

## Correspondence

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**Yun Hsiao<sup>1)</sup>, Naoki Takahashi<sup>2)</sup>, Ping-Shih Yang<sup>3\*)</sup>. REDESCRIPTION OF TWO SPECIES OF *PROTHEMUS* (COLEOPTERA: CANTHARIDAE), WITH SUPPLEMENT TO THE FEMALE MORPHOLOGY. – *Far Eastern Entomologist*. 2015. N 291: 7-13.**

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**Summary.** *Prothemus limbolarius* (Fairmaire, 1900) and *P. notsui* Wittmer, 1984 are redescribed, with supplementary descriptions and illustrations of the eighth abdominal sternites of females. Moreover, the distribution map of both species in Taiwan is given.

**Key words:** Coleoptera, Cantharidae, *Prothemus*, description, morphology, female.

**И. Цяо<sup>1)</sup>, Н. Такахаши<sup>2)</sup>, П.-Ш. Янь<sup>3\*)</sup>. Переописания двух видов рода *Prothemus* (Coleoptera: Cantharidae) с дополнением к морфологии самок // Дальневосточный энтомолог. 2015. N 291. С. 7-13.**

**Резюме.** Даны описания *Prothemus limbolarius* (Fairmaire, 1900) и *P. notsui* Wittmer, 1984; для обоих видов впервые описан и изображен восьмой стернит самок. Приведена карта-схема распространения этих видов на Тайване.

## INTRODUCTION

The genus *Prothemus* was established by Champion with *P. neglectus* Champion, 1926 as the type species (Champion, 1926). The members of *Prothemus* are characterized by the rounded pronotum and the oval aedeagus, with a pointed dorsal plate on each paramere. Up to the present, ten species of *Prothemus* have been known from Taiwan and are mostly endemic to Taiwan. However, most of them were not provided with illustrations of the eighth abdominal sternites of females except for *P. kanoi* Wittmer, 1984 (Okushima & Satô, 1997) only. These features are important diagnostic characteristics to identify females of soldier beetles.

In the present study, two similar and related species, *Prothemus limbolarius* and *P. notsui* are redescribed in detail, provided with photos of habitus and illustrations of the aedeagi and the eighth abdominal sternites of females to complete the morphological information.

## MATERIAL AND METHODS

The materials studied are preserved in the National Museum of Natural Science, Taichung, Taiwan (NMNS) and the first author's personal collection (YHC).

The terminology used in the descriptions followed Okushima (2008) and the methods of anatomy, sketch and measurement followed Hsiao & Yang (2014), but the eighth abdominal

sternite of female was glued on a separate card, which was pierced with the same pin underneath the specimen. The distribution map was prepared using SimpleMappr (Shorthouse, 2010) based on the label data of all the specimens examined in the present study.

## RESULTS

### *Prothemus limbolarius* (Fairmaire, 1900)

Figs. 1–4, 8–11, 16

*Telephorus limbolarius* Fairmaire, 1900[1899]: 628.

*Cantharis limbolaria* var. *fainanensis* Pic, 1916: 4.

*Prothemus limbolarius*: Wittmer, 1954a: 110; Wittmer, 1954b: 280; Wittmer, 1984: 146; Okushima, 2008: 289.

MATERIAL EXAMINED. **Taiwan**: Shenmuchun, Nantou, 29.IV 2012, 1♂, S.-B. Kao leg. (YHC); Guguan, 13.IV 2013, 1♂, W.-R. Liang leg. (YHC); Kantoushan, Tainan, 29.III 2014, 6♂, 5♀, W.-C. Liao leg. (3 in NMNS, 8 in YHC); Puli, Nantou, IV 2014, 1♂, 1♀, C.-H. Wu leg. (YHC); Dahan Bridge, Northern Cross-Island Highway 49.2 km, 1.IV 2014, 1♂, W.-R. Liang leg. (YHC); Huisun, Nantou, 4.IV 2014, 3♂, Y. Hsiao leg. (YHC); Jiuzhiche, Ilan, 25.IV 2014, 1♀, Y. Hsiao leg. (YHC); Taipingshan, Ilan, 800-900 m, 25.IV 2014, 1♂, Y. Hsiao leg. (NMNS); Chunyang, Nantou, 4.V 2014, 1♂, 2♀, C.-R. Lee leg. (YHC)

REDESCRIPTION. MALE (Figs. 1–3). Eyes black. Head, pronotum and scutellum orange; antennae black, with basal part of the first segment mostly or somewhat orange; elytra black, with sutural margin and lateral margins orange or completely black, the orange area variable; pro-, meso-, metasterna and abdomen orange though fuscous in the second to seventh abdominal sternites in some specimens; legs black, with coxae, trochanters and femora except for apical part orange, tibiae with orange tinge in some specimens. Body closely covered with fine pale pubescence.

Body slender. Head somewhat shorter than its width; dorsum faintly convex on vertex, flat in the area between the eyes and depressed along the apical margin of clypeus and in lateral areas before eyes; surface smooth without lustre and covered with minute and indistinct grains; apical margin of clypeus arcuate; eyes large, globular and prominent, ratio of an eye diameter to interocular space 1 : 3.18; labial palpus with broadened cultellate apical segment; maxillary palpus with somewhat slender and rounded axe-shaped apical segment; antennae filiform and slender, attaining to apical fourth of elytra, 1st segment clavate, 2nd short and dilated apicad, 3rd to 11th subcylindrical, each of 4th to 11th segments with a longitudinal groove on the dorsal-external side, though the grooves of 8th to 11th are oval (Fig. 16), ratio of the lengths of antennomeres from base to apex as follows: 21 : 10 : 18 : 25 : 25 : 25.5 : 25.5 : 24 : 23 : 20.5 : 23.

Pronotum mostly circular, 1.14 times as wide as head, 0.90 times as long as wide; anterior margin semicircular without corner on each side; posterior margin gently arcuate, with rounded corner on each side; lateral margins arcuate and approaching to each other forwards; disc convex, particularly in posterior part, antero-lateral areas hollowed, marginal area along circumference depressed, medio-longitudinal furrow vague in central area; surface smooth though indistinctly punctate, with faint lustre. Scutellum triangular with blunt apex.

Elytra elongate, conjointly 1.38 times as wide as pronotum, 2.86 times as long as wide, sides subparallel; surface rugosely punctate, but vague in basal part, without lustre; each elytron with two indistinct costae.



Figs. 1–7. Body, dorsal view. 1–4. *Prothemus limbolarius*; 5–7. *P. notsui*; (5 – paratype; 1–4, 6–7 – non-type specimens); 1–3, 6 – male; 4–5, 7 – female.

Legs slender; femora mostly straight; tibiae feebly arcuate at the base in fore legs, and feebly arcuate throughout in mid and hind legs; each outer claw of fore and mid legs with a small lobe at the base.

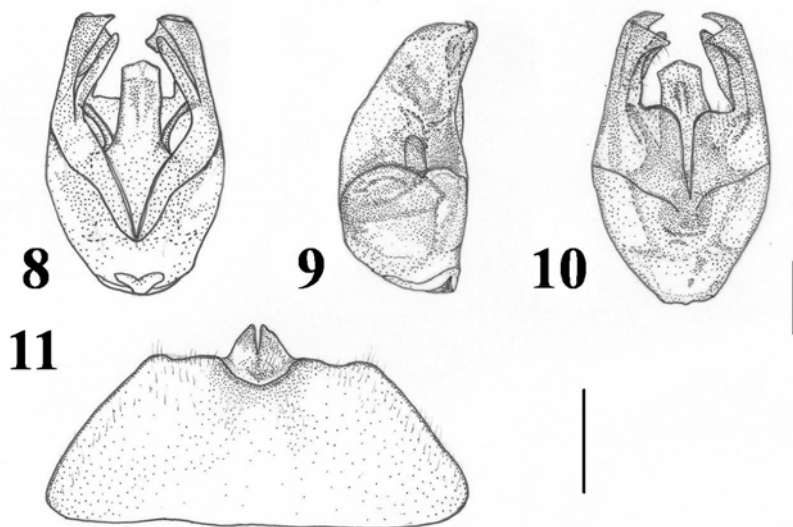
Male genitalia (Figs. 8–10). Tegmen elongate and suboval. Ventral process of each paramere slender and flat, with rounded apex; dorsal plate of each paramere forming a hook with a pointed apex towards inside, inner margin sinuate, with a pointed tooth near the apex and concave in middle. Each laterophysis long and slender, with a pointed apex, curved and diverged from each other.

MEASUREMENTS. Body length: 7–11 mm (8.0 mm in the original description); body width: 1.5–2.4 mm.

FEMALE (Fig. 4). Color and pubescence as in male. Body and pronotum clearly wider than in male; head somewhat shorter than its width; eyes considerably smaller than in male, ratio of an eye diameter to interocular space 1 : 3.65; antennae markedly shorter than in male, attaining to the half of elytra, without grooves on the antennomeres, ratio of the lengths of antennomeres from base to apex as follows: 16 : 10 : 18 : 24.5 : 23.5 : 23 : 22.5 : 22.5 : 22 : 19 : 21.5. Pronotum 1.33 times as wide as head, 0.88 times as long as wide. Elytra conjointly 1.42 times as wide as pronotum, 2.68 times as long as wide, sides subparallel. Claws simple.

Eighth abdominal sternite trapezoidal, lateral margins nearly straight, lateroapical margins sinuate and terminal margin semicircularly concave in middle part; the centre of terminal margin with a plate, which is cleft at the apex, and more prominent posteriad than the level of the lateral sides of terminal margin (Fig. 11).

MEASUREMENTS. Body length: 8.5–12.5 mm; body width: 2.2–3.2 mm.



Figs. 8–11. *Prothemus limbolarius*. 8–10 – male genitalia: 8 – ventral view; 9 – lateral view; 10 – dorsal view; 11 – female eighth abdominal sternite. Scale bar = 0.5 mm.

**DIAGNOSIS.** This species is very similar to *Prothemus notsui* Wittmer, 1984, from which it differs by the oval grooves of antennomeres 8 to 10, the structure of male genitalia, especially the longer and more slender laterophysis, and the dorsal plate of each paramere with a distinct tooth on inner side, and the shape of female eighth abdominal sternite, which is roundly concaved with the larger plate in the middle of the terminal margin.

**NOTES.** During the first author's survey in the field, *Prothemus limbolarius* is common in Taiwan and widely distributed in northern to south central Taiwan. This species mainly appears in spring to early summer. It was observed visiting flowers during the day and being attracted by light at night. Besides, it was also observed that during the copulation the male would lie face up and retract its legs to keep still, but the reason for the position remains unknown.

**DISTRIBUTION.** China (Sichuan) and Taiwan (Fig. 18).

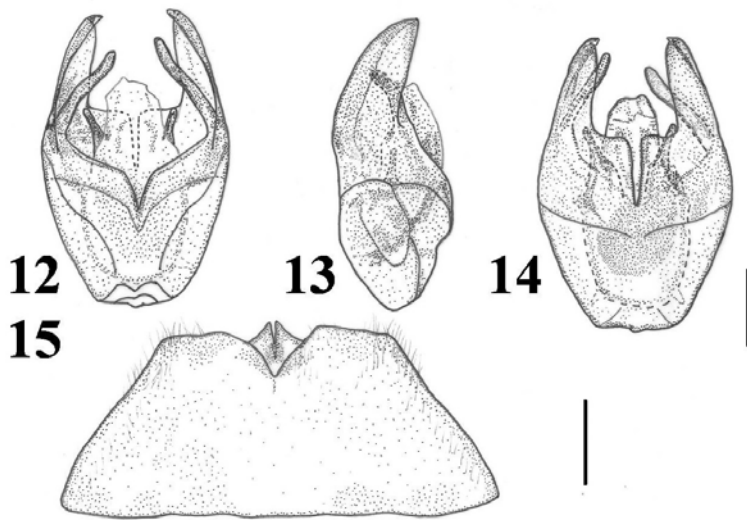
***Prothemus notsui* Wittmer, 1984**

Figs 5–7, 12–15, 17

*Prothemus notsui* Wittmer, 1984: 144; Okushima, 2008: 289.

**TYPE MATERIAL EXAMINED.** Paratype: **Taiwan:** Kenting, Pintung Co., 16.III 1977, 1♀, Y. Notsu leg. (NMNS).

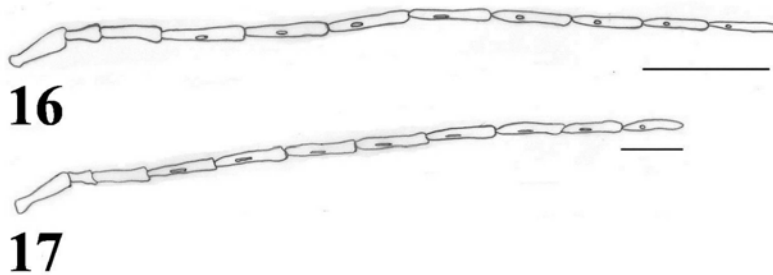
**ADDITIONAL MATERIAL EXAMINED.** **Taiwan:** Southern Cross-Island Highway 120K, 23°17'07"N, 120°50'15.6"E, 16.IV 2012, 1♀, collector unknown (YHC); Dahenshan, Pintung, 6.IV 2013, 1♂, 2♀, W.-R. Liang leg. (YHC); Shanping, Kaohsiung, 22.III 2014, 1♂, W.-C. Liao leg (YHC); Xiama, Haiduan, Taitung, 19.IV 2014, 1♀, W.-J. Huang leg (YHC).



Figs. 12–15. *Prothemus notsui*. 12–14 – male genitalia: 12 – ventral view; 13 – lateral view; 14 – dorsal view; 15 – female eighth abdominal sternite. Scale bar = 0.5 mm.

REDESCRIPTION. MALE (Fig. 6). Eyes black. Head, pronotum, scutellum and abdomen orange; antennae black, with basal part of the first segment mostly or somewhat orange; elytra black; legs black, with coxae, trochanters and femora except for apical part orange. Body closely covered with fine pale pubescence.

Body slender. Head somewhat shorter than its width; dorsum faintly convex on vertex, flat in the area between the eyes and depressed along the apical margin of clypeus and in lateral areas before eyes; surface smooth without lustre and covered with minute and indistinct grains; apical margin of clypeus arcuate; eyes large, globular and prominent, ratio of an eye diameter to interocular space 1 : 2.67; labial palpus with broadened cultellate apical segment; maxillary palpus with somewhat slender and rounded axe-shaped apical segment; antennae filiform and slender, attaining to apical fourth of elytra, 1st segment clavate, 2nd short and dilated apicad, 3rd to 11th subcylindrical, each of 4th to 11th segments with a longitudinal groove on the dorsal-external side (Fig. 17), though the groove of 11th is oval, ratio of the lengths of antennomeres from base to apex as follows: 27 : 10 : 24 : 29 : 32.5 : 31 : 32 : 31 : 30 : 26.5 : 27.5.



Figs. 16–17. Male antennae. 16 – *Prothemus limbolarius*; 17 – *P. notsui*. Scale bar = 1 mm.

Pronotum mostly circular, 1.14 times as wide as head, 0.94 times as long as wide (in original description, as long as wide or slight longer than wide); anterior margin semicircular without corner on each side; posterior margin gently arcuate, with rounded corner on each side; lateral margins arcuate and approaching to each other forwards; disc convex, particularly in posterior part, antero-lateral areas hollowed, marginal area along circumference depressed, medio-longitudinal furrow vague in central area; surface smooth though indistinctly punctate, with faint lustre. Scutellum triangular with blunt apex.

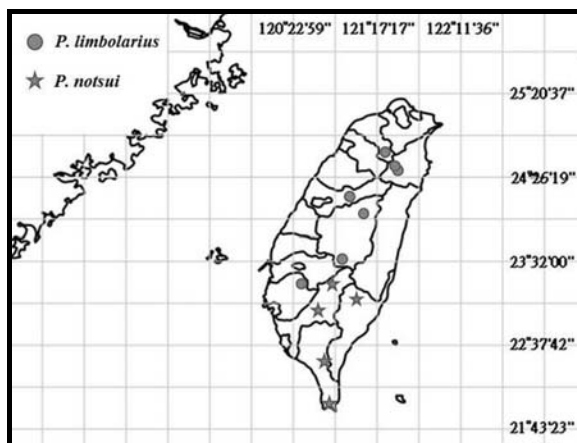


Fig. 18. The distribution map of *Prothemus limbolarius* and *P. notsui* in Taiwan.

Elytra elongate, conjointly 1.32 times as wide as pronotum, 2.93 times as long as wide, sides subparallel; surface rugosely punctate, but vague in basal part, without lustre; each elytron with two indistinct costae.

Legs slender; femora mostly straight; tibiae feebly arcuate at the base in fore legs, and feebly arcuate throughout in mid and hind legs; each outer claw of fore and mid legs with a small lobe at the base.

Male genitalia (Figs. 12–14). Tegmen elongate and suboval. Ventral process of each paramere slender and somewhat narrow in middle part, with rounded apex, usually under the curved apex of dorsal plate; dorsal plate of each paramere with a pointed apex towards inside, inner margin roundly concave in middle and sinuate near the base, without tooth. Each laterophysys not so long and moderately stout, with a blunt apex, slightly curved and diverged from each other.

MEASUREMENTS. Body length: 9.2–11.0 mm (8.0–13.0 mm in the original description); body width: 2.2–2.5 mm.

FEMALE (Figs. 5, 7). Color and pubescence as in male. Body and pronotum clearly wider than in male; head somewhat shorter than its width; eyes considerably smaller than in male, ratio of an eye diameter to interocular space 1 : 4.82; antennae markedly shorter than in male, attaining to the half of elytra, without grooves on the antennomeres, ratio of the lengths of antennomeres from base to apex as follows: 23.5 : 10 : 15.5 : 22 : 22 : 21.5 : 21.5 : 23.5 : 23.5 : 18.5 : 22.5. Pronotum 1.35 times as wide as head, 0.87 times as long as wide. Elytra conjointly 1.36 times as wide as pronotum, 2.69 times as long as wide, sides subparallel. Claws simple.

Eighth abdominal sternite trapezoidal, lateral margins nearly straight and somewhat sinuate, lateroapical margins sinuate and terminal margin triangularly concave in middle part; the centre of terminal margin with a plate, which is cleft at the apex, and more prominent posteriorly than the level of the lateral sides of terminal margin (Fig. 15).

MEASUREMENTS. Body length: 11.5–12.0 mm; body width: 2.5–3.0 mm

DIAGNOSIS. This species is very similar to *Prothemus limbolarius* (Fairmaire, 1900), from which it differs by the longitudinal grooves of antennomeres 8 to 10, the structure of male genitalia, especially the shorter and stouter laterophysis, and the dorsal plate of each paramere without any tooth on inner side, and the shape of female eighth abdominal sternite, which is triangularly concave with the smaller plate in the middle of the terminal margin.

NOTES. According to the label data and the literature, this species is distributed in southern Taiwan and mainly appears in spring.

DISTRIBUTION. Taiwan (Fig. 18).

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