

Three New Species of the Genus *Rhagophthalmus* (Coleoptera, Rhagophthalmidae) from Southeast Asia

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Abstract Three new species of the cantharoid genus *Rhagophthalmus* are described and illustrated, viz., *R. flavus* from North Thailand and Myanmar, *R. minutus* from Northeast Thailand and *R. jenniferae* from Taiwan.

Introduction

The genus *Rhagophthalmus* was originally established by MOTSCHULSKY (1854) for *R. scutellatus* from Peking, China. Since then, many species belonging to this genus have been described (FAIRMAIRE, 1988 a, b, 1896; OLIVIER, 1911; Pic, 1916, 1917, 1925; WITTMER & OHBA, 1994; WITTMER, 1997; etc.). OLIVIER (1911) revised the species of *Rhagophthalmus* then considered as a genus of the family Lampyridae, gave a generic definition and provided a key to the then known species. WITTMER and OHBA (1994) dealt with eight species from China, Myanmar and Japan with detailed illustrations of the male genitalia, and regarded *Ochotyra* PASCOE, 1862 as a junior synonym of *Rhagophthalmus*. At present, 25 species of the genus have been known from East and South Asia including India. Recently, the authors have examined the materials taken in Thailand, Myanmar and Taiwan, and have found after a careful examination, that three new species are included in the collection. In this paper, we are going to describe and illustrate them.

Materials and Methods

The materials used in the present study are described under the heading of “*Type series*” following the descriptions of the respective new species. For dissection, dried

materials were relaxed in hot water, and then, male genitalia were removed from body, mounted on slide glasses with glycerol, observed through optical microscope (OLYMPUS CH-2, max. magnification $\times 1,000$) and sketched with the aid of an attached drawing tube. External characters were observed and sketched with a stereoscopic microscope (OLYMPUS SZH10, max. magnification $\times 140$) equipped with a drawing tube. The abbreviations used herein are as follows: BL – length of body, from anterior margin of frons to elytral apices; HW – maximum width of head, including eyes; PL – length of pronotum along mid-line; PA – apical width of pronotum; PB – basal width of pronotum; PW – maximum width of pronotum; EL – length of elytra; EW – maximum width of elytra; EHW – humeral width of elytra; HTL – length of hind tibiae.

Description

Rhagophthalmus flavus KAWASHIMA et M. SATÔ, sp. nov.

(Figs. 1, 4, 7–9)

Male. Body moderately shiny, covered all over including appendages with golden or black subrecumbent pubescence. Head capsule entirely black; eyes blackish; antennae yellowish brown; mandibles blackish brown; maxillae and labium yellowish brown; disc of pronotum widely dark brownish, becoming much paler towards the yellowish sides; scutellum yellowish brown or pale brown; elytra yellowish or buff; legs entirely yellowish brown; ventral surface of thoraces and abdomen constantly yellowish brown.

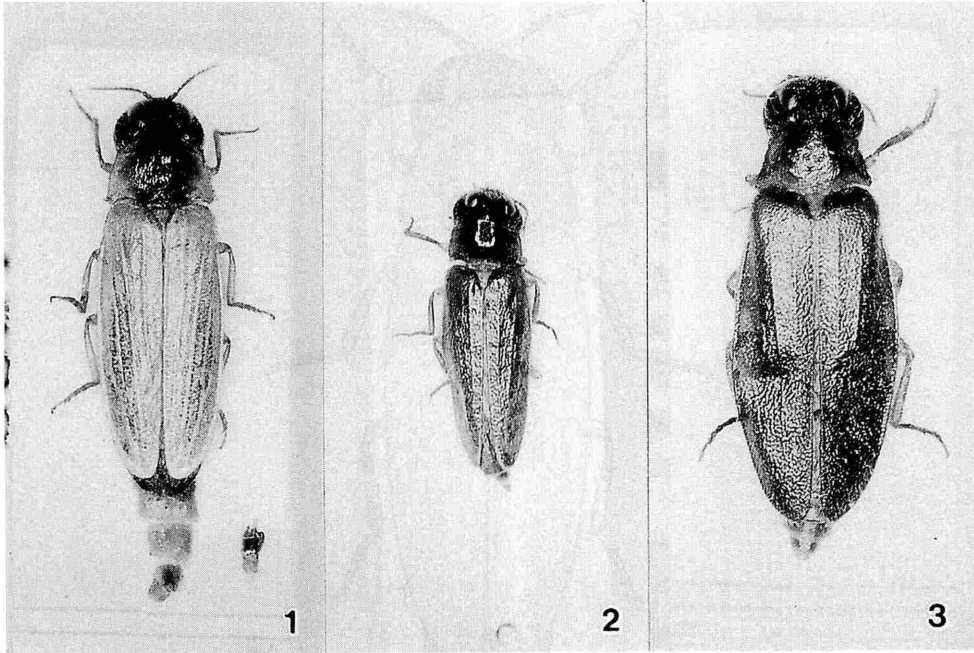
Body elongated oval or spindle-shaped, subparallel-sided.

Head large and transverse, depressed above and concave along mid-line, rather minutely and coarsely punctate on dorsal surface, clearly wider than the apical width of pronotum, but a little narrower than the basal and maximum widths.

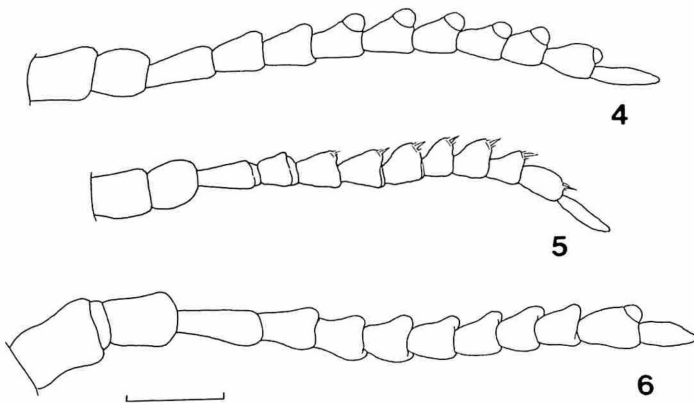
Antennae (Fig. 4) 12-segmented, short and serrate, barely reaching anterior margin of pronotum; scape short, very thick and subcylindrical, 1.27 times as long as wide; pedicel barrel-shaped; 3rd segment (1st flagellar segment) clavate and the longest; 4th and 5th (2nd and 3rd flagellar) clavate, becoming thicker towards the apices; 5th to 11th (3rd to 9th flagellar) serrated continuously; 6th to 11th (4th to 9th flagellar) each with a lens-like sensillum at the protruded antero-ventral portion; terminal segment or 12th (10th flagellar) the most slender and spindle-shaped.

Pronotum relatively large, transversely semicircular or trapezoidal in dorsal view, widest at the base; maximum width almost the same as elytral humeral width; anterior margin widely arcuate and produced anteriorly; both exteriormost portions of the margin forming shallow angles; sides straight, gradually divergent towards the base; basal margin clearly sinuate on each side, and narrowly bordered in central part; dorsal surface constantly and coarsely punctate; disc feebly depressed; PW/HW 1.16, PW/PL 1.52, PW/PA 1.22, PW/PB 1.00, PL/PW 0.66, PW/EHW 0.96.

Scutellum triangular with rounded apex, almost smooth on dorsal surface.



Figs. 1-3. Holotypes of *Rhagophthalmus* spp. — 1, *R. flavus* KAWASHIMA et M. SATÔ, sp. nov., from Myanmar; 2, *R. minutus* KAWASHIMA et M. SATÔ, sp. nov., from NE. Thailand; 3, *R. jenniferae* KAWASHIMA et M. SATÔ, sp. nov., from Taiwan.



Figs. 4-6. Right male antennae of *Rhagophthalmus* spp. — 4, *R. flavus* KAWASHIMA et M. SATÔ, sp. nov., from Myanmar; 5, *R. minutus* KAWASHIMA et M. SATÔ, sp. nov., from NE. Thailand; 6, *R. jenniferae* KAWASHIMA et M. SATÔ, sp. nov., from Taiwan. Scale: 0.25 mm.

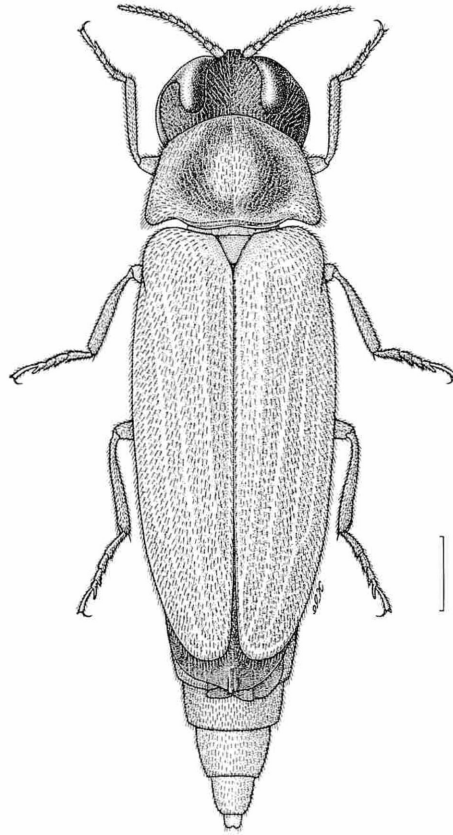
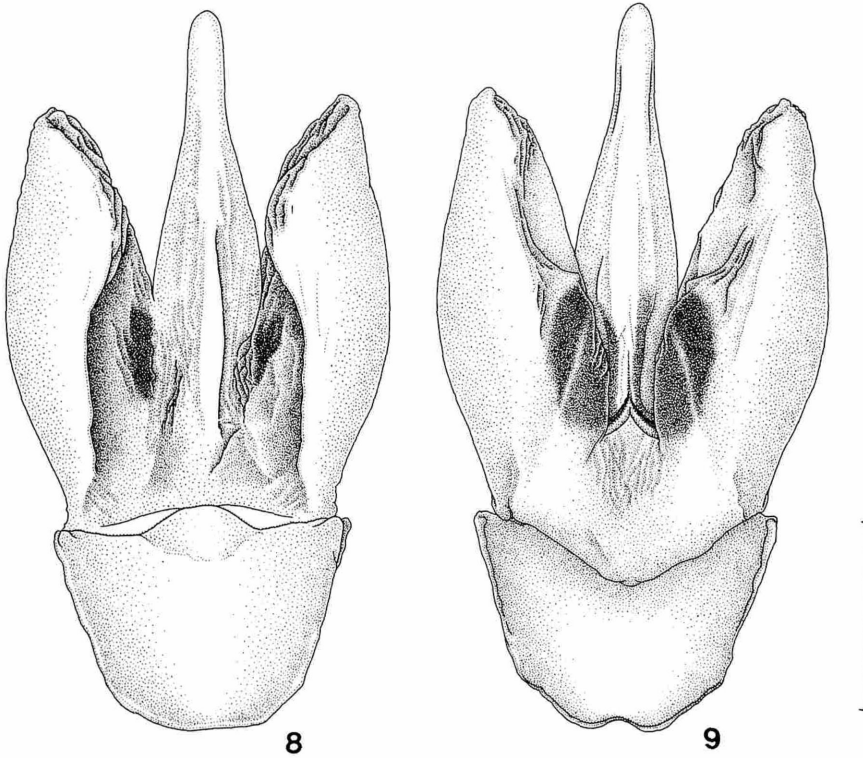


Fig. 7. Habitus of *Rhagophthalmus flavus* KAWASHIMA et M. SATÔ, sp. nov., from Myanmar. Scale: 1.0 mm.

Elytra moderately broad, sides subparallel and weakly arcuate, gradually divergent posteriad, widest before the middle, and then convergent to rounded apices, distinctly dehiscent in apical parts, narrowly bordered throughout including suture, the margin being concealed by rounded humeri; dorsal surface distinctly and irregularly rugose; each elytron with four thick costae though not sharply elevated, 2nd the longest, running throughout the length of elytra, the innermost one relatively long though attached to the sutural margin at apical fifth, 3rd also relatively long but disappearing near the humeral parts, exteriormost one the shortest, disappearing at anterior third of elytra and then connected with the 3rd at distal fourth; EL/PL 3.76, EL/EW 2.08, EW/PW 1.19.

All legs not so long but slender; tibiae almost straight though moderately incurved at the bases; tarsi relatively long, only a little shorter than the length of tibiae; 4th tarsomeres with membranous lingulate lamellae in ventro-apical portions; 1st and



Figs. 8–9. Male genitalia of *R. flavus* KAWASHIMA et M. SATÔ, sp. nov.; dorsal view (8), ventral view (9). Scale: 0.25 mm.

5th tarsomeres the longest, almost of the same length, and a little longer than the 3rd and 4th combined. Claws small and simple, weakly dilated at the bases.

Male genitalia as shown in Figs. 8–9, weakly depressed dorso-ventrally, moderately narrow and slender, external surface moderately shiny, smooth and glabrous. Basal plate small, semicircular or cup-shaped, distal margin almost straight but arcuate and moderately produced in central part. Aedeagus long and slender, with narrowly rounded apex, gradually narrowed from the middle but subparallel-sided in distal third. Parameres spatulate, embracing aedeagus from left and right, joining at the bases on ventral side, almost straight and spindle-shaped as a whole, feebly dilated towards the apices, and widely so and separated from each other on dorsal side; external sides arcuate, inner margin on dorsum sinuate; basal halves of inner margins parallel, then gradually convergent, and abruptly divergent towards the apices; inner margins on venter almost straight or weakly arcuate, gradually divergent towards the apices, distal halves scooped out; the apices neither hooked nor inwardly bent.

Measurement in mm. BL: 8.60 (in the holotype) (range 8.40–8.60); HW: 2.15 (2.15–2.18); PL: 1.65 (1.55–1.65); PA: 2.05 (2.05–2.05); PB: 2.50 (2.50–2.50); PW:

2.50 (2.50–2.50); EL: 6.20 (6.10–6.20); EW: 2.98 (2.90–2.98); EHW: 2.60 (2.50–2.60); HTL: 1.50 (1.30–1.50).

Female. Unknown (probably wingless larviform).

Type series (all dried). Holotype: ♂, Dawna, SE. Myanmar, 1–VI~2–V–1992, collector unknown. Paratype: 1♂ (moderately teneral), Sara Buri, Thailand, 25–III–1985, native collector.

The holotype is deposited in the insect collection of Nagoya Women's University, Nagoya. The paratype is preserved in KAWASHIMA's collection.

Range. Myanmar and Thailand.

Remarks. This new species is clearly distinguished from the other members of the genus by the characteristic body coloration, the number of antennal sensillae and the shape of male genitalia. The male genitalia are rather similar to those of *R. elongatus* WITTMER, 1994, from Kwangsi [=Guangxi] Province, China, but can easily be distinguished from the latter by the apices of the parameres not incurved and hooked.

***Rhagophthalmus minutus* KAWASHIMA et M. SATÔ, sp. nov.**

(Figs. 2, 5, 10–11)

Male. Body moderately shiny, covered all over including appendages with golden subrecumbent pubescence. Head capsule entirely black; eyes blackish; antennae yellowish brown, becoming darker towards the bases; mandibles black; maxillae and labium yellowish brown; pronotum blackish, more or less paler towards the sides, the posterior margin yellowish; scutellum yellowish brown; elytra dark brown, entirely tinged olive; femora yellowish brown; tibiae dark brown; tarsi dark brown; claws yellowish brown; ventral surface of thorax yellowish brown; abdominal sternites constantly buff.

Body spindle-shaped, almost parallel-sided.

Head large and transeverse, not depressed above, rather minutely and coarsely punctate on dorsal surface, a little wider than the apical width of pronotum, almost as wide as the maximum width of pronotum.

Antennae (Fig. 5) 12-segmented, rather long and serrate, reaching anterior margin of pronotum; scape short cylindrical, 1.25 times as long as wide; pedicel barrel-shaped; 3rd segment (1st flagellar segment) clavate and the longest, becoming thicker towards the apex; 4th to 11th (2nd to 9th flagellar) serrated continuously; 5th to 11th (3rd to 9th flagellar) each with minute spine-like sensilla at the protruded antero-ventral portion; terminal segment or the 12th (10th flagellar) the most slender and spindle-shaped.

Pronotum relatively large, trapezoidal or transversely subquadrate in dorsal view, widest before the base, across basal third to fourth; maximum width a little narrower than the elytral humeral width; anterior margin widely arcuate and weakly produced anteriorly; both exteriormost portions of the margin forming shallow angles; sides feebly arcuate; basal margin shallowly sinuate on both sides, narrowly bordered in central

part; dorsal surface constantly and coarsely punctate; disc feebly depressed; PW/HW 1.73, PW/PL 1.65, PW/PA 1.12, PW/PB 1.02, PL/PW 0.61, PW/EHW 0.91.

Scutellum triangular or tongue-shaped, coarsely punctate on dorsal surface.

Elytra fairly narrow, sides almost parallel, widest at basal third to fifth, and then gradually convergent to rounded apices, distinctly dehiscent in apical parts, narrowly bordered throughout including suture, the margin being concealed by rounded humeri; dorsal surface distinctly and irregularly rugose; each elytron with three thick costae, which are not sharply raised, middle one the longest and distinct, running for almost whole length of elytra but disappearing at apical parts, innermost one long but a little shorter than the middle one, disappearing at apical part, exteriormost one the shortest, very weak and almost obsolete. EL/PL 4.51, EL/EW 2.23, EW/PW 1.24.

All legs not so long and relatively thick, tibiae almost straight though incurved at the bases; tarsi relatively long, only a little shorter than the length of tibiae; 5th tarsomere the longest, almost of the same length as the combined length of the 2nd to 4th; 4th tarsomere protruded on ventro-apical portions. Claws small and simple, weakly dilated at the bases.

Male genitalia as shown in Figs. 10–11, weakly depressed dorso-ventrally, fairly narrow and slender; external surface moderately shiny, smooth and glabrous. Basal plate elongated cup-shaped, distal margin widely arcuate and anteriorly produced. Aedeagus long and slender, with rounded apex, sides gradually convergent from basal part. Parameres spatulate, spindle-shaped as a whole, embracing aedeagus from left and right, joining at the bases on ventral side, external sides arcuate, gradually convergent towards the apices, and separated from each other on dorsal side; inner margins of dorsum sinuate, subparallel in basal third, gradually convergent towards the apices, forming an arch and protruded, approaching to each other, and almost straight in apical third, and regularly and gradually convergent towards the apices; inner margins of venter also sinuate, gradually dilated towards apices at the bases, subparallel on central parts, and then, forming expanded and rounded apices.

Measurement in mm. BL: 6.60 (in the holotype)(range 5.80–6.60); HW: 1.65 (1.50–1.65); PL: 1.05 (0.93–1.05); PA: 1.55 (1.35–1.55); PB: 1.70 (1.45–1.70); PW: 1.73 (1.45–1.73); EL: 4.80 (4.30–4.80); EW: 2.15 (1.90–2.15); EHW: 1.90 (1.60–1.93); HTL: 1.05 (0.95–1.10).

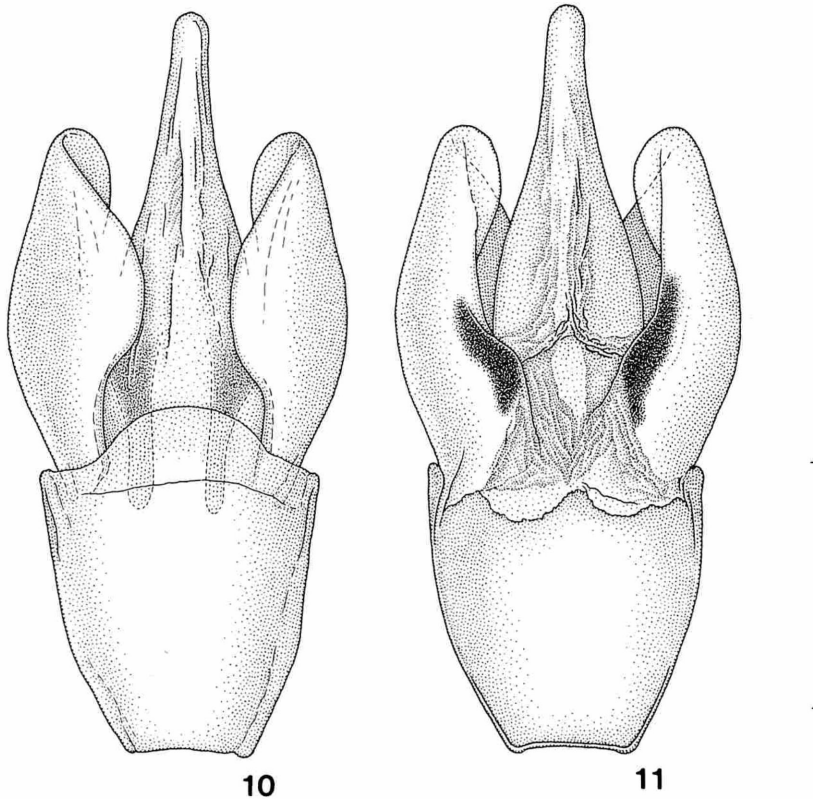
Female. Unknown (probably wingless larviform).

Type series (all dried). Holotype: 1 ♂, Lam Chee Yai, near Ban Lon, Kohn Kaen Province, NE. Thailand, 16–III–2000, M. SATÔ leg. Paratypes: 3 ♂♂, same locality and data as for the holotype, T. KISHIMOTO & M. SATÔ leg.

The holotype and two paratypes are deposited in the insect collection of Nagoya Women's University, Nagoya. The other paratype is preserved in KAWASHIMA's collection.

Range. NE. Thailand.

Remarks. This new species is one of the small species of the genus together with *R. filiformis* E. OLIVIER, 1911, from Ceylon, but can easily be distinguished from



Figs. 10–11. Male genitalia of *R. minutus* KAWASHIMA et M. SATŌ, sp. nov.; dorsal view (10), ventral view (11). Scale: 0.25 mm.

the latter by the body coloration and relatively short and wide body. The male genitalia are similar to those of *R. elongatus* WITTMER, 1994, from China and *R. flavus* sp. nov., but can easily be distinguished from the latter two species by the apices of parameres rounded and expanded.

All individuals flew to a torch at night at the river side in a thick forest.

***Rhagophthalmus jenniferae* KAWASHIMA et M. SATŌ, sp. nov.**

(Figs. 3, 6, 12–13)

Male. Body moderately shiny, covered all over including appendages with golden subrecumbent pubescence. Head capsule entirely black; eyes blackish; antennae yellowish brown; mandibles brownish, darker towards the blackish apices; maxillae and labium yellowish brown; pronotum blackish, becoming more or less paler towards the sides; scutellum yellowish brown; elytra dark brown, entirely tinged olive;

femora yellowish brown; tibiae dark brownish; tarsi blackish brown; claws dark brown; ventral surface of thoraces yellowish brown; abdominal sternites brownish.

Body elongated oval, gradually dilated towards the distal third of elytra, sides not subparallel.

Head large and transverse, depressed above and concave along the mid-line, rather minutely and coarsely punctate on dorsal surface, evidently wider than the apical width of pronotum, but a little narrower than the basal and maximum widths of pronotum.

Antennae (Fig. 6) 12-segmented, very short and serrate, barely or not reaching anterior margin of pronotum; scape cylindrical and thick, feebly constricted at the middle, 1.26 times as long as wide; pedicel short cylindrical, 1.27 times as long as wide; 3rd segment (1st flagellar segment) clavate and the longest, becoming thicker towards the apex; 4th to 11th (2nd to 9th flagellar) serrate continuously, only 11th with lens-like sensillum at the protruded antero-ventral portion; terminal segment or the 12th (10th flagellar) the most slender and spindle-shaped.

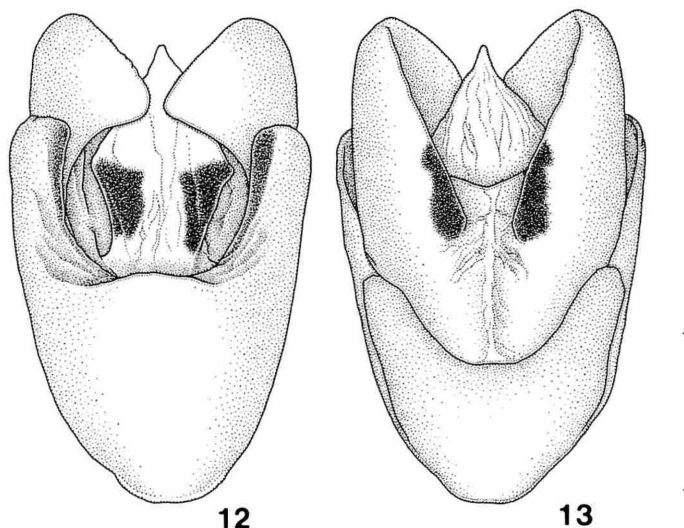
Pronotum relatively large, trapezoidal in dorsal view, widest at the base; the maximum width a little narrower than the elytral humeral width; anterior margin widely arcuate and produced anteriorly, both exterior portions of the margin forming shallow angles; sides almost straight but moderately curved exteriorly just before the base; basal angles projected outwards; basal margin sinuate on both sides, narrowly bordered in central part; dorsal surface constantly and densely punctate; disc feebly depressed; PW/HW 1.15, PW/PL 1.66, PW/PA 1.29, PW/PB 1.00, PL/PW 0.60, PW/EHW 0.75.

Scutellum triangular or lingulate, closely punctate on dorsal surface.

Elytra fairly broad, widest at apical two-fifths, and then narrowed to moderately pointed apices, dehiscent in apical parts; sides distinctly divergent posteriorly, narrowly bordered throughout including suture, the margin being concealed by rounded humeri; dorsal surface distinctly and irregularly rugose; each elytron with three vague costae, the middle one the longest and distinct, running throughout the length of elytra, though the apical parts disappear, innermost one moderately obsolete, disappearing at about middle, exteriormost one short, very weak and obsolete; EL/PL 4.75, EL/EW 2.00, EW/PW 1.43.

All legs not so long but slender; tibiae almost straight though incurved at the bases; tarsi relatively long, only a little shorter than the lengths of respective tibiae; 4th tarsomeres with membranous ligulate lamellae on ventro-apical portions; 1st and 5th tarsomeres almost of the same length, faintly longer than the combined length of 3rd and 4th. Claws small and simple, weakly dilated at the bases.

Male genitalia as shown in Figs. 12–13, weakly depressed dorso-ventrally, fairly broad, short and rounded; external surface moderately shiny, smooth and glabrous. Basal plate thick U-shaped on dorsum as a whole, but cup-shaped in basal half; distal margin nearly straight or feebly sinuate, with both sides prolonged towards the apices and covering the basal parts of parameres; prolonged parts almost straight, with rounded apices, which are feebly distant from each other. Aedeagus wide and flattened



Figs. 12–13. Male genitalia of *R. jenniferae* KAWASHIMA et M. SATÔ, sp. nov.; dorsal view (12), ventral view (13). Scale: 0.25 mm.

dorso-ventrally, subrhomboidal, with pointed apex. Parameres spatulate, embracing aedeagus from left and right, rounded triangular on dorsum, internal corners approaching to each other from left and right; external sides on venter more or less arcuate, gradually convergent towards the apices; inner margins on venter straight, gradually convergent towards the base.

Measurement in mm. BL: 10.00 (in the holotype) (range 10.00–11.00); HW: 2.30 (2.30–2.30); PL: 1.60 (1.60–1.65); PA: 2.05 (2.05–2.25); PB: 2.65 (2.65–2.85); PW: 2.65 (2.65–2.85); EL: 7.60 (7.60–8.50); EW: 3.80 (3.80–3.80); EHW: 2.80 (2.80–3.15); HTL: 1.75 (1.75–1.90).

Female. Unknown (probably wingless larviform).

Type series (all dried). Holotype: 1 ♂, Fenchihu, Chiai Hsien, Taiwan, 25–26–IV–1972, M. SAKAI leg. Paratypes: 1 ♂, same data as for the holotype; 2 ♂♂, Puli, Nantou Hsien, Taiwan, 10–V–1913, M. MAKI leg.

The holotype is deposited in the insect collection of Nagoya Women's University, Nagoya. The paratypes are preserved in the collection of the Department of Entomology, National Taiwan University and in KAWASHIMA's collection.

Range. Taiwan.

Remarks. This new species is very closely allied to *R. ohbai* WITTMER, 1994, from the Yaeyama Islands, Japan, but differs from the latter in relatively large and robust body. The male genitalia are also closely similar to those of *R. ohbai* (WITTMER et OHBA, 1994; OHBA *et al.*, 1996), but wider and shorter, width of both the parameres a little narrower than width of the basal plate, exterior margins of parameres not straight and feebly arcuate and incurved. The adult specimens of the species were collected in

the spring in contrast to the fact that the adults of *R. ohbai* were observed in the winter. The male genitalia are also similar to those of *R. scutellatus* MOTSCHULSKY, 1854, the type species of the genus, from Beijing, China, but differs from it by having more straight parameres.

This species is named after Ms. Jennifer LAI of National Taiwan University in honor of her contribution to the Taiwanese Lampyridae.

Acknowledgement

The authors wish to express their sincere thanks to Dr. Shun-Ichi UÉNO of the National Science Museum (Nat. Hist.), Tokyo, for his critically reading the original manuscript and helpful advice, and to Dr. Toshio KISHIMOTO of the Laboratory of Insect Resources, Tokyo University of Agriculture, Atsugi, Kanagawa, Ms. Jennifer LAI of the Department of Entomology, National Taiwan University, and Dr. Masahiro SAKAI of the Entomological Laboratory, Ehime University for their kind support and help.

要 約

川島逸郎・佐藤正孝：イリオモテボタル属の3新種の記載。——イリオモテボタル属（オオメボタル属）は、これまでにインドから東南アジア・中国大陸・日本にかけて25種が記載されているが、分類学的研究は十分でなく、近年でも新種が追加されている状況にある。今回、筆者らが実見することのできた標本を詳しく検討したところ、色彩や外部形態、雄交尾器の形状から判断して、3新種が認められたので、本論文において以下のように命名記載した。すなわち *Rhagophthalmus flavus* KAWASHIMA et M. SATÔ（タイ、ミャンマー）、*R. minutus* KAWASHIMA et M. SATÔ（タイ北東部）、*R. jenniferae* KAWASHIMA et M. SATÔ（台湾）である。

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Elytra, Tokyo, **29** (2): 434, November 15, 2001

Occurrence of *Lucidina biplagiata* (Coleoptera, Lampyridae) on Teuri-tô Island, off Hokkaido, Japan

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A middle-sized lampyrine beetle, *Lucidina biplagiata* (MOTSCHULSKY, 1866), is widely distributed in the region from the Kuril Islands in the northeast to Taiwan in the southwest including Japan. I had an opportunity to examine new materials of this species through the courtesy of Mr. T. SHIMADA. In this brief report, I will record it as a new locality of this species.

Materials examined. 3♂♂, 2♀♀, Benten, Teuri-tô Is., off NW. Hokkaido, 7~8-VII-2001, T. SHIMADA leg.

I am indebted to Mr. Takashi SHIMADA of the Laboratory of Insect Resources, Tokyo University of Agriculture, Atsugi, Kanagawa, for his supplying with the materials.