2 ♀♀, Mt. Omoto-dake, 14~15–III–1993, T. HANATANI leg.; 3 ♀♀, Mt. Omoto-dake, 6–III–1995, H. SATO leg.; 3 ♀♀, same data as for the holotype; 1 ♀, Mt. Omoto-dake, 7–III–1995, H. SATO leg.; 1 ♂, 2 ♀♀, same data as for the allotype; 1 ♀, Mt. Omoto-dake, 8–III–1995, K. MATSUMOTO leg.; 1 ♀, Mt. Omoto-dake, 21–III–1995, N. TAKAHASHI leg.; 1 ♂, Yamahara, 12–II–1996, T. FUKAISHI leg.; 1 ♂, Kabiranakasuji, 15–III–1996, T. FUKAISHI leg. [Iriomote-jima Is., Ryukyus] 1 ♀, Kanpira-no-taki, 27–III–1991, Y. OKUSHIMA leg.; 1 ♀, Shirahama-rindô, 9–III–1993, S. TSUCHIYA leg.; 2 ♂♂, 1 ♀, Maryûdo-no-taki, 9–III–1993, Y. OKUSHIMA leg.; 1 ♂, 2 ♀♀, Maryûdo-no-taki, 10–III–1993, Y. OKUSHIMA leg.; 1 ♀, Maryûdo-no-taki, 11–III–1993, Y. OKUSHIMA leg.; 1 ♀, Maryûdo-no-taki, 17–III–1993, Y. OKUSHIMA leg.; 3 ♂♂, 1 ♀, Maryûdo-no-taki, 12–III–1995, Y. OKUSHIMA leg.

Type depository. The holo- and allotypes are preserved in the collection of the Kurashiki Museum of Natural History. The paratypes will be distributed to the collections of the National Science Museum (Nat. Hist.), Tokyo, the Biological Laboratory, Nagoya Women's University, and so on.

Distribution. Ryukyu Islands (Ishigaki-jima Is., Iriomote-jima Is.).

Notes. The black stripe on each elytron is very variable in size. In the pale-coloured type, the black stripe remains only at the humeral part, while in the dark-coloured type, the black colour extends over most parts of the elytra except along the suture.

This new species is closely related to *P. ryukyuanus* WITTMER, 1975, from Amami-ōshima Is., but can easily be distinguished from the latter by the existence of the black stripe on each elytron, the long laterophyses of the male genitalia which obviously bend dorsad, and the median plate of the 8th abdominal sternite in female, which is more salient behind than the lateral sides of the terminal margin.

***Prothemus kanoi* WITTMER**

[Japanese name: Kano-marumune-joukai]

(Figs. 6–10)

Prothemus kanoi WITTMER, 1984, Ent. Rev. Japan, **39**: 146, fig. 85.

Notes. This species was described by WITTMER (1984) from Taiwan. According to the original description, the colour of the pronotum is usually almost black, but rarely orange in females.

In the present study, we have examined four *Prothemus* specimens from Ishigaki-jima and Iriomote-jima, which are small-sized and resemble *P. kanoi*. At first, we considered that they might belong to another species related to *P. kanoi*, because all of them had orange pronotum. However, we were unable to recognize any differences between the Taiwanese and the Yaeyama specimens other than the colour of the pronotum. We have therefore concluded that the two types of colour patterns merely show geographical variation within the same species.

Male genitalia and 8th abdominal sternite are as illustrated in Figs. 7–10.

Length of body: 6.44–7.95 mm in male, 8.05–8.44 mm in female.

Specimens examined. [Ryukyus] 1 ♂, Mt. Omoto-dake, Ishigaki-jima Is., 27–IV–1995, H. KARUBE leg.; 1 ♂, Takeda-rindō, Ishigaki-jima Is., 14–IV–1996, N. TAKAHASHI leg.; 1 ♂, Kanpira-no-taki, Iriomote-jima Is., 3–V–1984, M. TANIKADO leg.; 1 ♀, Gunkan-iwa–Kanpira-no-taki, Iriomote-jima Is., 17–IV–1996, N. TAKAHASHI leg. [Taiwan] 1 ♂, 1 ♀ (paratypes), Sungkang, 2,000 m–Tsui Feng, 2,300 m, Nantou Hsien, 29–VI–1965, T. YAMASAKI leg.; 1 ♂, Sungkang, Nantou Hsien, 28–VII–1968, K. YAMAMOTO leg.; 1 ♂, Lishan, Taichung Hsien, 22–VI–1976, H. MAKIHARA leg.; 1 ♂, Lushan Spa, Nantou Hsien, 31–V–1981, K. SASAGAWA leg.; 1 ♂, Alishan, 2,200 m, Chiayi Hsien, 12–VII–1984, Y. ARITA leg.; 1 ♂, Sungkang, Nantou Hsien, 28–VI–1995, C. LOU leg.; 1 ♂, Sungkang, Nantou Hsien, 1–VII–1995, C. LOU leg.; 1 ♂, 1 ♀, Nanshan, Ilan Hsien, 23–VII–1995, C. LOU leg.

Depository of the specimens examined. The paratypes are preserved in the collection of the Biological Laboratory, Nagoya Women's University. The other specimens recorded above are preserved in the collections of the Kurashiki Museum of Natural History, the Biological Laboratory, Nagoya Women's University, Kyushu University, and N. TAKAHASHI.

Distribution. Ryukyus (Ishigaki-jima Is., Iriomote-jima Is.)—new records, Taiwan.

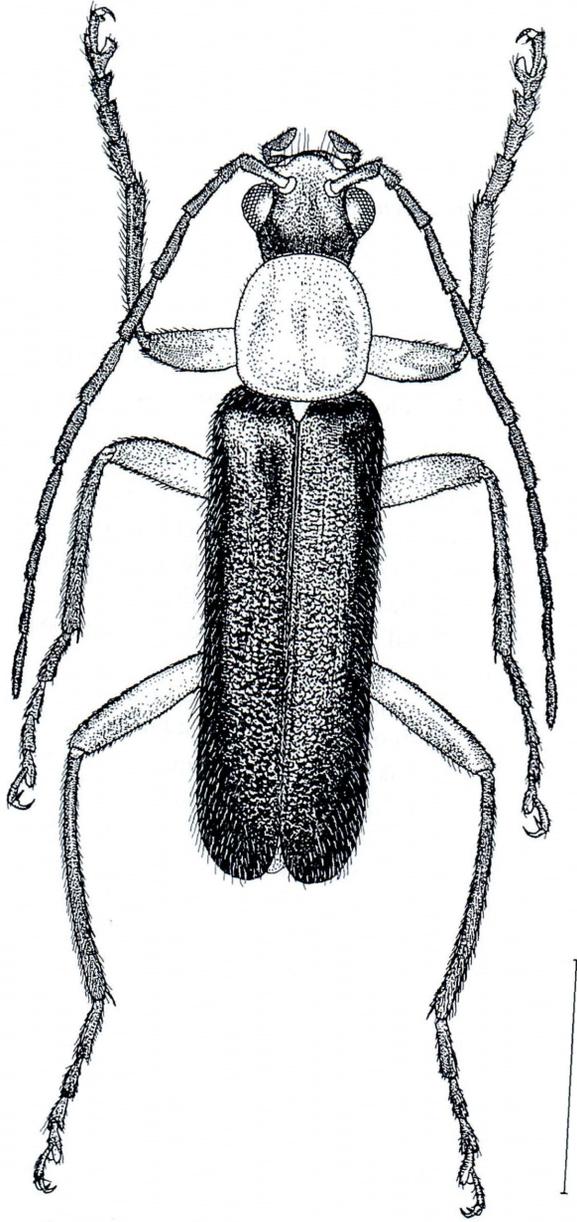
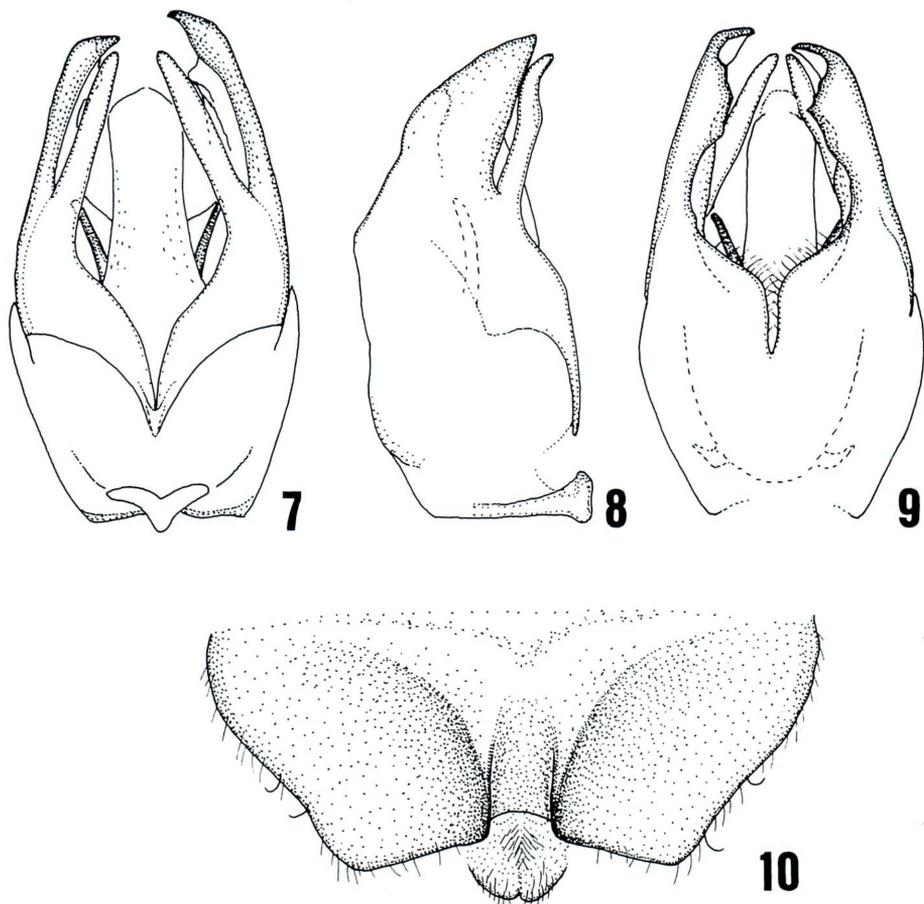


Fig. 6. *Prothemus kanoi* WITTMER, from Ishigaki-jima of the Ryukyus, ♂. (Scale: 2.0 mm.)



Figs. 7-10. *Prothemus kanoi* WITTMER, from Iriomote-jima of the Ryukyus. — 7-9, Male genitalia (7, ventral view; 8, lateral view; 9, dorsal view); 10, 8th abdominal sternite in female. (Scale: 0.5 mm.)

Key to the Species of the Genus *Prothemus* from the Ryukyus

- 1. Elytra wholly black *P. kanoi* WITTMER.
- Elytra brownish at least in sutural parts 2.
- 2. Elytra wholly brown or yellowish brown *P. ryukyuanus* WITTMER.
- Elytra black at least in humeral parts *P. nigrihumeralis* sp. nov.

要 約

奥島雄一・佐藤正孝：琉球列島のマルムネジウカイ属。—— 琉球列島のマルムネジウカイ属の種は、奄美大島、徳之島および沖縄本島から、リュウキュウマルムネジウカイ *Prothemus ryukyuanus* WITTMER ただ1種が、これまで知られているだけであった。今回、リュウ

キュウマルムネジヨウカイを久米島から、また、台湾から記載されていたカノマルムネジヨウカイ *Prothemus kanoi* WITTMER を石垣島と西表島から記録し、さらに石垣島と西表島から新たに1新種を認め、カタグロマルムネジヨウカイ *P. nigrihumeralis* OKUSHIMA et M. SATŌ, sp. nov. と命名して記載した。カタグロマルムネジヨウカイはリュウキュウマルムネジヨウカイに近縁であるが、上翅に黒条をもつこと、雄交尾器の側突起が長く、背方へ強く曲がること、雌の第8腹板の中央片が側方より突き出ることによって区別できる。

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