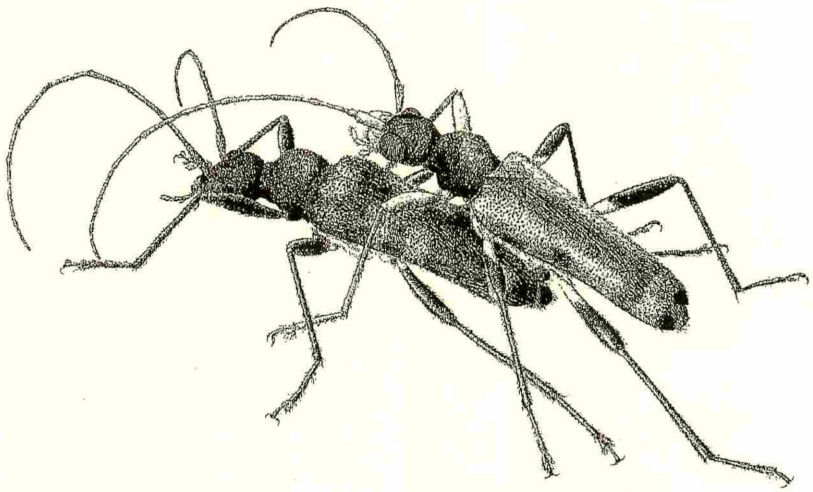
ISSN 0286-9810

Vol. 60, No. 1 April 30, 2005

昆蟲學評論

THE ENTOMOLOGICAL REVIEW OF JAPAN



日 本 甲 蟲 學 會

THE JAPAN COLEOPTEROLOGICAL SOCIETY
OSAKA

The Entomological Review of Japan (ISSN 0286-9810) is published biannually on April and October, by the Japan Coleopterological Society. Annual subscription is ¥ 5,000 for individual members. We are willing to exchange with any publications on entomology.

Business Office
The Japan Coleopterological Society
c/o Entomological Labolatory
Osaka Museum of Natural History
Nagai Park 1–23, Higashisumiyoshi-ku
Osaka, 546–0034 JAPAN
URL – http://www.mus-nh.city.osaka.jp/jcs.html

Printed by
NPC Corporation, Osaka, Japan

Ent. Rev. Japan, **60** (1): 1–7, April 30, 2005

Records of Donaciinae from Primorsky Province in 2004, with Notes on the Distribution of *Plateumaris shirahatai* KIMOTO (Coleoptera: Chrysomelidae)

Masakazu HAYASHI

Hoshizaki Green Foundation, 1659–5, Okinoshima, Sono, Izumo, 691–0076 Japan
E-mail: hgf-haya@green-f.or.jp

and

Osamu TOMINAGA

A–312, Shibatsuji-cho 4–1–15, Nara, 630–8144 Japan

Abstract Eight species of donaciine beetles taken in 2004 from south Primorsky, Far Eastern Russia, are recorded, with the first record of *Plateumaris shirahatai* KIMOTO from the continental region.

HAYASHI (2001, 2002) reported collecting records of 11 species of Donaciinae from southern Primorsky Province, Far Eastern Russia including the first records of *Donacia bicoloricornis* and *Donacia vulgaris* from the province.

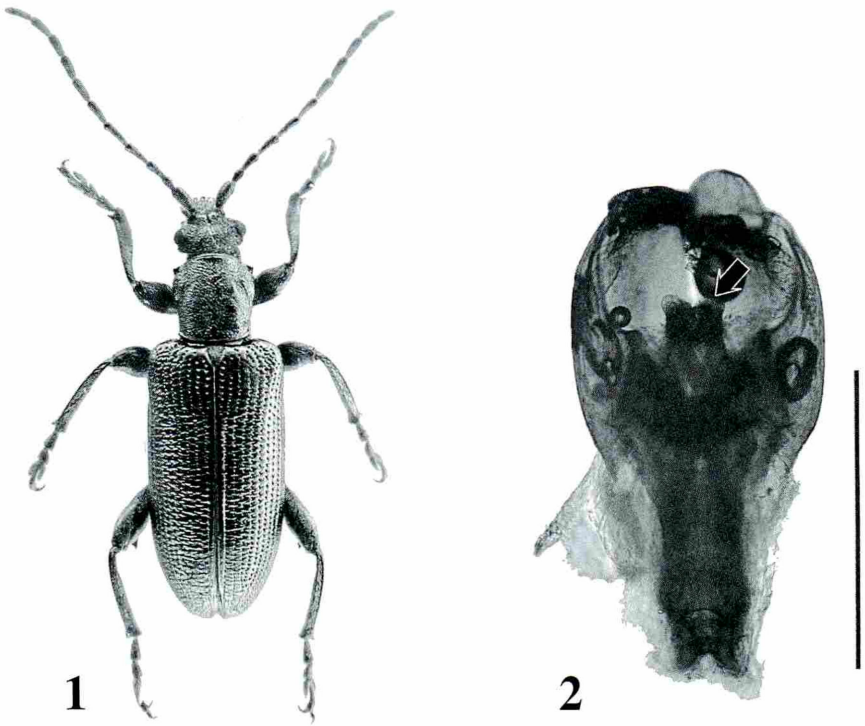
We visited the region again in May, 2004 and collected eight species in two genera: *Plateumaris shirahatai*, *P. roscida*, *P. weisei*, *Donacia aquatica*, *D. flemora*, *D. ochloreuca*, *D. vulgaris* and *Donacia* sp. Among them, *P. shirahatai* previously known from Sakhalin and Japan (Hokkaido, Honshu) is commonly found from marsh in the region.

We gratefully acknowledge to Dr. Victor N. KUZNETSOV (Institute of Biology and Soil Science, Far Eastern Branch of Russian Academy of Science, Vladivostok) and Mr. Shigehiko SHIYAKE (Osaka Museum of Natural History) for supporting our field survey.

Plateumaris shirahatai KIMOTO

(Figs. 1, 2, 11)

Records. 4♂♂, 1♀, pond, 4 km E of Romanovka V., Bolshoy Kamen Town, Primorsky, 15. V. 2004, M. HAYASHI leg.; 5♂♂, 1♀, pond, 4 km W of Novonezhino V., Bolshoy Kamen Town, Primorsky, 15. V. 2004, M. HAYASHI leg.; 3♂♂, ditto, O. TOMINAGA leg.; 5♂♂, pond, 2 km WSW of Gornotayozhnoye V., Ussuriysky District, Primorsky, 16. V. 2004, O. TOMINAGA leg.; 5♂♂, 4♀♀, pond, 3 km NW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, M. HAYASHI leg.; 13♂♂, 4♀♀, ditto, O. TOMINAGA leg.; 1♀, pond, 5 km WNW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, O. TOMINAGA leg.; 7♂♂, 1♀, marsh, Zarechnoye V., Ussuriysky District, Primorsky, 17. V. 2004, M. HAYASHI leg.; 18♂♂, 8♀♀, ditto, O. TOMINAGA leg.



Figs. 1–2. *Plateumaris shirahatai* from south Primorsky —— 1, Habitus, male; 2. endophallus. Allow indicates notched median process. Scale bar = 0.5 mm.

Host plants. Adults were collected on the flowers of *Carex* spp.

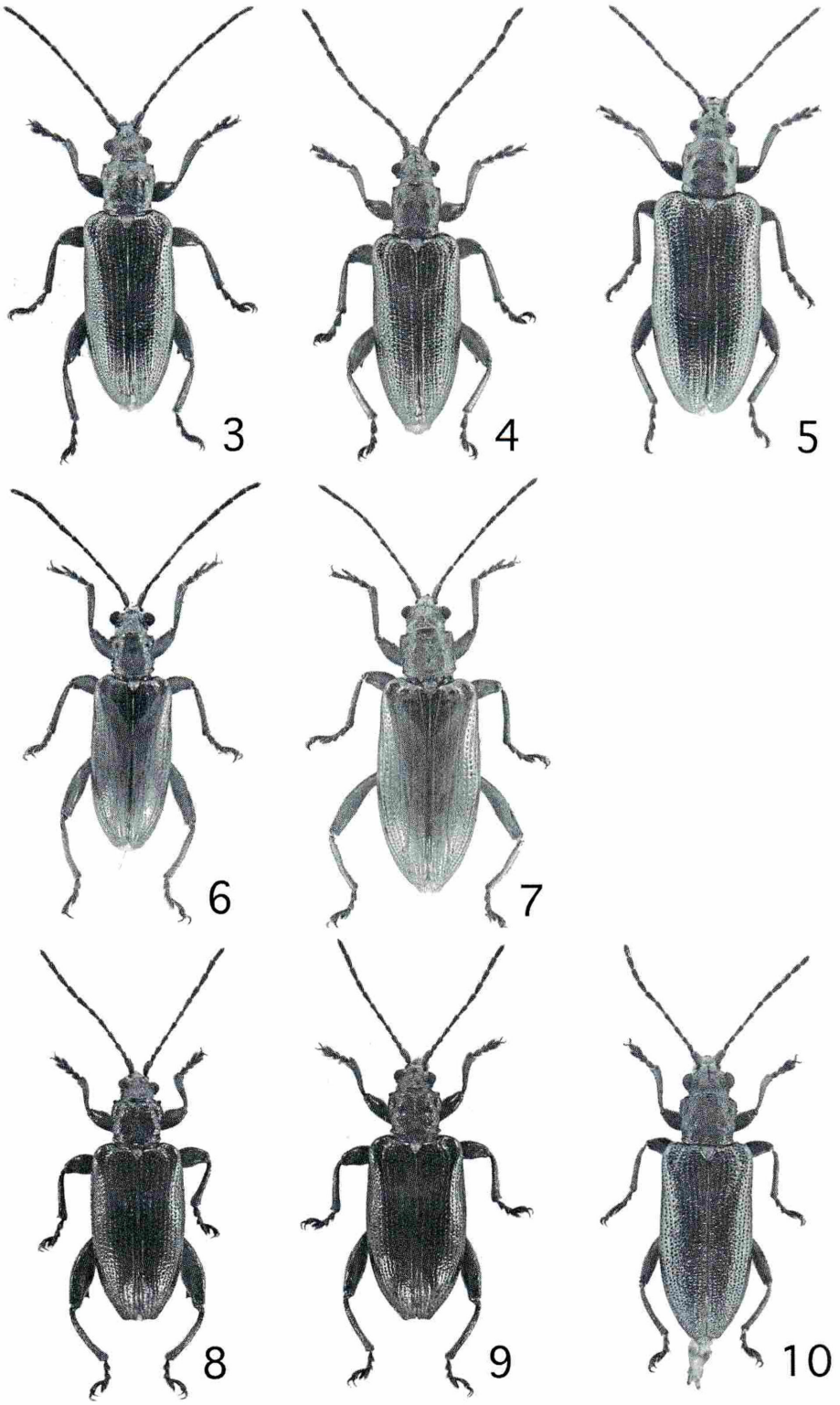
Remarks. *Plateumaris shirahatai* was described from Yamagata Prefecture, Honshu, Japan (KIMOTO and HIURA, 1971). It resembles a transpalaearctic species, *P. sericea* LINNAEUS. It had been known as a Japanese endemic species (KIMOTO, 1983), but recorded from south Sakhalin (MIKHAILOV and HAYASHI, 2000), and also commonly found from several localities in south Primorsky. It is quite within the bounds of possibility that *P. shirahatai* is a synonym of other Palaearctic species (for example, *P. obsoleta* JACOBSON) because its identification is very difficult based on external morphology.

Distribution. Primorsky, Sakhalin; Hokkaido, Honshu.

Plateumaris roscida WEISE

(Figs. 3–5)

Records. 1♂, 1♀, marsh, 1km E of Mt. Sestra, Partizansky District, Primorsky, 14. V. 2004, M. HAYASHI leg.; 4♂♂, ditto, O. TOMINAGA leg.; 3♂♂, pond, 2 km WSW of Gornotayozhnoye V., Ussuriysky District, Primorsky, 16. V. 2004, M. HAYASHI leg.; 18♂♂, 1♀, ditto, O. TOMINAGA leg.; 6♂♂, pond, 3 km NW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, M. HAYASHI leg.; 6♂♂, 1♀, ditto, O. TOMINAGA leg.; 1♂, pond, 5 km WNW of Kaimanovka V., Ussuriysky District,



Figs. 3–10. Donaciinae from south Primorsky. — 3–5, *Plateumaris roscida* (3–4, male; 5, female); 6–7, *Donacia ochloreuca* (6, male; 7, female); 8–9, *D. flemora* (8, male; 9, female); 10, *D. vulgaris*, female.

Primorsky, 16. V. 2004, M. HAYASHI leg.; 1♂, ditto, O. TOMINAGA leg.; 12♂♂, 2♀♀, marsh, Zarechnoye V., Ussuriysky District, Primorsky, 17. V. 2004, M. HAYASHI leg.; 14♂♂, 5♀♀, ditto, M. HAYASHI leg.

Host plants. Adults were collected on the flowers of *Carex* spp.

Remarks. In some specimens, the femora are entirely rufous and partly dark-colored (Fig. 4).

Plateumaris weisei DUVIVIER

Records. 1♀, marsh, 1km E of Mt. Sestra, Partizansky District, Primorsky, 14. V. 2004, M. HAYASHI leg.; 1♂, ditto, O. TOMINAGA leg.; 1♂, pond, 3 km NW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, M. HAYASHI leg.; 1♀, marsh, Zarechnoye V., Ussuriysky District, Primorsky, 17. V. 2004, O. TOMINAGA leg.

Host plants. *Carex* spp.

Donacia* (*Donaciomima*) *aquatica LINNAEUS

(Fig. 12)

Records. 1♂, 1♀, pond, 4km E of Romanovka V., Bolshoy Kamen Town, Primorsky, 15. V. 2004, M. HAYASHI leg.; 1♂, ditto, O. TOMINAGA leg.; 8♂♂, 3♀♀, pond, 4 km W of Novonezhino V., Bolshoy Kamen Town, Primorsky, 15. V. 2004, M. HAYASHI leg.; 3♂♂, 4♀♀, ditto, O. TOMINAGA leg.; 1♂, pond, 2 km WSW of Gornotayozhnoye V., Ussuriysky District, Primorsky, 16. V. 2004, M. HAYASHI leg.; 1♀, ditto, O. TOMINAGA leg.; 4♂♂, 7♀♀, pond, 3 km NW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, M. HAYASHI leg.; 25♂♂, 18♀♀, ditto, O. TOMINAGA leg.; 3♂♂, 1♀, pond, 5 km WNW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, M. HAYASHI leg.; 4♂♂, 8♀♀, ditto, O. TOMINAGA leg.; 3♂♂, 4♀♀, marsh, Zarechnoye V., Ussuriysky District, Primorsky, 17. V. 2004, M. HAYASHI leg.; 9♂♂, 7♀♀, ditto, M. HAYASHI leg.

Host plants. Adults were collected on the flowers of *Carex* spp.

Donacia* (*Donaciomima*) *flemora GOECKE

(Figs. 8, 9)

Records. 1♂, pond, 4 km E of Romanovka V., Bolshoy Kamen Town, Primorsky, 15. V. 2004, O. TOMINAGA leg.; 1♂, 1♀, pond, 4 km W of Novonezhino V., Bolshoy Kamen Town, Primorsky, 15. V. 2004, O. TOMINAGA leg.; 1♂, 1♀, pond, 3 km NW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, M. HAYASHI leg.; 1♂, 2♀♀, ditto, O. TOMINAGA leg.; 1♂, 4♀♀, marsh, Zarechnoye V., Ussuriysky District, Primorsky, 17. V. 2004, M. HAYASHI leg.

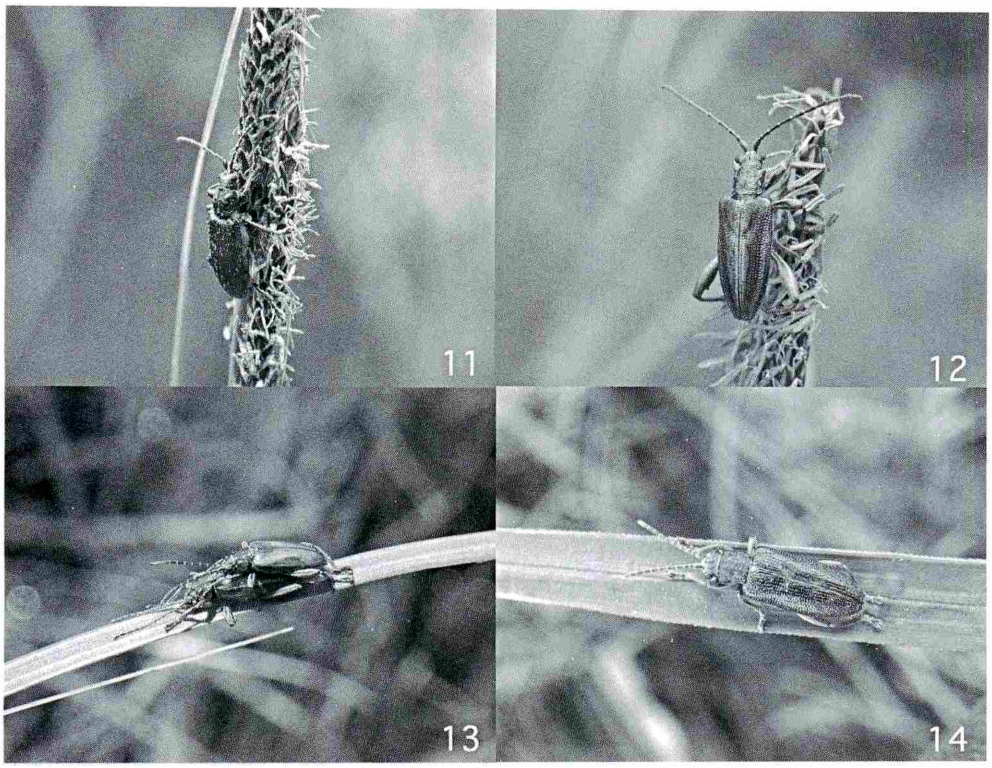
Host plants. *Carex* spp.

Donacia* (*Donaciomima*) *ochroleuca WEISE

(Figs. 6, 7, 13)

Records. 9♂♂, 8♀♀, marsh, 1 km E of Mt. Sestra, Partizansky District, Primorsky, 14. V. 2004, M. HAYASHI leg.; 11♂♂, 7♀♀, ditto, O. TOMINAGA leg.; 2♂♂, 1♀, pond, 3 km NW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, O. TOMINAGA leg.; 1♂, pond, 2 km WSW of Gornotayozhnoye V., Ussuriysky District, Primorsky, 16. V. 2004, O. TOMINAGA leg.

Host plants. *Carex* spp.



Figs. 11–14. Donaciinae from south Primorsky. — 11, *Plateumaris shirahatai* on flower of *Carex* sp.; 12, *Donacia aquatica* on flower of *Carex* sp.; 13, *D. ochloreuca* on leaf of *Carex* sp.; 14, *D. vulgaris* on leaf of *Carex* sp.

Remarks. ASKEVOLD (1990) recognized that *Donacia ochroleuca* was a synonym of *D. fennica* PAYKULL, but MEDVEDEV (1992) treated *D. ocreleuca* as an independent species.

Donacia* (*Donaciomima*) *vulgaris ZSCHACH

(Figs. 10, 14)

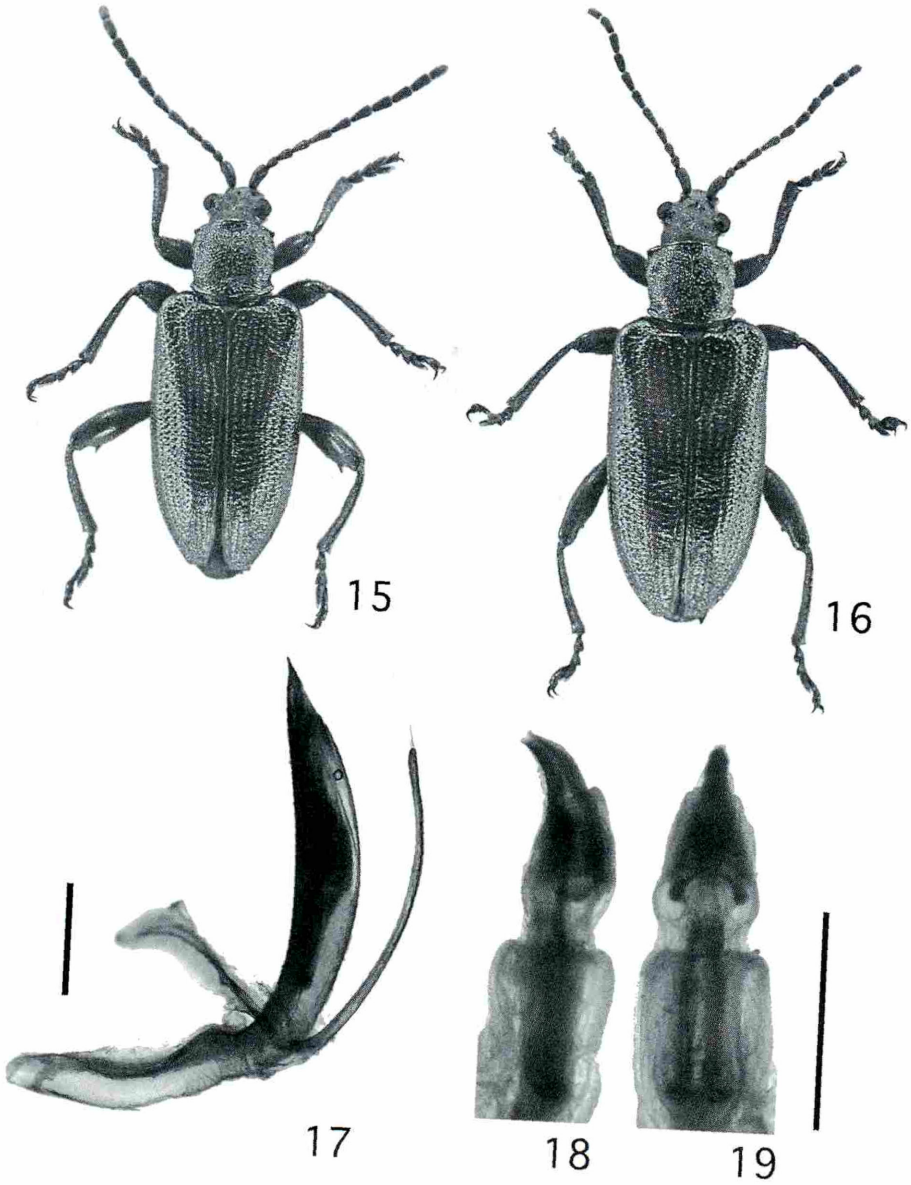
Records. 1♂, pond, 4 km W of Novonezhino V., Bolshoy Kamen Town, Primorsky, 15. V. 2004, S. SHIYAKE leg.; 1♀, marsh, Zarechnoye V., Ussuriysky District, Primorsky, 17. V. 2004, M. HAYASHI leg.

***Donacia* (*Donaciomima*) sp.**

(Figs. 15–19)

Records. 1♂, 2♀♀, pond, 3 km NW of Kaimanovka V., Ussuriysky District, Primorsky, 16. V. 2004, O. TOMINAGA leg.

Remarks. This species is characterized by robust body and antennae, metallic legs, and glabrous pronotum (Figs. 15 and 16). Median process of endophallus is short and gently arched



Figs. 15–19. *Donacia* (*Donaciomima*) sp. — 15–16, Habitus (15, male; 16, female); 17, median lobe and tegmen; 18–19, endophallus (18, lateral view; 19, dorsal view). Scale bar = 0.5 mm.

towards underside (Figs. 18 and 19). We can not identify it with any species known from the Far Eastern Russia at present.

要　　約

林　成多・冨永　修：ロシア沿海州で採集したネクイハムシ亜科の記録（2004年）およびシラハタミズクサハムシの分布記録．——— 2004年7月にロシア沿海州南部での野外調査において８種のネクイハムシ亜科甲虫類を得ることができた．渡航時はスゲ類の開花期の初めであったが，シラハタミズクサハムシ *Plateumaris shirahatai* KIMOTO や *P. roscida* WEISE，*Donacia aquatica* LINNAEUS はスゲ類の花上で多くみられた．シラハタミズクサハムシは従来，サハリンと日本（北海道，本州）から知られていたが，沿海州南部でも普通種であることが確認された．また，得られたフトネクイハムシ亜属の１種は，交尾器を含め形態的特徴から，これまでに極東ロシアから記録された種には同定されなかった．

References

ASKEVOLD, I. S. 1990. Reconstructed phylogeny and reclassification of the genera of Donaciinae (Coleoptera: Chrysomelidae). *Quaestiones Entomologicae*, **26**: 601–664.

HAYASHI, M., 2001. *Donacia bicoloricornis* CHEN from Far East Russia, with records on several *Donacia* from Primorskiy Province (Coleoptera: Chrysomelidae: Donaciinae). *The Entomological Review of Japan*, **56**: 63–66.

——— , 2002. Records on Donaciinae from Primorsky Province in 2002, with taxonomic study on *Donacia knipotschi* JACOBSON (Coleoptera: Chrysomelidae). *The Entomological Review of Japan*, **57**: 197–202.

KIMOTO, S. and HIURA, I. 1971. A List of the Chrysomelid specimens preserved in the Osaka Museum of Natural History , III (Insecta: Coleoptera). *The Bulletin of the Osaka Museum of Natural History*, **25**: 1–26. (In Japanese, with English original descriptions.)

MEDVEDEV, L. N. 1992. Fam. Chrysomelidae. *In*. Opredelitel' nasekomyh Dalnego Vostoka SSSR. V. 3. Part 2. Nauka, St. Petersburg: 533–602. (In Russian.)

MIKHAILOV, Y. E. and M. HAYASHI, 2000. Chrysomelidae of Sakhalin I. *The Entomological Review of Japan*, **55**: 71–83.

(Received September 19, 2004; Accepted January 22, 2005)

Ent. Rev. Japan, **60** (1): 9–12, April 30, 2005

A New *Pterostichus* (Coleoptera: Carabidae) from the Islands of Tsushima, West Japan

Seiji MORITA

Higashi-gotanda 5–19–7, Shinagawa-ku, Tokyo, 141–0022 Japan

Abstract A new pterostichine carabid beetle, *Pterostichus* (*Micronialoe*) *kaniei* is described from the Islands of Tsushima, West Japan. It is related to *P.* (*M.*) *bifoveolatus* PARK, KWON et LAFER, but differs from it mainly in the body size, structure of pronotum, and shape of the male genital organ.

So far as I am aware, only three species of the genus *Pterostichus* have been recorded from the Islands of Tsushima, which are *Pterostichus eschscholtzii* GERMER (= *P. fortis* MORAWITZ), *P. symmetricus* STRANEO and *P. opacipennis* JEDLIČKA. Of these, the latter two are endemic to the islands and in this paper, I am going to describe a new species as the third endemic species.

Abbreviations. The abbreviations used herein are as follows: L—body length, measured from apical margin of clypeus to apices of elytra; HW—greatest width of head; PW—greatest width of pronotum; PL—length of pronotum, measured along the mid-line; PA—width of pronotal apex; PB—width of pronotal base; EW—greatest width of elytra; EL—greatest length of elytra; FL—length of metafemur; ML—length of metatrochanter; TL—length of hind tarsus; M—arithmetic mean; NSMT—National Science Museum (Nat. Hist.,), Tokyo; H—holotype.

Acknowledgements. I wish to express my deep gratitude to Dr. Shun-Ichi UÉNO for critically reading the manuscript of this paper. My thanks are also due to Messrs. Noboru KANIE and Takashi KURIHARA for supplying me with important material.

Thanks are also due to Dr. German Sh. LAFER and Dr. Jong Cheol PAIK for giving me an opportunity to study the specimens belonging to the subgenus *Micronialoe*.

Pterostichus* (*Micronialoe*) *kaniei MORITA, sp. nov.

(Figs. 1–7)

Description. L: 6.1–7.0 mm. Colour dark brown to blackish brown, but the appendages are a little lighter than dorsum.

Head moderately convex; PW/HW 1.63 in H, 1.67 in 1♂, 1.64 in 1♀; frontal furrows deep, wide and divergent posteriad, and with weak wrinkles; eyes small and less convex; lateral grooves deep, straight and reaching the basal part of genae on each side; anterior supraorbital pores situated a little before the mid-eye level; posterior ones situated a little behind the post-eye level; genae slightly convex; neck wide; microsculpture composed of polygonal meshes; mentum tooth bifid and wide; relative lengths of antennal segments as follows: —— I : II : III : IV : V : VI : XI ≒ 1 : 0.50 : 0.95 : 0.93 : 0.84 : 0.84 : 1.14 in H, ≒ 1 : 0.51 : 0.92 : 0.83 : 0.75 :

0.76 : 1.08 in 1♀.

Pronotum a little convex and widest at about basal 2/5 (measured along the mid line) in H; PW/PL 1.15 in H, 1.14 in 1♂ and 1♀; apex widely emarginate, a little wider than base; PA/PB 0.76 in H, 0.78 in 1♂, 0.82 in 1♀; PW/PA 1.49 in H, 1.47 in 1♂, 1.45 in 1♀; PW/PB 1.13 in H, 1.15 in 1♂, 1.19 in 1♀; apical angles slightly produced and obtusely pointed at the tips, hind ones obtuse; sides weakly and widely arcuate in front, shallowly sinuate behind, and then weakly divergent just before hind angles in H; base emarginate at middle and slightly arcuate at the sides; median line finely impressed; anterior transverse impression evanescent, posterior one vague; two basal foveae present on each side; inner basal fovea deep, small, linear at the bottom, and very sparsely and rather coarsely punctate at the bottom; outer basal fovea short, linear and situated near hind angle; microsculpture composed of fine transverse meshes.

Elytra moderately convex; shoulders prominent and with a rather large tooth on each side; EW/PW 1.27 in H, 1.26 in 1♀; EL/EW 1.49 in H, 1.43 in 1♀; sides slightly arcuate, and with very shallow preapical emargination; epipleuron gradually narrowed towards apex; inner plica distinct; apices conjointly rounded; basal border slightly arcuate and joining stria 1; intervals weakly convex and impunctate; striae coarsely and sparsely punctate; marginal series composed of 13 to 15 pores; microsculpture composed of fine transverse meshes.

Gula with transverse wrinkles at the sides; proepisterna, sides of prosternum, mesosternum, mesepisterna, and metepisterna coarsely punctate; sternites rugose; microsculpture of anal sternite (VII) composed of polygonal to wide meshes in apical half and of wide to transverse ones in basal half; in ♂, anal sternite elongate, weakly depressed at apical part, and narrowly bordered throughout.

Legs stout; TL/HW 1.02 in H, 0.97 in 1♂, 0.90 1♀; metafemora with two setae on each side; metatrochanters with a seta on each side; ML/FL 0.48 in H, 0.50 in 1♂, 0.47 in 1♀.

Aedeagus stout, small and moderately bent at basal third; viewed dorsally, apical part of aedeagus curved towards the right and with simply rounded apex; right wall of aedeagus widely concave, and with a carina (cf. Figs. 3–5, c) at the ventral edge; ventral side of aedeagus weakly concave (cf. Fig. 4); apical lobe rather short and thin.

Right paramere elongate, bent at basal 3/5, and with rounded apex; left paramere wide.

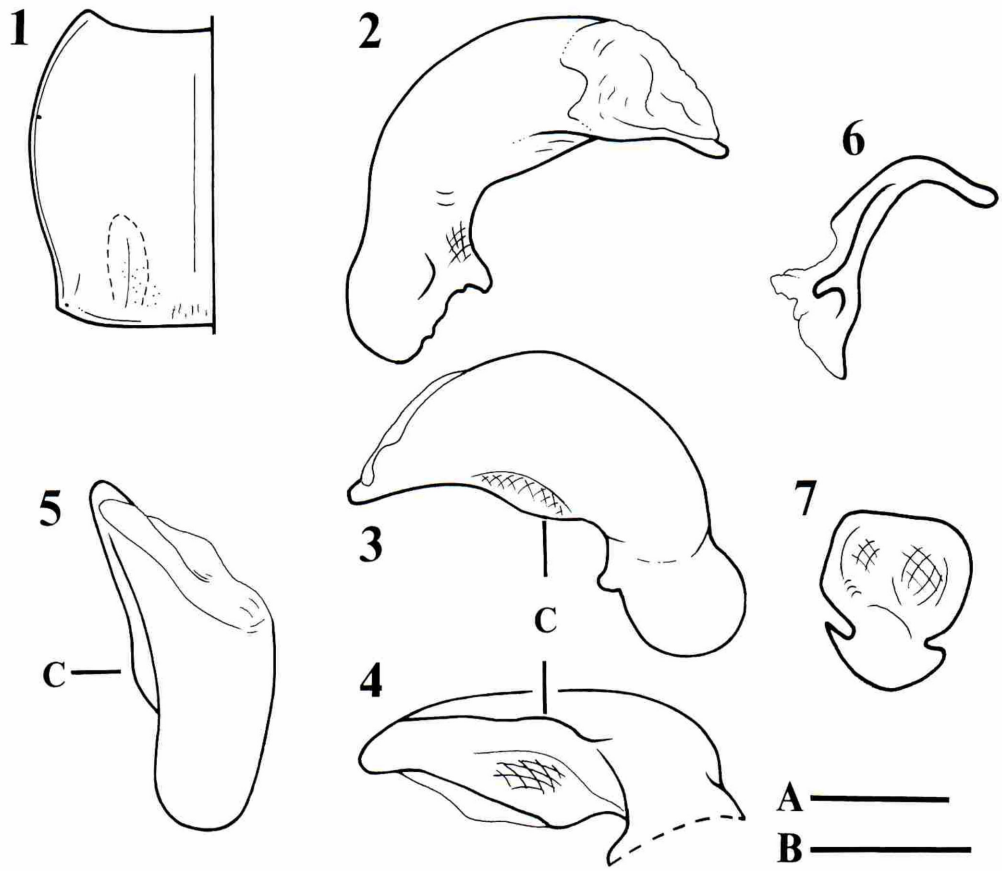
Type series. Holotype: ♂, Mt. Ôhira-yama, 9. VI. 2002, T. KURIHARA leg. (NSMT). Paratypes: 1♂, 1♀, Mt. Mokkoku-yama, 24. IX. 1993, N. KANIE leg.

Localities of the type series. Mt. Ôhira-yama and Mt. Mokkoku-yama, Izuhara-machi, Nagasaki Prefecture, Japan.

Notes. The subgenus *Micronialoe* is a close relative of *Abea* beyond all doubt. The two subgenera have many basic characters in common, including the shape of the male genital organ. The only prominent difference between them is the shape of the right paramere of the male genital organ: in *Abea*, short and robust; in *Micronialoe*, elongate and bent.

The shape of the right paramere of the male genital organ serves by itself as a key character for a higher classification of pterostichine carabids, though there are some exceptions. I place this new species in the subgenus *Micronialoe*, for the time being.

This new species may have a relationship with *P.* (*M.*) *bifoveolatus* PARK, KWON et LAFER distributed in Korea. However, it is distinguished from the latter by the following points: 1) body smaller; 2) body form robust; 3) neck narrower; 4) frontal furrows shorter and more strongly divergent posteriad; 5) microsculpture of head more clearly impressed; 6) structure of pronotum different (weakly produced apical angles, reflexed basal borders wider near apical



Figs. 1–7. *Pterostichus* (*Micronialoe*) *kaniei* MORITA, sp. nov. from Mt. Mokkoku-yama. —— 1, Left side of pronotum; 2, aedeagus, left lateral view; 3, aedeagus, right dorso-lateral view; 4, aedeagus, right ventro-lateral view; 5, aedeagus apico-dorsal view; 6, right paramere, left lateral view; 7, left paramere, left lateral view. c – carina. (Scale 1 mm: A for 1; 0.5 mm: B for 2–7.)

angles, basal part convex and almost smooth, posterior transverse impression vague, bottom on basal foveae shallower, and outer foveae vague); 7) elytral striae more strongly impressed; 8) EL/EW 1.49 in ♂; 9) anal sternite weakly depressed at apical part; 10) aedeagus elongate and with rather weak carina. [in *P.* (*M.*) *bifoveolatus* PARK, KWON et LAFER, L: 7.7 mm. Head rather large, with flat eyes; neck wide. Pronotum moderately convex; reflexed lateral borders very narrow throughout; outer foveae deeper; PW/HW 1.58, PW/PL 1.11, PW/PA 1.43, PW/PB 1.18, PA/PB 0.82 in 1 ♂. Elytra elongate; EW/PW 1.21; EL/EW 1.65 in 1 ♂; striae moderately punctate. Anal sternite in ♂ strongly depressed at apical part. Aedeagus robust, short and with a prominent carina; right paramere elongate and arcuate.]

This species is named in honor of Mr. Noboru KANIE, the discoverer of the pterostichine.

要　　約

森田 誠司：対馬産のナガゴミムシの１新種. ―― 長崎県対馬から発見されたナガゴミムシの１新種，ツシマヒメナガゴミムシ *Pterostichus* (*Micronialoe*) *kaniei* MORITA を記載した．韓国から知られている *P.* (*M.*) *bifoveolatus* PARK, KWON et LAFER に近縁であるが，小型で，前胸背板の構造，短い上翅，細長い交尾器などをもつ点で，容易に識別される．なお，亜属 *Micronialoe* と *Abea* の関係に関しては，多くの基本的な特徴を共有するものの，ここでは区別して取り扱うことにした．

References

MORITA, S., 1992. A new subgenus and species of *Pterostichus* (Coleoptera, Carabidae) from Aomori Prefecture, North Japan. *Elytra*, *Tokyo*, **20**: 15–19.

PARK, J. K., Y. J. KWON and G. Sh. LAFER, 1996. Classification of the genus *Pterostichus* BONELLI from Korea (Coleoptera, Harpalidae) I. *Micronialoe* subgen. nov. *Korean Journal of Entomology*, *Seoul*, **26** : 73–77.

(Received December 16, 2004; Accepted January 22, 2005)

Ent. Rev. Japan, **60** (1): 13–16, April 30, 2005

Synonymic Notes on Two Species of the Families Hydrophilidae and Leiodidae (Coleoptera) from Japan

Hideto HOSHINA

Department of Regional Environment, Faculty of Education & Regional Studies, Fukui University, Fukui, 910–8507 Japan

and

Masataka SATÔ

Dia Cuore Tokushige 306, Kamegahora 3–1404, Midori-ku, Nagoya, 458–0804 Japan

Abstract *Megasternum japonicum* SHATROVSKIY, 1989 (Hydrophilidae) and *Agathidium (Neoceble) fujiyamaense* HOSHINA, 1997 (Leiodidae) are newly treated as junior synonyms of *M. gibbulum* MOTSCHULSKY, 1866 and *A. (N.) funereum* ANGELINI et De MARZO, 1990, respectively.

After the examinations of many specimens of the genera *Megasternum* MULSANT, 1844 of Hydrophilidae and *Agathidium* PANZER, 1797 of Leiodidae upon our recent collections, and the paratypes of *Megasternum japonicum* SHATROVSKIY, 1989 and the holotype of *Agathidium (Neoceble) funereum* ANGELINI et De MARZO, 1990 through the courtesies of Drs. M. ÔHARA and I. LÖBL, two synonymies are newly recognized as noted in the followings.

Before going further, we owe thanks to Drs. Ivan LÖBL (Muséum d'histoire naturelle, Genève) and Masahiro ÔHARA (The Hokkaido University Museum, Hokkaido University, Sapporo) who kindly provided us with the opportunity to examine the type specimens.

Family Hydrophilidae

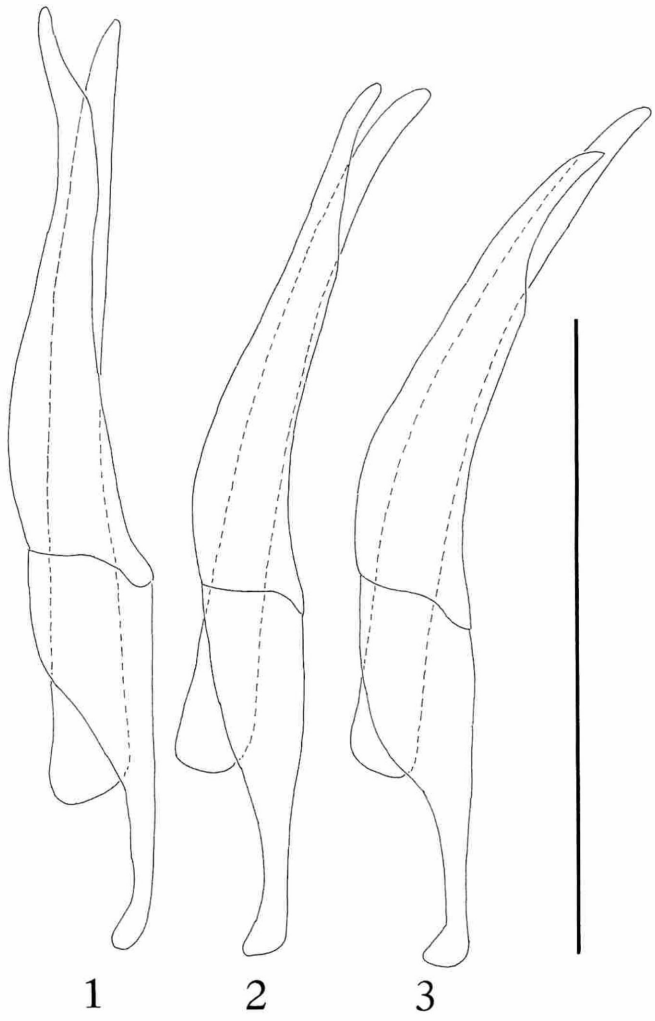
Megasternum gibbulum MOTSHULSKY, 1866

(Figs. 1–3)

Megasternum gibbulum MOTSCHULSKY, 1866: 169; SHARP, 1884: 464; HANSEN, 1999: 305.
Megasternum japonicum SHATROVSKIY, 1989: 286; SHATROVSKIY, 1992: 368; HANSEN, 1999: 305. **Syn. nov.**

Distribution. Japan and Korea.

Specimens examined. Paratypes of *M. japonicum*, 1 ex., Mt. Kasuga, Nara Pref., Honshu, 26. V. 1954, K. SAWADA leg.; 4 exs., Naga Town, Wakayama Pref., Honshu, 29. III. 1952, K. ISHIKAWA leg. (Those paratypes are preserved in the collection of Systematic Entomology, Faculty of Agriculture, Hokkaido University.); 1 ex., Mt. Eniwadake, Hokkaido, 20. VII. 1997, H. HOSHINA leg.; 7 exs., Shinrin-



Figs. 1–3, *Megasternum gibbulum* MOTSCHULSKY. Median lobe of male genitalia in lateral view. Scale: 0.5 mm.

Kagakuen, Takao, Tokyo Pref., Honshu, 22. XI. 2000, H. HOSHINA leg.; 8 exs., Tendaki, Ôya Town, Hyôgo Pref., Honshu, 8. VI. 1996, H. HOSHINA leg.; 1 ex., Matsuyama Castle, Matsuyama City, Ehime Pref., Shikoku, 14. VIII. 1996, H. HOSHINA leg.; 1 ex., Shirataki, Nagahama Town, Ehime Pref., Shikoku, 15. VI. 1997, H. HOSHINA leg.; 2 exs., Chikuzen-Okinoshima Is., Fukuoka Pref., Kyushu, 21. V. 1998, H. HOSHINA leg.; 2 exs., Shiroyama, Kagoshima City, Kagoshima Pref., Kyushu, 7. III. 1997, H. HOSHINA leg.

Notes. SHATROVSKIY (1989; 1992) described *Megasternum japonicum* on specimens from some type specimens of *Megasternum gibbulum* MOTSCHULSKY in the LEWIS Collection of the Natural History Museum in London, and distinguished by the reddish brown dorsal color from the blackish *M. gibbulum* MOTSCHULSKY, 1866. However, *M. gibbulum* are variable among specimens upon such characters as the dorsal coloration, clearness of punctures in the striae,

density of the discal punctures, strength of curvature of median lobe of aedeagus in lateral view (Figs. 1–3), girth of median lobe in ventral view, and so on, and the character defining *M. japonicum* fall evidently in the range of variation. Moreover, the specimens of both reddish brown and black dorsal color and the two types of median lobe (Figs. 2 and 3) were collected at the same time from one locality, Tendaki in Hyôgo, and no correction between the dorsal coloration and the shape of aedeagus has not been demonstrated. Consequently, it can be given as the conclusion that *M. japonicum* is a junior synonym of *M. gibbulum*, neither independent species nor the local variation.

Family Leiodidae

Agathidium (*Neoceble*) *funereum* ANGELINI et De MARZO, 1990

Agathidium (*Neoceble*) *funereum* ANGELINI et De MARZO, 1990: 92; ANGELINI, 1995: 140; HOSHINA, 2000: 67.
Agathidium (*Neoceble*) *fujiyamaense* HOSHINA, 1997: 164. **Syn. nov.**

Distribution. Japan (Honshu).

Specimens examined. Holotype of *A.* (*N.*) *funereum*, ♂, Yaseyuen, Kyoto Pref., Honshu, 4. VIII. 1980, C. BESUCHET leg. (preserved in Muséum d'histoire naturelle, Genève); holotype of *A.* (*N.*) *fujiyamaense*, ♂, Aokigahara, Mt. Fujisan, Yamanashi Pref., Honshu, 23. VIII. 1982, S. NAOMI leg. (preserved in Kyushu University). Not type specimens, 5 exs., Tendaki, Ôya Town, Hyôgo Pref., 28. V. 1998, H. HOSHINA leg.; 16 exs., Mt. Maya, Kobe City, Hyôgo Pref., 30. V. 1998, H. HOSHINA leg.

Notes. *Agathidium* (*Neoceble*) *fujiyamaense* was described on a male from Aokigahara, Mt. Fujisan, and *A.* (*N.*) *funereum* on the specimens from Kyoto. The median lobe of aedeagus in *A.* (*N.*) *funereum* is a little slenderer than that in *A.* (*N.*) *fujiyamaense* in ventral view (cf. figs in ANGELINI and De MARZO, 1990, and HOSHINA, 1997), but these differences seem to be not enough for separating both populations as the independent species nor subspecies after examination of some additional specimens.

要　　約

保科 英人・佐藤 正孝：日本産ガムシ科とタマキノコムシ科2種のシノニム処置．――*Megasternum japonicum* は SHATROVSKIY (1989) によって，日本産同属種の *M. gibbulum* MOTSCHULSKY, 1866（和名：セマルマグソガムシ）のタイプシリーズの一部や，他の標本を基に記載された種である．しかし，*M. gibbulum* MOTSCHULSKY, 1866 は雄交尾器や体色など，地理的なものではない個体変異が激しく，*M. japonicum* は明らかに *M. gibbulum* のシノニムである．また，*Agathidium* (*Neoceble*) *fujiyamaense* HOSHINA, 1997（和名：フジサンマルタマキノコムシ）は，雄交尾器が *A.* (*N.*) *funereum* ANGELINI et De MARZO, 1990（和名：ギオンマルタマキノコムシ）のそれと比べてやや太く，この形質差は地理的変異であるものの，亜種・種レベルの変異ではないと考えられ，後者のシノニムとした．

References

ANGELINI, F., 1995. Revisione tassonomica delle specie paleartiche del genere *Agathidium* PANZER (Coleoptera: Leiodidae: Agathidiini). *Museo Regionale di Scienze Naturali, Torino, Monografie*, **18**: 1–485.

——— and L. De MARZO, 1990. Anisotomini del Giappone (Coleoptera, Leiodidae). *Entomologica, Bari*, **23**: 47–122.

HANSEN, M., 1999. Hydrophiloidea (s. str.) (Coleoptera). World Catalogue of Insects, 2. 416 pp. Apollo Books, Stenstrup.

HOSHINA, H., 1997. Two new species on the genus *Agathidium* (Coleoptera, Leiodidae) from Japan. *The Japanese Journal of Systematic Entomology*, **3**: 161–165.

———, 2000. A taxonomic study on the subgenus *Neoceble* (Coleoptera: Leiodidae: *Agathidium*) from Kyushu, Japan. *Species Diversity, Sapporo*, **5**: 59–88.

MOTSCHULSKY, V., 1866. Catalogue des Insects reçus du Japon. *Bulletin de la Société impériale des Naturalistes de Moscou*, **39, 1**: 163–200.

SHARP, D., 1884. The water-beetles of Japan. *Transactions of the Entomological Society of London*, **1884**: 439–464.

SHATROVSKIY, A. G., 1989. Hydraenidae, Hydrophilidae (pp. 260–293). *In* LER, P. A. (ed.). Operedelitel' nasekomykh Dal'nego Vostoka SSSR v shesti tomakh. Vol. 3. Zhestkokrylye, ili zhuki (part 1). 572 pp. Nauka, Leningrad. (In Russian.)

SHATROVSKIY, A. G., 1992. Novye i moloizvestnye vodolyubovye (Coleoptera, Hydrophiloidea) iz yuzhnogo Primor'ya i sopredel'iykh territorii. *Éntomologicheskoe Obozrenie*, **71**: 359–371. (In Russian.)

(Received December 16, 2004; Accepted January 28, 2005)

Ent. Rev. Japan, **60** (1): 17–21, April 30, 2005

The Complex of *Trechiama fujitai* (Coleoptera: Trechinae) from Hyôgo Prefecture, West Japan (III)

— A New Relative of *Trechiama latilobatus* ASHIDA —

Hisashi ASHIDA

7–4–201, Shimeien, Ibaraki, Osaka, 567–0045 Japan
E-mail: BYD01621@nifty.ne.jp

Abstract An additional new species belonging to the *Trechiama fujitai* complex in the group of *T. oni* is described from Asago-chô and Aogaki-chô in the central part of Hyôgo Prefecture under the name *T.* (s. str.) *asagonis* ASHIDA, sp. nov. This new species is a close relative of *T.* (s. str.) *latilobatus* ASHIDA, though easily discriminated from the latter species by the configuration of the male genitalia.

In the first part of this series, I described *Trechiama latilobatus* from the central part of Hyôgo Prefecture, which is an isolated species within the *fujitai* complex of the group of *T. oni* (ASHIDA, 2003). This species was found from three localities in the eastern hills of the upstream of the Maruyama-gawa River that flows from the central part of the prefecture to the Sea of Japan. This is quite exceptional in the *fujitai* complex, because this complex is mainly distributed in the western area of the Maruyama-gawa / Ichi-kawa line and another complex of *T. kosugei* largely occupies the opposite side of the line (UÉNO, 1985; ASHIDA, 2003, 2005). When I described *T. latilobatus*, I also examined several specimens brought from the adjacent areas of its localities; they are similar to that species but have some differences. However, I did not determine the real status of them due to the insufficient number of available specimens. After that, I confirmed the stable phenotype of this population by examining a series of specimens, and am convinced that this is a new species.

The abbreviations used herein are as follows: HW – greatest width of head; PW – greatest width of pronotum; PL – length of pronotum, measured along the mid-line; PA – width of pronotal apex; PB – width of pronotal base; EW – greatest width of elytra; EL – greatest length of elytra; M – arithmetic mean. Measurement was carried out using six male and six female specimens.

Trechiama (s. str.) ***asagonis*** ASHIDA, sp. nov.

(Figs. 1–5)

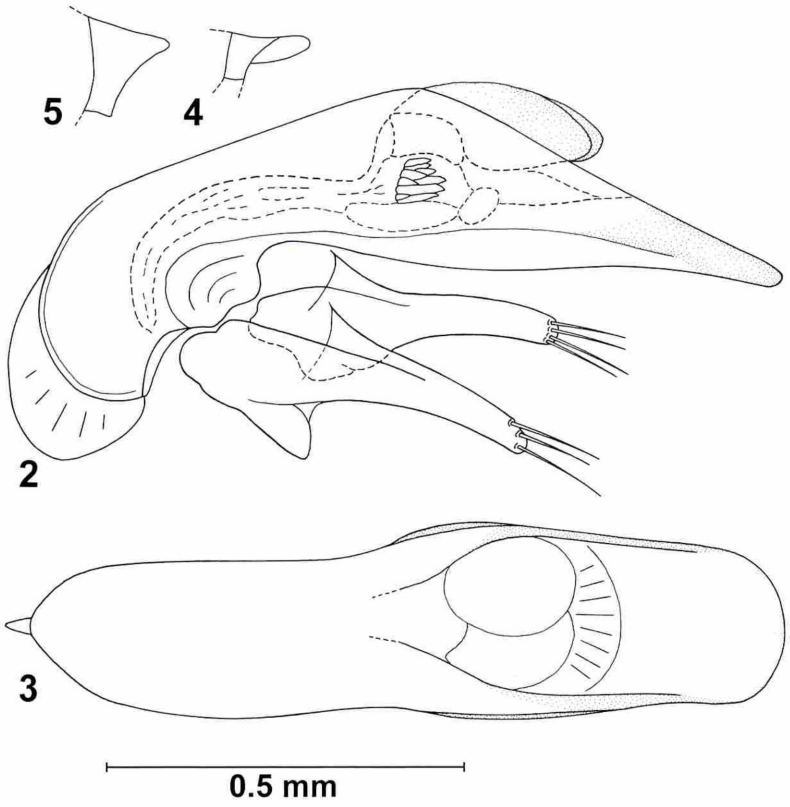
Length: 4.75–5.45 mm (from apical margin of clypeus to apices of elytra).

Closely related to *T. latilobatus* ASHIDA (2003, p. 431, figs. 1, 4–7), though discriminated from the latter species by less depressed and less elongate shape of male genitalia.

Fig. 1. *Trechiama* (s. str.) *asagonis* ASHIDA, sp. nov., from the Iyû-tôge in Asago-chô, ♂, dorsal view.

Relatively small species and externally very similar to *T. latilobatus*. Color yellowish brown with light-colored appendages. Head slender, a little longer than width; genae slightly convex; antennae slender, reaching the middle of elytra. Pronotum similar to that of *T. latilobatus* though a little wider, subcordate, widest at two-thirds from base; PW/HW 1.37–1.46 (M 1.42), PW/PL 1.06–1.18 (M 1.11), PW/PA 1.31–1.47 (M 1.41), PW/PB 1.27–1.45 (M 1.39), PB/PA 0.97–1.06 (M 1.01); sides more strongly arcuate in front; front and hind angles as in *T. latilobatus*; postangular setae absent; base slightly emarginated at middle. Elytra exactly similar to those of *T. latilobatus*, regularly ovate, rather slender, widest at about middle; EW/PW 1.58–1.76 (M 1.69); EL/PL 2.68–2.94 (M 2.78); EL/EW 1.42–1.52 (M 1.48); EW/PW 1.67–1.82 (M 1.73); EL/PL 2.50–2.75 (M 2.67); EL/EW 1.45–1.51 (M 1.49); prehumeral borders oblique; shoulders completely effaced; sides regularly rounded towards apices; striae and chaetotaxy as in *T. latilobatus*. Legs as in *T. latilobatus*.

Male genital organ large, elongate and heavily sclerotized, basically similar to that of *T. latilobatus*. Aedeagus one-third as long as elytra, compressed on dorsum though less heavily than in *T. latilobatus*; basal part ampler and more strongly curved ventrad than in *T. latilobatus* with large and hyaline sagittal aileron; viewed laterally, middle part moderately convex on dorsum, then gradually and regularly narrowed towards apical tip, which is much thicker than in *T. latilobatus*; viewed dorsally, apical lobe gradually dilated, widest at apical third, and then feebly



Figs. 2–5. Male genitalia of *Trechiama* (s. str.) *asagonis* ASHIDA, sp. nov., from the Iyû-tôge in Asago-chô; left lateral view (2), dorsal view (3), and separated copulatory piece, lateral (4) and dorsal (5) views.

narrowed apicad, which is wide and subsquare with widely rounded corners; viewed ventrally, apical lobe longitudinally convex behind apex. Inner sac armed with a teeth-patch, a copulatory piece and two plates as in *T. latilobatus*; teeth-patch small, consisting of fairly long teeth, lying on left side at about middle of aedeagus; copulatory piece very lightly sclerotized, lying at right side of teeth-patch, trapezoidal, one-ninth as long as aedeagus, a little wider than in *T. latilobatus*, rolled ventrad, whose apical margin is slightly emarginated and projected at right-apical corner; two large plates covered with minute scales at the dorsal side of apical orifice. Styles nearly straight and long; the left one slightly longer than the right, each bearing three or four setae at apex.

Type series. Holotype: ♂, 23. IX. 2003, H. ASHIDA leg. Paratypes: 1♂, 1♀, 1. VI. 2002, A. SOUMA leg.; 3♂♂, 4♀♀, 14. IX. 2002, A. SOUMA leg.; 3♂♂, 1♀, 4. V. 2003, S. YAMASHITA leg.; 2♂♂, 2. VIII. 2003, Y. OKUDA and T. SAITÔ leg.; 13♂♂, 12♀♀, 23. IX. 2003, H. ASHIDA leg.; 4♂♂, 1♀, 5. X. 2003, Y. OKUDA leg. The holotype and one female paratype are preserved in the collection of the National Science Museum (Nat. Hist.), Tokyo.

Type locality. Iyû-tôge (400 m in altitude), the southeastern slope of Mt. Asago-yama (756.5 m in height), Kawakami, Asago-chô, Hyôgo Prefecture, West Japan. Asago-chô was incorporated into Asago-shi on April 1, 2005.

Further records. 1♂, Mt. Awaga-yama (700 m in altitude), Aogaki-chô, Hyôgo Prefecture, 13. VII. 2001, M. MORI leg.; 1♂, 1♀, same locality (550 m in altitude), 31. III. 2002, M. MORI leg.; 1♀, same locality (700 m in altitude), 21. IV. 2002, Y. OKUDA leg.; 1♀, same locality (700 m in altitude), 2. V. 2002, T. SAITÔ leg. Aogaki-chô was incorporated into Tamba-shi on November 1, 2004.

Etymology. The specific name of this species is derived from the type locality, Mt. Asago-yama in Asago-chô.

Notes. As described above, *T. asagonis* is a close relative of *T. latilobatus*, which is one of the most isolated and specialized species within the *fujitai* complex. Judging from the features of the male genitalia, however, the former species is less specialized than the latter, namely, the aedeagus of *T. asagonis* is less flattened, less elongated at apical part, and somewhat resembles those of the other members of the *fujitai* complex. The Iyû-tôge, the type locality of the present species, is located on the southeastern slope of Mt. Asago-yama and is 3.5 km distant to the northeast from Tataragi, the type locality of *T. latilobatus*. The type specimens were dug out from colluvia deposited at the riverhead of the Iyûdani-gawa River, an eastern branch of the upstream of the Maruyama-gawa River. The second locality of this species lies on the eastern slope of Mt. Awaga-yama (962.3 m in height). It is 6.5 km distant to the east-northeast from the Iyû-tôge, 7 km to the northeast from Kurogawa, the second known locality of *T. latilobatus*, and 2.5 km to the south from the Tôsaka-tôge, the type locality of *T. siva* ASHIDA, a member of the *notoi* complex. *Trechiama asagonis* from Mt. Awaga-yama is therefore the easternmost population of the *fujitai* complex. Two collecting points on Mt. Awaga-yama are near the head of the Inazuchi-gawa River, one of the sources of the Kako-gawa River that flows into the Seto Inland Sea. There, *T. asagonis* coexists with another species belonging to the *kosugei* complex that is dominant. Details will be reported elsewhere.

Acknowledgements

I thank Messrs. Masato MORI, Akinao SOUMA, Shun-ichi YAMASHITA, Yoshihide OKUDA, and Takumi SAITÔ for their kindly providing the materials, and Dr. Shun-Ichi UÉNO of the National Science Museum (Nat. Hist.), Tokyo, for his continuous guidance.

要　　約

芦田　久：兵庫県のフジタメクラチビゴミムシ系（第III報）―タタラギメクラチビゴミムシに近似の１新種―．――― タタラギメクラチビゴミムシ *Trechiama* (s. str.) *latilobatus* ASHIDA, 2003 は，兵庫県中央部の円山川源流部右岸（東側）から記載された，フジタメクラチビゴミムシ系に属する顕著な種である．その既知産地の北および北東の２ヵ所，朝来町朝来山伊由峠と青垣町粟鹿山から見いだされた近似種が新種と認められたので，アサゴメクラチビゴミムシ *T.* (s. str.) *asagonis* ASHIDA, sp. nov. と命名し，記載した．本種の雄交尾器はタタラギメクラチビゴミムシのそれに似ているが，後者ほど扁平ではなく，中央片先端部がやや短いことから容易に識別される．

References

ASHIDA, H., 2003. The complex of *Trechiama fujitai* (Coleoptera, Trechinae) from Hyôgo Prefecture, West Japan (I) —Two new species from the Maruyama-gawa drainage area—. *Elytra, Tokyo*, **31**: 431–438.

——— , 2004. An additional species belonging to the *Trechiama notoi* complex (Coleoptera, Trechinae) from the southern part of the Tajima area in Hyôgo Prefecture, Central Japan. *Elytra, Tokyo*, **32**: 259–263.

——— , 2005. The complex of *Trechiama fujitai* (Coleoptera, Trechinae) from Hyôgo Prefecture, West Japan (II) —Two new species and several new records from the Ibo-gawa drainage area—. *Elytra, Tokyo*, **33**: in press.

UÉNO, S.-I., 1985. The group of *Trechiama oni* (Coleoptera, Trechinae) —Its distribution and differentiation—. *Memoirs of the National Science Museum, Tokyo*, (18): 163–198.

(Received January 25, 2005; Accepted February 16, 2005)

Ent. Rev. Japan, **60** (1): 23–33, April 30, 2005

Origin of *Ohomopterus uenoi* (Coleoptera: Carabidae: Carabinae) as Deduced from Comparisons of DNA Sequences of Mitochondrial ND5 Gene and Nuclear Internal Transcribed Spacer I (ITS I) with Morphological Characters

Osamu TOMINAGA[1)], Yûki IMURA[2)], Munehiro OKAMOTO[3)], Zhi-Hui SU[4*)], Tooru OJIKA[5)], Nobuo KASHIWAI[6)] and Syozo OSAWA[7)]

1) A312, 4–1–15, Shibatsuji-chô, Nara, 630–8114 Japan
2) Shinohara-chô 1249–8, Kôhoku-ku, Yokohama, 222–0026 Japan
3) Department of Laboratory Animal Science, School of Veterinary Medicine, Faculty of Agriculture, Tottori University, Tottori, 680–8553 Japan
4) JT Biohistory Research Hall, 1–1 Murasaki-chô, Takatsuki, Osaka, 569–1125 Japan
5) Imahon-Machi, 2–9–27–301, Anjo-shi, Aichi, 446–0008 Japan
6) Hosen-Gakuen High School, Chuo, Nakano-ku, Tokyo, 164–8628 Japan
7) Ushita-Asahi 2–4–7–1003, Higashi-ku, Hiroshima, 732–0067 Japan

Abstract The phylogenetic trees have been constructed using the mitochondrial ND5 gene and the nuclear ITS I sequences of *Ohomopterus uenoi* from the Kongô Mountains together with its relevant species inhabiting the Kinki and Chûbu Districts in Central Japan. The morphological characters, especially the genital organs of these species, have been re-examined. Altogether, the results obtained from molecular and morphological characteristics suggest strongly that *O. uenoi* is a descendant from a hybrid between the female of *O. arrowianus* and the male of either *O. iwawakianus* or *O. kiiensis*.

Introduction

Ohomopterus uenoi (ISHIKAWA, 1960) is one of the most peculiar species of the genus *Ohomopterus* in several respects. Firstly, the distribution of this species is narrowly restricted to the upper parts of Mt. Kongô-zan and Mt. Yamatokatsuragi-san of the Kongô Mountains in the Kinki District of central Honshu, Central Japan (ISHIKAWA, 1962; HIURA, 1965; KOMIYA, 1971; Kinki Research Group of Carabid Beetles, 1979, ISHIKAWA, 1991, *etc.*). No species other than *O. uenoi* inhabiting such an isolated region have been known in the genus *Ohomopterus*. Secondly, *O. uenoi* has an exceptionally huge copulatory piece of the male genital organ of the *insulicola*-type (I-type). Thirdly, except for the copulatory piece, the general appearance of *O. uenoi* is similar to *O. yaconinus* and to some extent to *O. iwawakianus* both having copulatory piece of the *yaconinus*-type (Y-type) and inhabiting with *O. uenoi* in the Kongô Mountains, although the latter two species are distributed widely in the Kinki District. *Ohomopterus dehaanii* and *O. yamato* also inhabit the Kongô Mountains, both of which would most probably

* Corresponding author. E-mail: su.zhihui@brh.co.jp

be irrelevant to *O. uenoi* and are not treated here.

Now, where did *O. uenoi* come from? In one of our previous papers (SU *et al.*, 1996), we reported that the mitochondrial ND5 gene of *O. uenoi* shares the common ancestry with that of *O. arrowianus*, the main distributional range of which is the central Honshu. There are at least two possibilities to account for the origin of *O. uenoi*. One would be that there was a certain period where the ancestor of *O. arrowianus* was distributed in Central Japan through the Kongô Mountains. The male copulatory piece of *O. arrowianus* evolved to the direction of extreme elongation. Another possibility would be that the ancestor of *O. arrowianus* (♀), which once inhabited the Kongô Mountains, was hybridized with some other *Ohomopterus* species (♂) having inhabited there. This would have resulted in the ancestor of the present-day *O. uenoi*. *Ohomopterus arrowianus* that participated in this hybridization must be the female, because the mitochondrial inheritance is female mediated, and the ND5 gene of *O. uenoi* reveals the *O. arrowianus*-type sequence.

To know which possibility is more likely than the other one, we have analyzed the sequences of the ND5 gene and nuclear ITS I of all the *Ohomopterus* species and subspecies inhabiting the Kinki and Chûbu Districts including *O. uenoi*, *O. arrowianus*, *O. iwawakianus* and *O. yaconinus*. The whole pictures of the phylogenetic trees will be published later.

If the ITS I sequence of *O. uenoi* is of the *O. arrowianus*-type, the first possibility, i.e., the hypertrophic evolution (probably by genetic event(s)) of the male genital organ of *O. arrowianus* to the *O. uenoi*-type would be the case. If the ITS I sequence is of some other species, the second possibility, i.e., *O. uenoi* would have been derived from the hybrid ancestor between *O. arrowianus* (♀) and the species concerned (♂).

Materials and Methods

More than 150 *Ohomopterus* specimens from the Kinki and Chûbu Districts were analyzed, and only those relevant to *O. uenoi* were treated in this paper and are shown in the phylogenetic trees. The ND5 gene sequence (1,069 bp.) analysis and construction of a phylogenetic tree by the UPGMA with bootstrap test were the same as described previously (e.g., SU *et al.*, 2004). The dating was done assuming that a 0.01 unit corresponds to 3.6 million years for the carabid ND5 gene according to SU *et al.* (1998, 2001).

The DNA fragment including ITS I, 5.8S rDNA and ITS2 was amplified by two adapted primers: 5'-AAG TCG TAA CAA GGT TTC CG- 3' and 5'-TCC TTG TTA GTT TCT TTT CCT C-3'. About 1,000 bp sequence region of ITS I was directly sequenced whenever possible and used for construction of the phylogenetic tree. The direct sequencing was sometimes not possible by a small heterogeneity due to multicopy of ITS I. In such cases, the amplified DNA fragments were subjected to cloning. Five to ten independent clones from one individual were sequenced.

For both the ND5 gene and ITS I, phylogenetic analyses by means of the UPGMA, NJ-, MP- and ML-methods (see SAITO *et al.*, 2003) were performed, obtaining essentially the same results. Only the UPGMA trees were shown in this paper. Both the ND5 and ITS I trees are also used in the next paper (IMURA *et al.*, 2005a).

Results

Phylogenetic trees of the representative *Ohomopterus* species and subspecies, which are supposed to be relevant to *O. uenoi*

ND5 tree: Fig. 1 shows the UPGMA-phylogenetic tree of the representative *Ohomopterus* species and subspecies in the Kinki and Chûbu Districts with exclusion of *O. yamato*, *O. insulicola* and *O. albrechti* which are not directly connected with the present subject. Four major clusters were recognized in the tree. The cluster I consisted of mostly *O. arrowianus* from the

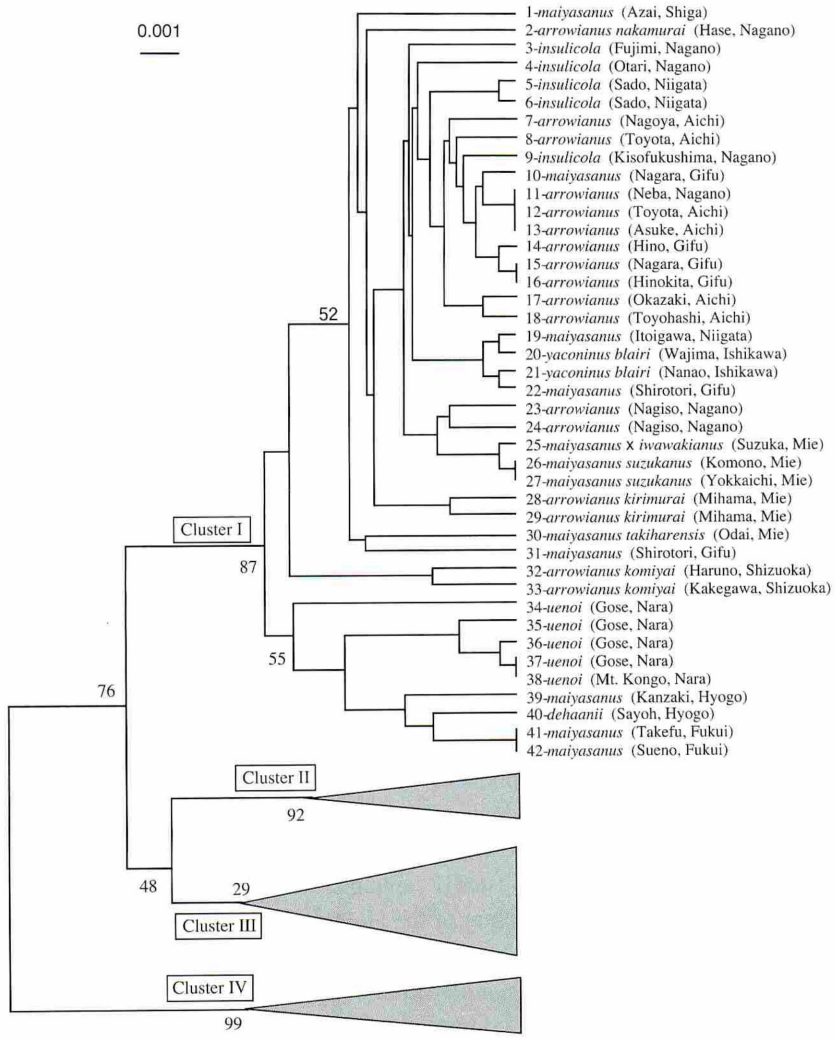


Fig. 1. UPGMA-phylogenetic tree of the mitochondrial ND5 gene of the representative *Ohomopterus* species and subspecies of the Kinki and Chûbu Districts. The tree is based on that presented by Su *et al.* (1996), with additions of the sequences determined in this study. All examples of *O. insulicola*, *O. maiyasanus*, *O. yaconinus* and *O. dehaanii* in the cluster I are the hybrid- or hybrid-derivatives (to be published elsewhere). For the clusters II-IV, see the first section of Results. Scale bar shown in all the trees in this paper represents Kimura's 2-parameter evolutionary distance. Value at the node shows bootstrap confidence level (%) based on 500 resampling. For details, see Su *et al.* (2004).

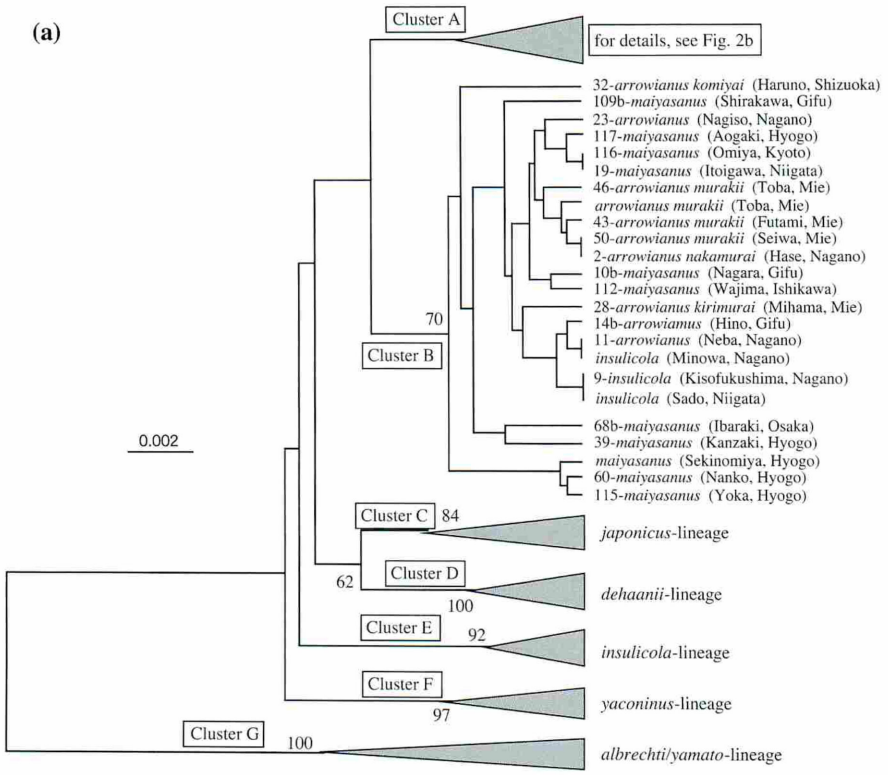
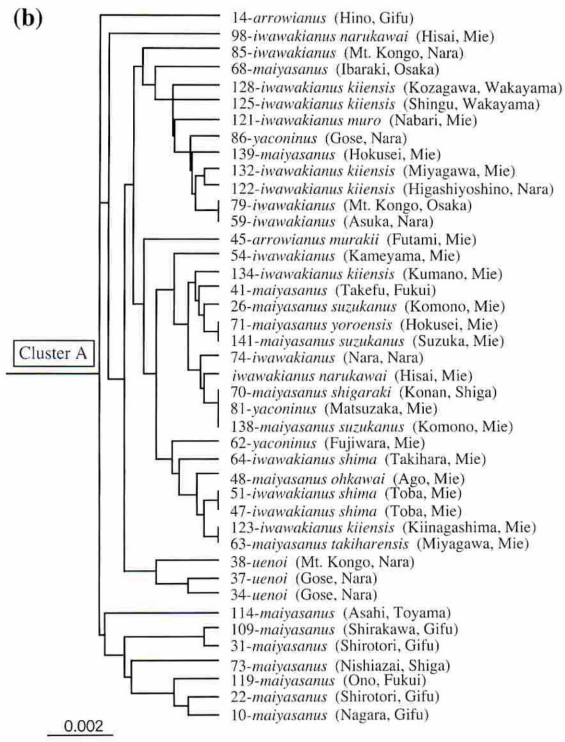


Fig. 2. UPGMA-phylogenetic tree of the nuclear ITS I sequence of the representative *Ohomopterus* species and subspecies of the Japanese Islands with special reference to the Kinki and Chûbu Districts. a) the overall tree; b) the details for Cluster A. Some bootstrap values are shown at the branching points. All examples of *O. yaconinus*, *O. maiyasanus* and *O. arrowianus* in the cluster A are the hybrid- or hybrid-derivatives (to be published elsewhere). All examples of *O. insulicola* in the cluster B are the hybrid- or hybrid-derivatives between *O. arrowianus* (♀) and *O. insulicola* (♂). The specimens without number represent the lack of the ND5 sequences.

Chûbu District with some individuals presumably derived from hybrids between *O. arrowianus* (♀) and other species (♂). Five individuals of *O. uenoi* collected both from Mt. Kongô-zan and Mt. Yamatokatsuragi-san of the Kongô Mountains were also included in this cluster as previously reported (SU *et al.*, 1996). The cluster II contained *O. maiyasanus* from the northern parts of the Kinki District to Ishikawa Prefecture of the Hokuriku District along with the coast of the Sea of Japan. The composition of the cluster III was quite complex, including *O. arrowianus murakii* (!), several subspecies of *O. maiyasanus*, *O. yaconinus*, *O. iwawakianus* and *O. dehaanii*. The cluster IV was mainly composed of *O. kiiensis***. Some *O. maiyasanus* subspecies were also included in this cluster. From the results, it is apparent that *O. uenoi* is somehow related to *O. arrowianus* and no evidence was found the relation between *O. uenoi* and *O. yaconinus*.

** In the present paper, the taxon "*kiiensis*" is applied to the name for a full species, which has previously been treated as a subspecies of *O. iwawakianus*. Instead, *O. iwawakianus iwawakianus*, which is conventionally called here *O. iwawakianus*, is a hybrid-derivative between *O. kiiensis* and *O. maiyasanus*, and would be, strictly speaking, not a good species (see Discussion and IMURA *et al.*, 2005b).



ITS I tree: Seven clusters (clusters A~G) were recognized in the ITS I phylogenetic tree in the genus *Ohomopterus* from Japan (Fig. 2a), and four of them (clusters A, B, D and F) which could be related to *O. uenoi*, were treated in details in this paper. The composition of the cluster A was complex and of special importance in unmasking the origin of *O. uenoi****. This cluster contained *O. iwawakianus*, *O. kiiensis*, several subspecies of *O. maiyasanus* and *O. uenoi*. The ITS from all the specimens of *O. uenoi*, *O. kiiensis* and *O. iwawakianus* fell under the cluster A (Fig. 2b). The cluster B included both *O. arrowianus arrowianus*, *O. a. murakii* and several subspecies of *O. maiyasanus* (Fig. 2a). However, the sequence difference between them was so small that the separation was not possible in the UPGMA-tree, although *O. arrowianus* and *O. maiyasanus* were somewhat indefinitely separated from each other in the NJ-tree (not shown). So we tentatively treated them collectively as the members of the same cluster B. The cluster D consisted of exclusively *O. dehaanii*, the individuals from the western Japan being also included in this cluster, in contrast to the fact that in the phylogenetic tree of the ND5 gene of *O. dehaanii* of the Kinki and Chûbu Districts were not clustered with the same species from the western Japan (Su *et al.*, 1996). This will be discussed in a separate paper. The cluster

---

*** *Ohomopterus uenoi* was previously considered as a derivative of a hybrid between *O. arrowianus* and *O. yaconinus* (see Table 7.2 on p. 116 of Osawa *et al.*, 2004). This is not correct as discussed in this paper, because the ITS I of *O. yaconinus* does not belong to the cluster A. The specimens of "*yaconinus*" (Nos. 62, 81 and 86 in Fig. 2) have been shown to be the hybrids formed by complex participation of *O. yaconinus* and *O. iwawakinaus* (Okamoto *et al.*, 2005).

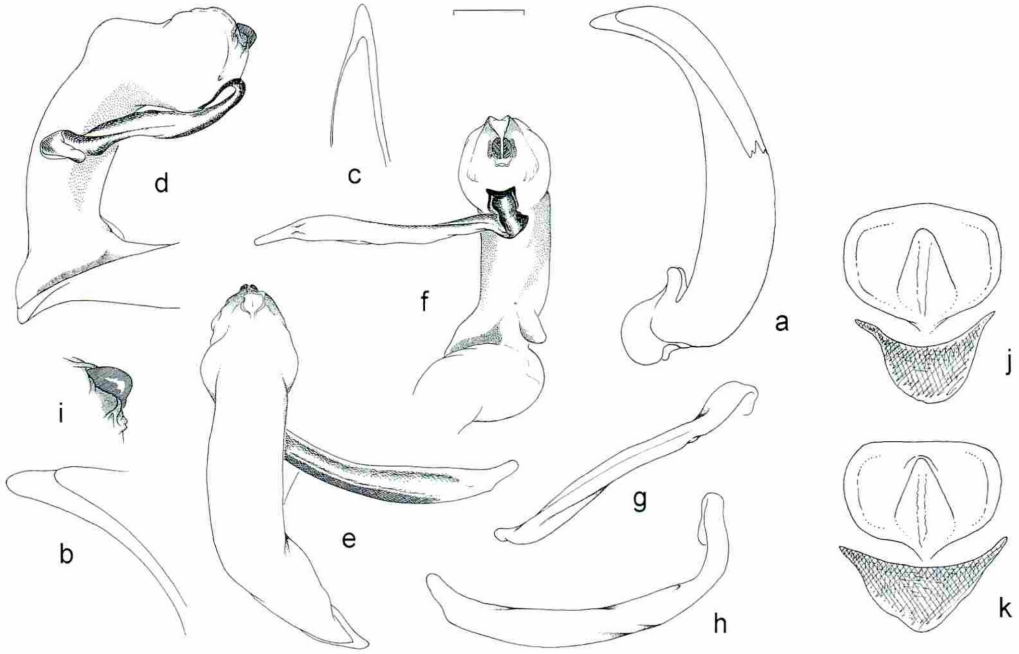


Fig. 3. Genital organ of *Ohomopterus uenoi* (Mt. Yamatokatsuragi-san, Osaka~Nara Prefs.). a, aedeagus in right lateral view; b, apical part of aedeagus in the same view; c, ditto in dorsal view; d, fully everted endophallus in right lateral view; e, ditto in posterior view; f, ditto in anterior view; g, copulatory piece in ventral view; h, ditto in lateral view; i, peripheral rim of gonopore in right lateral view; j and k, inner plate of vaginal apophysis in dorsal view. Scale: 2 mm for a, d–f; 1 mm for b, c, g–i, 0.5 mm for j–k.

F was composed of solely *O. yaconinus*. As in the case of *O. dehaanii*, the Kinki population of *O. yaconinus* was clustered together with *O. yaconinus* from the same species from western Japan, although in the ND5 tree the Kinki population was not clustered with *O. yaconinus* from the western Japan (SU *et al.*, 1996; OKAMOTO *et al.*, 2005).

Morphology

Male and female genital organs of *O. uenoi* and its relevant species were illustrated in figs. 3–7.

The aedeagus of *O. uenoi* is very large and stout, nearly three-fifths of elytra in length, with the basal portion thick, robust and twisted from the left proximal to the right apical. The median portion is moderately arcuate in the lateral view and rather sigmoid in the dorsal view. The apical portion strongly bent ventrally and gradually narrowed toward the apex, which is not so sharply pointed. The endophallus is also long and tube-like, entirely lacking the basal lobes, any inflation in the median portion and the protuberance of the praeputial pad, but only paraligula is well developed. The copulatory piece is monstrously elongated, about seven-eighths as long as the aedeagus, extending rectangularly to the right side of the endophallus, acutely curved and twisted at the base, feebly arcuate and rather compressed in the median portion, somewhat tuberculate on the dorsal margin before the apex and gently bent near the apex which

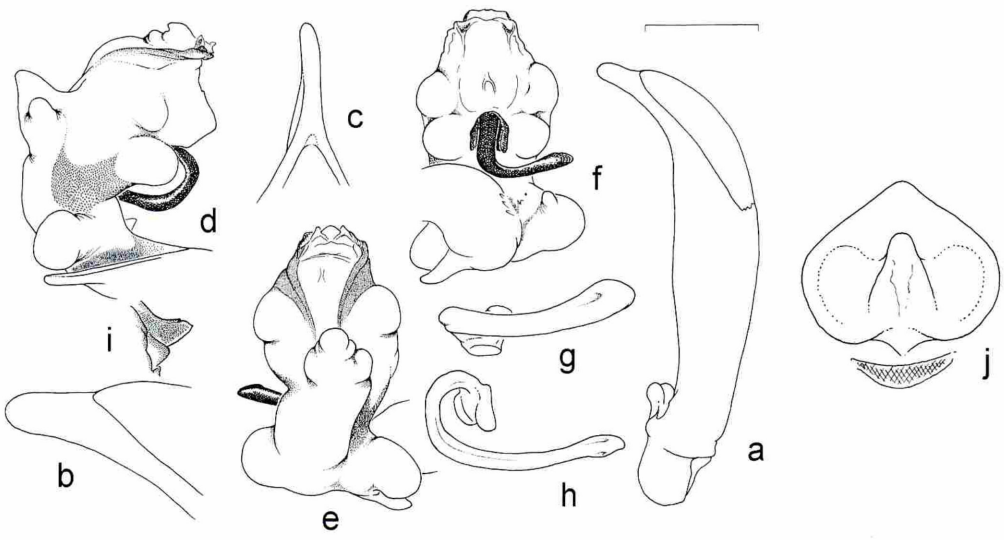


Fig. 4. Genital organ of *Ohomopterus arrowianus* (Toyota-shi, Aichi Pref.). Captions for each illustration correspond to those in fig. 3. Scale: 2 mm for a, d–f; 1 mm for b, c, g–i; 0.68 mm for j.

is narrowly rounded. The peripheral rim of gonopore is well sclerotized and pigmented. All these findings are quite exceptional for the genus, and it is difficult to elucidate the true affinity of *O. uenoi* by the male genitalic morphology alone, except that its copulatory piece is of I-type and not of Y-type as in *O. yaconinus* or *O. iwawakianus*.

The inner plate of the vaginal apophysis is subquadrate in the shape and not deeply concave, resembling that of *O. iwawakianus* but is much different from those of *O. yaconinus* or *O. arrowianus*.

It has been often said that the external appearance of *O. uenoi* resembles that of *O. yaconinus*, and to some extent that of *O. iwawakianus* both also inhabiting the Kongô Mountains. However, *O. uenoi* has some features suggesting its affinity to *O. arrowianus* than to *O. yaconinus*, for example, not remarkably punctate lateral parts of the abdominal sternites, apparently angulate inner margin of the male protibia, etc. These characteristics have not necessarily been taken into consideration for a long time, simply because *O. arrowianus* is not distributed near the Kongô Mountains. However, this possibility should be revived because, as noted before (Su *et al.*, 1996, and also see below), the ND5 sequence of *O. uenoi* is of the *O. arrowianus*-type and is not the *O. yaconinus*-type.

In the *Ohomopterus* taxonomy, the copulatory piece of the male genital organ has been pinpointed more seriously than the external morphology, because morphology of the copulatory pieces is characteristic to the species or the species-group, while external morphology reveals considerable similarity between various *Ohomopterus* species and yet sometimes conspicuous variability even within the species.

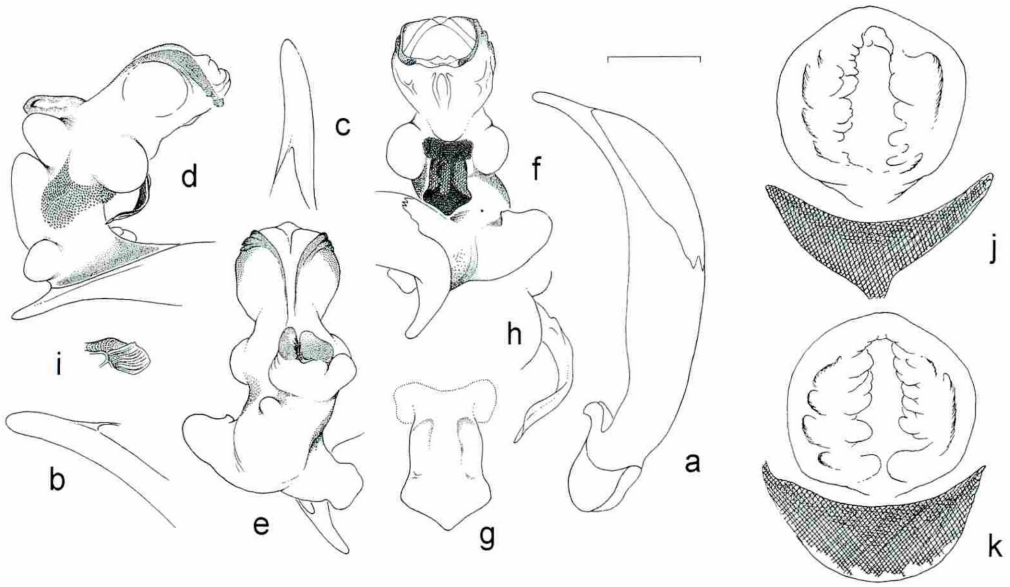


Fig. 5. Genital organ of *Ohomopterus yaconinus* (♂, Gose-shi, Nara Pref.; ♀, Hisai-shi, Mie Pref. (j) and Ureshino-chô, Mie Pref.). Captions for each illustration correspond to those in fig. 3. Scale: 2 mm for a, d–f; 1 mm for b, c, g–i; 0.6 mm for j–k.

Discussion

In agreement with the result reported by SU *et al.* (1996), the ND5 gene of all examples of *O. uenoi* examined in this study is included in the cluster I, to which authentic *O. arrowianus* belongs. This suggests that mitochondrial DNA of *O. uenoi* was derived from *O. arrowianus*. In contrast to the ND5 gene, the ITS I sequence of *O. uenoi* belongs to the cluster A, in which *O. iwawakianus*, *O. kiiensis* and some subspecies of *O. maiyasanus* are included, and is not in the cluster B where ITS I from all *O. arrowianus* species are included. Thus, incongruence between the ND5 gene and ITS I of *O. uenoi* suggests strongly that the first possibility described in Introduction, i.e., *O. uenoi* evolved from *O. arrowianus* to the direction to develop a huge copulatory piece, may be excluded. The existence of the ITS I sequence of *O. uenoi* in the cluster A may be explained in such a way that *O. uenoi* was derived from a hybrid between *O. arrowianus* (♀) and one of the members in the cluster (♂). The most plausible candidate would be *O. iwawakianus* (♂) that participated in the hybridization with *O. arrowianus* (♀), although participation of *O. kiiensis*, instead of *O. iwawakianus*, in the hybridization cannot be excluded. Indeed, *O. iwawakianus* inhabits around the area of the Kongô Mountains, and female copulatory organ of *O. iwawakianus* reveals a strong resemblance to that of *O. uenoi* as compared with that of the other species in the cluster A such as several subspecies of *O. maiyasanus*. It should be noted here that *O. iwawakianus* is not itself an authentic species strain, and is a hybrid-derivative between *O. kiiensis* (♂) and *O. maiyasanus* (♀), i.e., mitochondria of all *O. iwawakianus* were derived from *O. maiyasanus*, while *O. kiiensis* had not passed hybridization since its establishment, i.e., it is a pure species strain (IMURA *et al.*, 2005b). Incidentally, the subspecies of *O. maiyasanus* in the ITS cluster A carry the ITS sequences resembling that of *O. iwawakianus*,

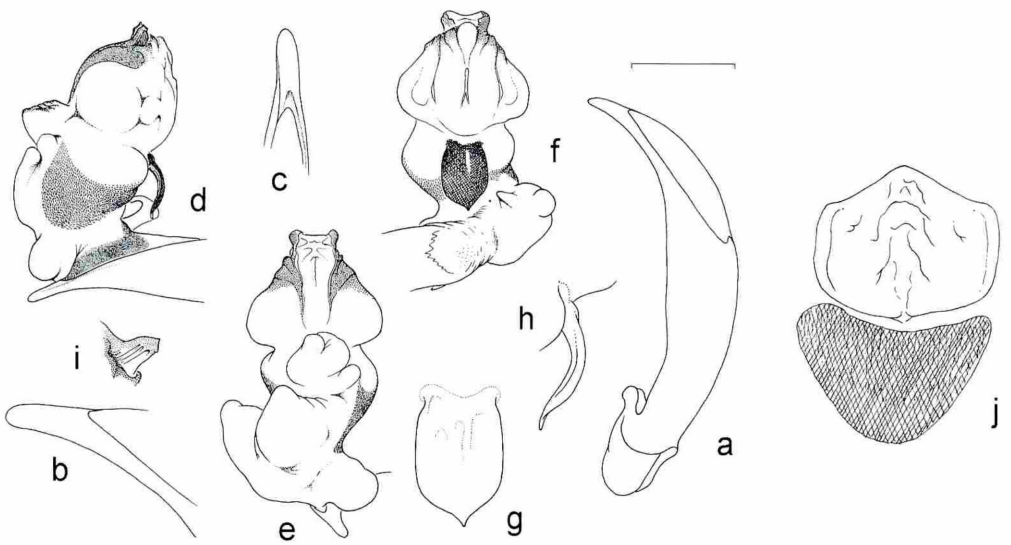


Fig. 6. Genital organ of *Ohomopterus iwawakianus* (♂, Mt. Kongô-zan, Osaka Pref.; ♀, Matsuzaka-shi, Mie Pref.). Captions for each illustration correspond to those in fig. 3. Scale: 2 mm for a, d–f; 1 mm for b, c, g–i; 0.64 mm for j.

suggesting that these subspecies were derived from the hybrids between *O. maiyasanus* and *O. iwawakianus* or *O. kiiensis* (IMURA *et al.*, 2005b).

From the above discussion, we suggest that most of the *O. arrowianus* population, which once inhabited between Central Japan and the Kongô Mountains, became extinct. Then the population of the Kongô Mountains was geographically isolated, and hybridized with *O. iwawakianus*, followed by the hypertrophic development of the male genital organ presumably by some genetic event(s). This assumption is not unreasonable, because *O. arrowianus murakii* inhabiting the mid-eastern part of the Kinki District has been shown to be a derivative of the hybrid between *O. arrowianus* (♂) and *O. iwawakianus* (♀) (IMURA *et al.*, 2005b). Note that the Kongô Mountains are situated just about 60 km west of the habitat of *O. arrowianus murakii*, suggesting that *O. arrowianus* once inhabited the intermediate region between the mid-eastern part of the Kinki District and the Kongô Mountains. The separation of the ND5 gene sequence between the common ancestor of *O. arrowianus* in the Chûbu District and that of the ancestor of *O. uenoi* was calculated to have occurred about 5.6 million years ago. *Ohomopterus uenoi* is clearly separable either from *O. arrowianus* or *O. iwawakianus*, and is one of the rare cases for the differentiation of a distinct morphological species from a hybrid-derived ancestor.

Acknowledgements

We express our appreciation to Hideko KANDA for skillful technical assistance. Thanks are also due to all our friends who have collaborated with us by supplying invaluable specimens and discussion. This work was supported in part by Grant-in-Aid for Scientific Research (B) (no. 13575013) from Japan Society of the Promotion of Science.

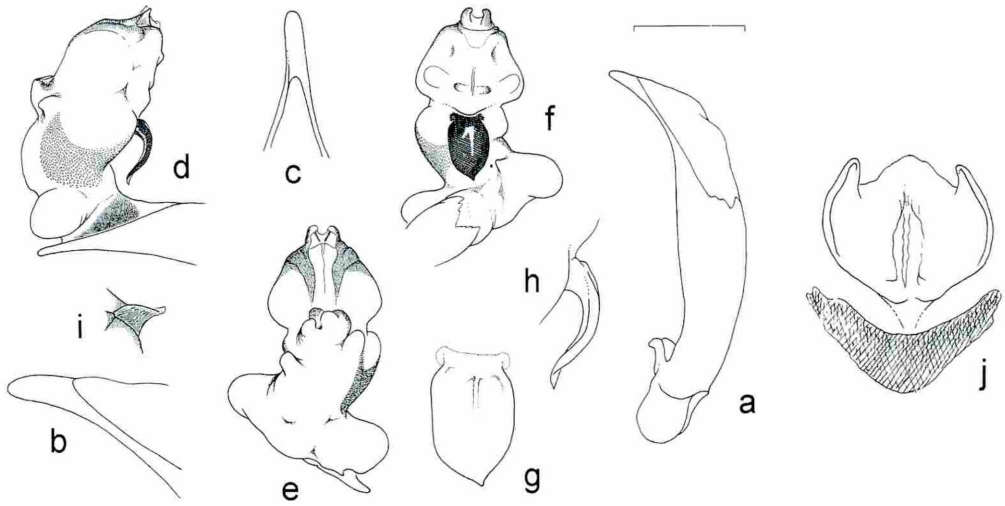


Fig. 7. Genital organ of *Ohomopterus kiiensis* (♂, Mt. Nagao-yama, Kumano-shi, Mie Pref.; ♀, Miyama-mura, Wakayama Pref.). Captions for each illustration correspond to those in fig. 3. Scale: 2 mm for a, d–f; 1 mm for b, c, g–i; 0.66 mm for j.

要　　約

冨永 修・井村有希・岡本宗裕・蘇 智慧・小鹿 亨・柏井伸夫・大澤省三：ミトコンドリア ND5 遺伝子および核 ITS I DNA と形態からみたドウキョウオサムシの起源. ——— ドウキョウオサムシとその関連種のミトコンドリア ND5 遺伝子ならびに核 ITS I の塩基配列を決定し，分子系統樹を作製した．その結果，ドウキョウオサムシは過去におきたミカワオサムシ（♀）とイワワキオサムシまたはキイオサムシ（♂）の交雑個体に由来すると推定された．ドウキョウオサムシ♂交尾器の骨片は極端に巨大化してはいるものの，基本的にはミカワオサムシと同じアオオサムシ・タイプ（I-type）であるが，♀交尾器の膣底部節片内板はミカワオサムシ型でなく，イワワキオサムシ（♂交尾器骨片はヤコンオサムシ・タイプ（Y-type））のそれに酷似しており，ヤコンオサムシ型とは明らかに異なっている．こうした形態学的所見からも，上記の結果は支持される。

References

HIURA, I., 1965. Distribution of *Apotomopterus* beetles in the Kongô-Ikoma Mountain Range, Central Kinki, Japan, with special reference to their geohitoric backgrounds (Coleoptera: Carabidae). *The Bulletin of the Osaka Museum of Natural History,* (18): 49–68. (In Japanese, with English title and summary.)

IMURA, Y., K. AKITA, M. OKAMOTO, O. TOMINAGA, N. KASHIWAI, Z.-H. SU, T. OJIKA and S. OSAWA, 2005a. On *Ohomopterus arrowianus kirimurai* (Coleoptera, Crabidae) as examined by phylogenetic trees of mitochondrial ND5 gene and nuclear ITS I DNA as well as morphology of genital organs. *The Entomological Review of Japan,* **60**: 35–38.

IMURA, Y., O. TOMINAGA, N. KASHIWAI, M. OKAMOTO, Z.-H. SU, T. OJIKA, K. AKITA and S. OSAWA, 2005b. Phylogenetic properties of *Ohomopterus iwawakianus* (Coleoptera, Carabidae) as evidenced by the sequence comparisons of mitochondrial ND5 gene and nuclear internal transcribed spacer I: Extensive participation of *O. iwawakianus* in the faunal establishment of the genus *Ohomopterus* in the Kinki District. *Elytra, Tokyo,* **33** (in press).

ISHIKAWA, R., 1960. A new species of *Apotomopterus* from Japan (Coleoptera, Carabidae). *Kontyû,* **24**: 168–169.

———, 1991. The evolution of *Carabus*: Divergence and isolating mechanisms. 295 pp. Yasaka Shobo, Tokyo. (In Japanese.)

KOMIYA, J., 1971. Classfication of the genus *Apotomopterus*. *Insect Magazine*, (76): 22-64. (In Japanese.)

Kinki Research Group of Carabid Beetles (TOMINAGA, O., K. KATSURA, K. HARUSAWA, I. HIURA, K. TANI and N. DOI), 1979. Carabid beetles of the Kinki District in the collection of the Osaka Museum of Natural History. *Special Publications from the Osaka Museum of Natural History,* **11**, 83 pp. (In Japanese, with English title.)

OKAMOTO, M., O. TOMINAGA, Z.-H. SU., Y. IMURA, N. KASHIWAI, N. OJIKA, K. AKITA and S. OSAWA, 2005. Differentiation of *Ohomopterus yaconinus* and its "subspecies" (Coleoptera: Carabidae) inferred from DNA sequences of mitochondrial ND gene and internal transcribed spacer I (ITS I). *Elytra, Tokyo,* **33** (in press).

OSAWA, S., Z.-H. SU and Y. IMURA, 2004. Molecular phylogenyand evolutin of carabid ground beetles. 191 pp. 119 figs. Springer Verlag, Tokyo.

SAITO, S., Z.-H. SU, O. TOMINAGA, N. KASHIWAI and S. OSAWA, 2003. Pattern of colonization and differentiation in *Ohomopterus albrechti* and its related species (Carabinae: Carabidae). *The Entomological Review of Japan,* **58**: 83–94.

SU, Z-H., O. TOMINAGA, T. OHAMA, E. KAJIWARA, R. ISHIKAWA, T.S. OKADA, K. NAKAMURA and S. OSAWA, 1996. Parallel evolution in radiation of *Ohomopterus* ground beetles inferred from mitochondrial ND5 gene sequences. *Journal of Molecular Evolution,* **43**: 662–671.

———, ———, M. OKAMOTO and S. OSAWA, 1998. Origin and diversification of hind-wingless *Damaster* ground beetles within the Japanese Islands as deduced from mitochondrial ND5 gene sequences (Coleoptera, Carabidae). *Molecular Biology and Evolution,* **15**: 1025–1039.

———, Y. IMURA and S. OSAWA, 2001. Evolutionary discontinuity of the carabid ground beetles. *Journal of Molecular Evolution,* **53**: 517–529.

———, ———, M. OKAMOTO, C.-G. KIM, H.-Z. ZHOU, J.-C. PAIK and S. OSAWA, 2004. Phylogeny and evolution of Digitulati ground beetles (Coleoptera, Carabidae) inferred from mitochondrial ND5 gene sequences. *Molecular Phylogenetics and Evolution,* **30**: 152–166.

(Received February 1, 2005; Accepted February 26, 2005)

Ent. Rev. Japan, **60** (1): 35–38, April 30, 2005

On *Ohomopterus arrowianus kirimurai* (Coleoptera: Carabidae) as Examined by Phylogenetic Trees of Mitochondrial ND5 Gene and Nuclear ITS I DNA as well as Morphology of Genital Organs

Yûki IMURA[1)], Katsumi AKITA[2)], Munehiro OKAMOTO[3)], Osamu TOMINAGA[4)], Nobuo KASHIWAI[5)], Zhi-Hui SU[6*)], Tooru OJIKA[7)] and Syozo OSAWA[8)]

1) Shinohara-chô, 1249–8, Kôhoku-ku, Yokohama, 222–0026 Japan
2) Iba-chô 66, D-304, Hisai City, Mie, 514–1108 Japan
3) Department of Laboratory Animal Science, School of Veterinary Medicine, Faculty of Agriculture, Tottori University, Tottori, 680–8553 Japan
4) A312, 4–1–15, Shibatsuji-chô, Nara, 630–8114 Japan
5) Hosen-Gakuen High School, Chuo, Nakano-ku, Tokyo, 164–8628 Japan
6) JT Biohistory Research Hall, 1–1 Murasaki-chô, Takatsuki, Osaka, 569–1125 Japan
7) Imahon-machi, 2–9–27–301, Anjo-shi, Aichi, 446–0008 Japan
8) Ushita-Asahi 2–4–7–1003, Higashi-ku, Hiroshima, 732–0067 Japan

Abstract *Ohomopterus arrowianus kirimurai*, recently described from a very restricted area of the southeastern periphery of the Kii Peninsula, was investigated by the phylogenetic trees constructed using the mitochondrial ND5 gene and the nuclear ITS I DNA sequence as well as morphology of the genital organ of both sexes. The results indicate that this taxon carries the ND5 gene and the ITS I inseparable from those of the nominotypical *O. arrowianus*. However, its female genital organ is of *O. iwawakianus*-type, which is clearly distinguishable from that of *O. arrowianus*-type.

Introduction

Recently, a new subspecies of *Ohomopterus arrowianus* was described by KUBOTA and YAHIRO (2003) under the name *kirimurai* from the southeastern periphery of the Kii Peninsula based on slight differences in the external and male genitalic morphologies as compared with all the known races of *O. arrowianus*. The habitat of this taxon is restricted to an extremely small area in Mihama-chô near the southern end of Mie Prefecture. In this paper, we wish to present the results of phylogenetic analyses using the mitochondrial ND5 gene and the nuclear ITS I DNA sequence, together with the detailed morphologies of the genital organ of both sexes.

*Corresponding author: E-mail: su.zhihui@brh.co.jp

Results and Discussion

The ND5 gene of *O. a. kirimurai* in the phylogenetic tree is surely in the cluster I defined in the previous paper (Fig. 1 of TOMINAGA *et al.* 2005), to which the ND5 gene of all the *O. arrowianus* specimens belong. This suggests strongly that the ND5 gene of *kirimurai* was derived from *O. arrowianus*, which was immigrated from the southern area of the Chûbu District (presumably the Atsumi Peninsula) at the time when the Ise-wan Bay was still closed.

The ITS I of *kirimurai* is in the cluster B (Fig. 2a of TOMINAGA *et al.*, 2005) together with that of the nominotypical *arrowianus*, and not in the cluster A, to which ITS I of all *O. iwawakianus* belong.

As shown in Fig. 1, the basic structure of the male genital organ of "subsp." *kirimurai* is almost the same as that of the nominotypical *arrowianus*, though the figures of the aedeagus and endophallus were not shown in the original description and are illustrated for the first time in the present paper. In the nominotypical *arrowianus* from the Chûbu District, the inner plate of the vaginal apophysis is rather stable in the shape, which is characterized by a chestnut-like or a reverse heart shaped outline in the dorsal view (see TOMINAGA *et al.*, 2005, Fig. 4j), while that of *kirimurai* is of *O. iwawakianus* type (see Fig. 1j~m of this paper and Fig. 6j of TOMINAGA *et al.*, 2005), more strictly, of the intermediate between the A-type and B-type of the same species (KAMIYOSHI, 1963; KOMIYA, 1971). Although *O. iwawakianus* shows considerable geographical and individual variations in the shape of this plate, the plate of *kirimurai* surely resembles that of *O. iwawakianus*, and is clearly different not only from *O. arrowianus* but also from *O. kiiensis* or *O. yaconinus*, suggesting that *kirimurai* is not a mere local race of *O. arrowianus*.

The results of the ND5 gene and ITS I look like as if *kirimurai* was derived directly from a pure line of *O. arrowianus*, despite that *kirimurai* has the *iwawakianus*-type female genital organ. There are at least three possibilities to account for this superficial discrepancy between the morphology and the molecular data. The first possibility would be that after immigration of *O. arrowianus* from the Chûbu District to the Mihama-chô of the Kii Peninsula, some mutation(s) leading to the female genital organ of the *iwawakianus*-type. The second possibility would be that the ITS I and the gene(s) for the female genital organ are separately localized in the different chromosomes. Upon the hybridization between *O. arrowianus* (♀) and *O. iwawakianus* (♂), there should be an opportunity to have conveyed the gene(s) for the *O. iwawakianus* female genital organ to the offspring together with the *O. arrowianus* mitochondria, having resulted in establishment of *kirimurai*, although this event is unable to detect by the ITS I analysis alone. The third possibility would be that the ITS I and the gene(s) for the female genital organ coexisted on the same chromosome, and upon the hybridization of *O. arrowianus* (♀) with *O. iwawakianus* (♂), a recombination between *O. arrowianus* and *O. iwawakianus* occurred so as to have produced a chimera recombinant carrying the ITS I of *O. arrowianus* and the gene(s) of *O. iwawakianus* female genital organ. If such an event took place, *kirimurai* having the ND5 gene and ITS I of the *arrowianus*-type would have resulted. It is necessary to identify and localize the ITS I and the gene(s) responsible for the morphology of female genital organ on the chromosome(s).

In summary, *O. arrowianus kirimurai* is a fortuitous remnant with an accompanied mutational change(s) for the female genital organ, or a descendant resulted by chance from a hybrid between *O. arrowianus arrowianus* (♀) and *O. iwawakianus* (♂). At present, there is no evi-

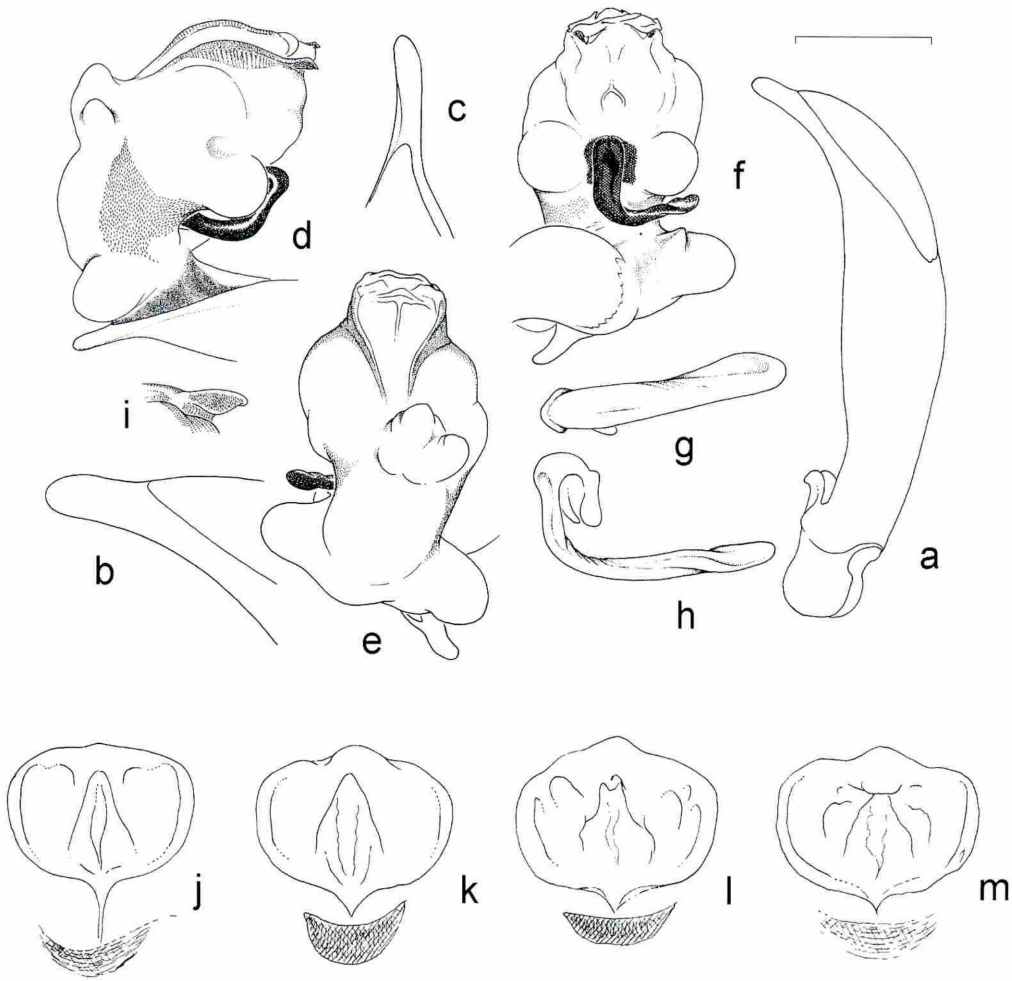


Fig. 1. Genital organ of *Ohomopterus arrowianus kirimurai* (Mihama-chô, Mie Pref.). a, Aedeagus in right lateral view; b, apical part of aedeagus in the same view; c, ditto in dorsal view; d, fully everted endophallus in right lateral view; e, ditto in posterior view; f, ditto in anterior view; g, copulatory piece in ventral view; h, ditto in lateral view; i, peripheral rim of gonopore in right lateral view; j–m, inner plate of vaginal apophysis in dorsal view. Scale: 2 mm for a, d–f; 1 mm for b, c, g–i, 0.7 mm for j–m.

dence to decide which possibility is more likely. The quite narrow distributional range of this "subspecies" does not warrant optimism for its long survival.

Acknowledgements

We express our appreciation to Hideko KANDA for skillful technical assistance. Thanks are also due to Mr. Naoaki Toda (Nagoya) and all our friends who have collaborated with us by supplying invaluable specimens and discussion. This work was supported in part by Grant-in-Aid for Scientific Research (B) (no. 13575013) from Japan Society of the Promotion of Science.

要　　約

井村有希・秋田勝己・岡本宗裕・冨永 修・柏井伸夫・蘇 智慧・小鹿 亨・大澤省三：ミハマオサムシの形態学的，分子系統学的知見．――― ミハマオサムシはミカワオサムシの１亜種としてごく最近記載されたもので，同種の母集団から遠く離れた三重県御浜町のごく限られた地域のみに孤立分布する特異なオサムシである．ミトコンドリア ND5 遺伝子と核 ITS I の塩基配列を決定し，分子系統樹を作成した結果，同亜種はミカワオサムシの基亜種と同じクラスターに入ることが分かった．しかし，ミハマオサムシの雌交尾器膣底部節片内板（杯体）の形態はイワワキオサムシ型で，ミカワオサムシのそれとは明らかに異なっている．したがって，ミハマオサムシの起源については，ミカワオサムシの純系から直接派生した一地域型という解釈以外に，他種，おそらくはイワワキオサムシとの交雑に由来した集団という可能性もあるように思われる．

References

KAMIYOSHI, M., 1963. On the female genitalia of *Apotomopterus* from Japan (Col., Carabidae). *Insect Science,* **13**: 1–8. (In Japanese.)

KOMIYA, Z., 1971. Classification of the genus *Apotomopterus*. *Insect Magazine,* (76): 22–64. (In Japanese.)

KUBOTA, K. and K. YAHIRO, 2003. Description of an isolated and specialized population of *Carabus arrowianus* (BREUINING, 1934) (Coleoptera, Carabidae) discovered in the southernmost part of Mie Prefecture, Japan, as a new subspecies, with analyses of its morphological features. *Biogeography,* **5**: 9–15.

TOMINAGA, O., Y. IMURA, M. OKAMOTO, Z.-H. SU, T. OJIKA, N. KASHIWAI, and S. OSAWA, 2005. Origin of *Ohomopterus uenoi* (Coleoptera: Carabinae: Carabidae) as deduced from comparisons of DNA sequences of mitochondrial ND5 gene and nuclear internal transcribed spacer I (ITS I) with morphological characters. *The Entomological Review of Japan,* **60**: 23–33.

(Received February 1, 2005; Accepted February 21, 2005)

Ent. Rev. Japan, **60** (1): 39–51, April 30, 2005

Five New Species of the *leptopus* Group of Harpaline Genus *Trichotichnus* (Coleoptera: Carabidae) from Central and Northeastern Japan, with Note on Taxonomic Position of *T. tsurugiyamanus*

Noboru ITO

1–7–18 Higashiuneno, Kawanishi City, Hyôgo Pref., 666–0117 Japan

Abstract Five new species of the *leptopus* group of the genus *Trichotichnus* are described under the names of *Trichotichnus marubayashiorum* from Kamikochi and the adjacent places, *T. iidesanus* from Mt. Iide-san and near regions, *T. choukaisanus* from Mt. Choukai-san, and *T. mizunoi* and *T. hosodai* from Gozaishi Spa. Further, it is indicated by detailed reexamination that *T. tsurugiyamanus* HABU belongs to the *congruus* group.

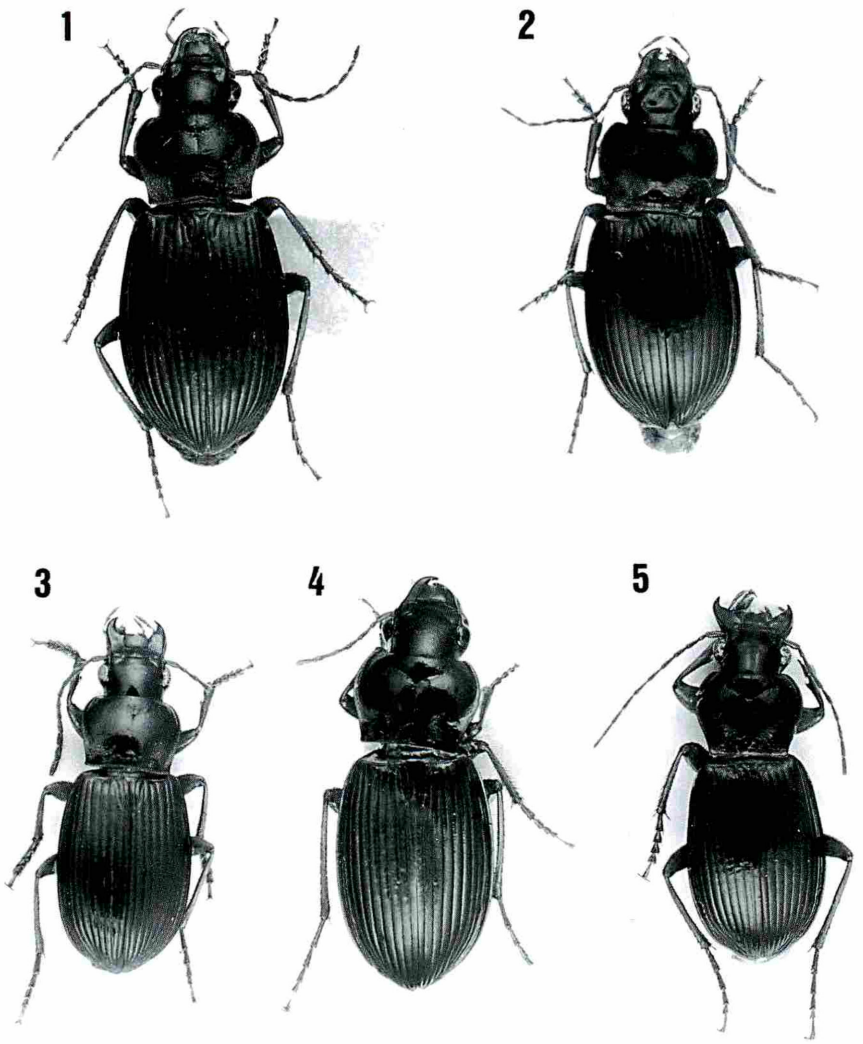
In 1973, the *leptopus* group of the genus *Trichotichnus* MORAWITZ was established by HABU and known species were reviewed with description of a new species. After that, several new species were described by HABU and KASAHARA. In 1996, I revised all the species from western Japan including Fukui Pref., with descriptions of some new species. In next year, MORITA treated all species of the group including many new species described then and proposed six complexes. The species of the group are well diversified locally owing to vestigial hind wings, and many unknown species may be estimated to occur yet. I collected in Central and Northeast Japan and found additional new species.

HABU (1973) included *Trichotichnus tsurugiyamanus* HABU within the *leptopus* group in his revision and I followed his treatment (ITO, 1996). Recently I reexamined characteristics of pronotum, legs, 6th abdominal sternite and male genitalia of *tsurugiyamanus* and concluded that *tsurugiyamanus* should be transfer to the *congruus* group.

In this paper I am going to describe five new species of the *leptopus* group as following: *Trichotichnus* (*Trichotichnus*) *marubayashiorum* from Kamikôchi and adjacent places, *T.* (*T.*) *iidesanus* from Mt. Iide-san and nearby regions, *T.* (*T.*) *choukaisanus* from Mt. Choukai-san, *T.* (*T.*) *mizunoi* and *T.* (*T.*) *hosodai* from Gozaishi Spa at the foot of Mt. Houou. Also *T.* (*T.*) *tsurugiyamanus* is newly transferred to the *congruus* group.

Before going further, I would like to express my hearty thanks to Mr. Yoshiyuki ITO, Kochi, Mr. Kozo MIZUNO, Uji, Mr. Kouichi HOSODA, Nirasaki, Mr. Masato MORI, Nishinomiya, Drs. Shin-ichirou YOSHIMATSU and Kazuhiko KONISHI of the National Institute of Agro-Environmental Sciences, Tsukuba, and Dr. Shuhei NOMURA of the National Science Museum (Nat. Hist.), Tokyo for their kindly offering or loaning material. Also, I heartily thank Mr. Seiji MORITA, Tokyo, for his valuable opinion. Lastly, I am indebted to parents' family of my wife, MARUBAYASHI for their kind support on my field work in Nagano Pref.

I employ the abbreviation of depository as following: the National Institute of Agro-Environmental Sciences as NIAS; the Osaka Museum of Natural History as OMNH; the National Science Museum (Nat. Hist.) as NSMT; the author's collection as NIc. Concerning measurement of body parts, see my former paper.



Figs. 1–5. Habitus of *Trichotichnus* spp. — 1, *Trichotichnus* (*Trichotichnus*) *marubayashiorum* N. ITO, sp. nov.; 2, *T.* (*T.*) *iidesanus* N. ITO, sp. nov.; 3, *T.* (*T.*) *choukaisanus* N. ITO, sp. nov.; 4, *T.* (*T.*) *mizunoi* N. ITO, sp. nov.; 5, *T.* (*T.*) *hosodai* N. ITO, sp. nov.

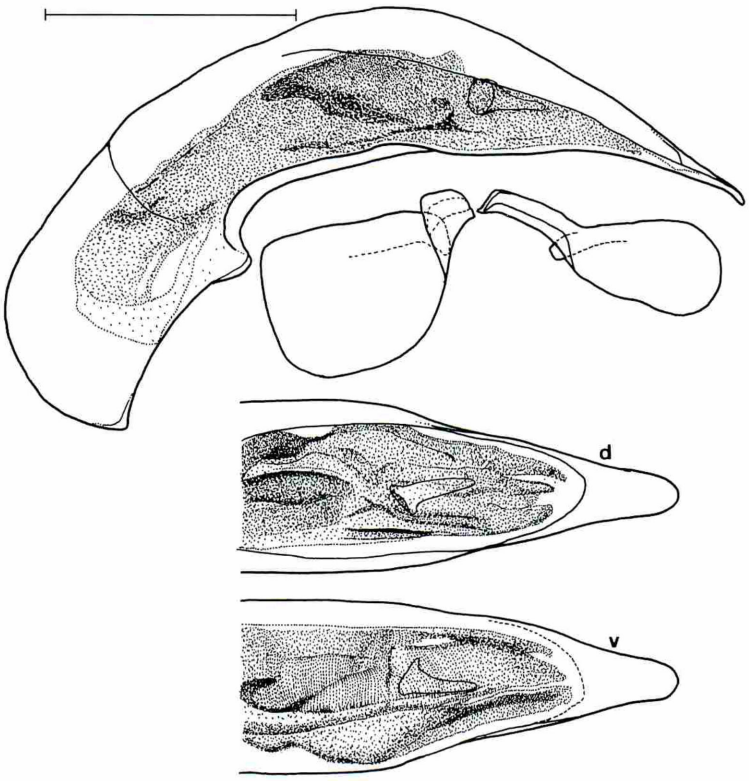


Fig. 6. Male genitalia of *Trichotichnus* (*Trichotichnus*) *marubayashiorum* N. Ito, sp. nov.
d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

Trichotichnus* (*Trichotichnus*) *marubayashiorum N. Ito, sp. nov.

(Figs. 1, 6)

Body rather wide, oblong, black, shiny, with iridescent lustre on elytra; labial and maxillary palpi, antennae and legs somewhat light to dark reddish brown, labrum and mandibles brownish black.

Head gently convex, a little large, 0.65–0.69 times as wide as pronotum, with several punctures on frons; labrum triangularly concave at apex; clypeus ante-trapezoidally emarginate at apex, depressed in apical part, weakly elevated behind there; clypeal suture shallow but clear; frontal impressions moderately deep throughout, reaching supraorbital grooves; interocular space wide, 0.71 times as wide as width of head including eyes; eyes not convex, short; temples long, 0.4 times of eye length, straightly convergent behind; genuine ventral margins of eyes narrowly separated from buccal fissure; labial palpi slender, 2nd segment slightly longer than the 3rd; ligula wide, acutely produced laterad at apical angles; paraglossae narrow, slightly prolonged behind ligula; mentum with epilobes strongly widened apicad, median tooth rounded at

apex; microsculpture obscure, consisting of isodiametric meshes near clypeal apex, and partly of transverse meshes on frons.

Pronotum 1.33–1.39 times as wide as long, fairly convex, wholly covered with punctures, which are fine on central area and become coarser towards surrounding areas, especially coarse in basal foveae; apex uniformly emarginate, with border obscure in middle; sides clearly arcuate apicad and gently oblique basad from the widest point, rather deeply sinuate before base; base one-tenth wider than the apex, barely bisinuate, and thickly bordered lengthwise; apical angles narrowly rounded; basal angles rectangular, produced laterad at tips; lateral furrows narrow in apical third, thence gradually and weakly widened backwards, fallen into basal foveae which are large and longitudinally grooved at inner side; front transverse impression rather deep, the hind one indistinct; median line thin but clear; microsculpture clearer in female than in male, consisting of mixture with isodiametric and transverse meshes.

Elytra widely suboval, widest at apical two-fifths, 1.40–1.50 as long as wide, one-fourth to three-tenths wider than pronotal width, gently and uniformly convex, without punctures; bases shallowly emarginate (almost straight in one specimen), humeral angles weakly produced forwards, with a tiny tooth at each tip; sides feebly concave in basal fifth, very shallow in preapical sinus; apices narrowly rounded at tips; striae narrow and shallow, scutellar striole short; intervals weakly convex, becoming a little more convex basad and apicad, a setiferous pore of 3rd interval situated slightly before middle; marginal series composed of 23–28 umbilicate pores, continuous though rather wide at intervals between several neighboring pores in middle; microsculptures invisible or partly visible as vague transverse lines. Hind wings well reduced, one-fifth of elytral length.

Metepisterna 0.81 times as long as wide; 6th abdominal sternite truncate or feebly notched in male and widely rounded in female at apex, unisetose in male and bisetose in female at each side.

Legs long; hind femora bisetose along hind margin; fore tibiae sulcate along full length, trispinose apico-external margin; hind tarsi 1.13 times in male and 1.05 times in female as long as the width of head, relative length of 1st to 4th segments = 1.00 : 0.75 : 0.58 : 0.38, claw segment trisetose along inner margin and tri- or quadrisetose along the outer one.

Aedeagus (Fig. 6) thick, gradually thinned apicad, slightly curved ventrad at tip; apical orifice wide, directed oblique-dorsad, armed with a copulatory piece peg-shaped; apical orifice elongate-triangular, thinly bordered; ventral surface gently curved, weakly arcuate in middle.

Length: 10.9–11.9 mm. Width: 4.5–4.9 mm.

Holotype: ♂, Kamikôchi, Nagano, 27–30. VI. 1958, H. YOKOYAMA leg. Paratypes: 1♂, same locality as the holotype, 27. VI. 1958, H. YOKOYAMA leg.; 2♀♀, same locality as the holotype, 21. VII. 1959, T. SHIBATA leg.; 1♀, Iwanadome, Nagano, 5. VIII. 1965, Y. IMAI leg.; 1♂, Tokugo Pass, Nagano, 11. VIII. 1992, N. ITO leg. (preserved in NIc); 3♂♂, Hirayu pass, Gifu, 20. VII. 1988, M. SAITO leg. (preserved in NSMT and NIc).

Remark: This new species is allied to *Trichotichnus* (*Trichotichnus*) *furihatai* MORITA from Nakabusa-onsen, but the body is robuster, eyes are flatter, and the aedeagus is thinner at apical lobe in lateral aspect.

Etymology: The new species, "*marubayashiorum*" is named after MARUBAYASHI family.

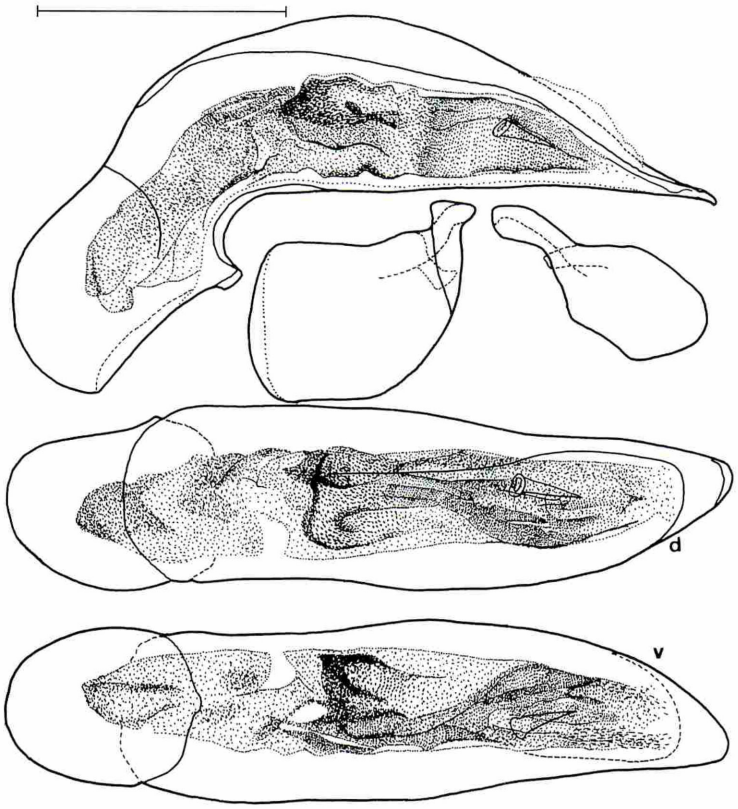


Fig. 7. Male genitalia of *Trichotichnus* (*Trichotichnus*) *iidesanus* N. Ito, sp. nov. d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

Trichotichnus* (*Trichotichnus*) *iidesanus N. Ito, sp. nov.

(Figs. 2, 7)

Body moderate-sized, gently convex, black, shiny, weakly iridescent on elytra; palpi, antennae and legs yellowish brown to a little dark brown, and labrum and middle of mandibles a little darker.

Head more or less large, 0.68–0.73 times the pronotal width, fairly raised on vertex, somewhat coarsely and sparsely punctate, with wide interocular space three-fourths of the width of head; labrum shallowly notched at apex; clypeal suture thin, uninterrupted; frontal impressions almost straightly divergent behind, reaching supraorbital grooves, rather deep throughout; eyes slightly prominent; temples long, one-third of the eye length, rather well tumid; space between genuine ventral margins of eyes and buccal fissure; antennae slender, reaching basal sixth of elytra, 3rd segment as long as the 4th and twice the 2nd ; labial palpi short; ligula and paraglossae similar in shape to the previous new species; epilobes of mentum weakly widened; microsculpture a little clearer in female than in male, composed of isodiametric meshes on apical area of clypeus and partly of transverse meshes on frons.

Pronotum somewhat transversely cordate, widest at apical third, 1.40–1.46 times as wide as long, gently declivous apico-laterad; sides a little weakly arcuate from apex to middle, thence straightly oblique backwards, sinuate before base; apex rather strongly emarginate, with border vague in middle; base one-tenth wider than apex, shallowly emarginate, feebly rounded at the sides, and thickly bordered throughout; apical angles fairly produced forwards, narrowly rounded; basal angles acute, triangularly protruding laterad; lateral furrows narrow, weakly expanded backwards; basal foveae moderate in size, weakly humped in the middle, longitudinally grooved inside the humps; front transverse impressions rather deep, the hind one obscure; median line fine, though somewhat clear, lying between the impressions; surface very sparsely and finely punctate on central area, a little more coarsely and moderately so in apical and lateral areas, rather coarsely so in lateral furrows and basal foveae where the punctures are dense and partly confluent; microsculpture a little more clearly observed in female than in male, partly visible as mixtures with isodiametric and transverse meshes.

Elytra oval, rather short, 1.39–1.45 times as long as wide, gently raised, very sparsely with very minute punctures; sides not concave, uniformly arcuate or straight behind humeral arc, somewhat deeply sinuate before apices which are rather produced and narrowly rounded at distal margins; bases shallowly emarginate, acute at shoulder angles; striae thin, shallow, and finely crenulate; scutellar striole short; intervals flat on disc and becoming a little convex apicad, basad and laterad, a setiferous dorsal pore of 3rd interval situated between apical four- and five-ninths; marginal series continuous, consisting of 24–30 umbilicate pores. Hind wings obliterated.

Metepisterna 0.90 times as long as wide; 6th abdominal sternite in male weakly arcuate at apical margin and unisetose at each side and in female a little more strongly arcuate and bisetose.

Legs rather long; hind femora bisetose along hind margin; fore tibiae sulcate lengthwise, apico-externally with three spines; hind tarsi in male 1.02–1.08 times and in female 0.95–0.96 times as long as the width of head, relative length of 1st to 4th segments as 1.00 : 0.70 : 0.50 : 0.31, ventral sides of claw segment trisetose along external margin and tri- or quadrisetose along inner one.

Aedeagus (Fig. 7) stout, abruptly tapered forwards, thinned at apex, feebly curved obliquo-ventrad at tip; apical orifice almost directed dorsad, widely open, armed with a short copulatory piece peg-shaped; apical orifice short, widely rounded and bordered at distal margin; ventral surface not curved.

Length: 9.9–11.0 mm. Width: 4.2–4.7 mm.

Holotype: ♂, Nukumidaira, Mt. Iide, Yamagata, 14. VIII. 1984, N. ITO leg. (preserved in OMNH). Paratypes: 3♂♂, 2♀♀, same data as the holotype (preserved in NIc); 2♀♀, Kurokawa, Niigata, 24. VII. 1957, K. BABA leg.; 1♂, ditto, 27. VII. 1957; 1♀, ditto, 17. IX. 1957; 1♂, Kanamaru, Niigata, 2. VIII. 1957, K. BABA leg. (preserved in NIAS and NIc).

Remark: This new species is similar in lateral aspect of aedeagus to *Trichotichnus armiger* MORITA, but being judged from the original description of the latter, the new species is distinguished from it by the eyes flatter, the elytra wider, and the aedeagus bearing apical lobe shorter and bordered at distal margin.

Etymology: The species "*iidesanus*" is named after the type locality, Mt. Iide-san.

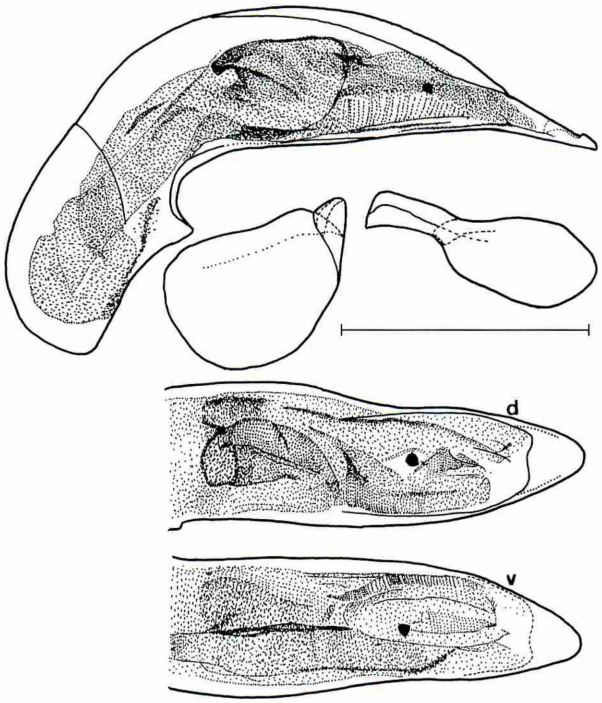


Fig. 8. Male genitalia of *Trichotichnus* (*Trichotichnus*) *choukaisanus* N. ITO, sp. nov.
d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

Trichotichnus* (*Trichotichnus*) *choukaisanus N. ITO, sp. nov.

(Figs. 3, 8)

This new species is allied to *Trichotichnus* (*Trichotichnus*) *abei* MORITA, but the body is a little narrower, the pronotum is thinner in lateral margins and narrower in lateral furrows, and the aedeagus bears apical orifice wider and truncate at distal margin.

Body slightly brownish black, iridescent on elytra; head brownish, maxillary and labial palpi, antennae, and legs light brown. Head wide, 0.70–0.72 times as wide as pronotal width, fairly convex, with very sparse and somewhat coarse punctures; eyes relatively large, rather convex; clypeal suture more or less deep; frontal impressions relatively deep, shallowed behind; 3rd segments of antennae slightly longer than the 4th and twice the 2nd; ligula and paraglossae alike former new species, *T. iidesanus*; 2nd segment of labial palpi one-ninth longer than the 3rd; median tooth rounded; microsculpture obscure. Pronotum widest at apical third, 1.40–1.44 times as wide as long, rather convex; sides weakly arcuate from apex to basal third, thence linearly oblique and sinuate before base; apex gently and a little strongly emarginate; base one-sixth wider than apex, weakly bisinuate-emarginate, thickly bordered; surface smooth on central area, sparsely and minutely punctate in apical area, coarsely and densely in lateral furrows and basal foveae; basal angles rectangular or feebly protruding laterad; microsculpture vague, partly observed as transverse meshes in basal foveae. Elytra oval, wide, two-fifths longer than wide,

one-third wider than pronotal width, weakly and uniformly convex, wholly smooth; a setiferous pore on 3rd interval situated between basal two-fifths and three-sevenths; marginal series interrupted medially, composed of (10–11) + (12–13) umbilicate pores. Hind wings vestigial, one-sixth of elytral length. Metepisternuna 0.93 times as long as wide; 6th abdominal segment in male truncate and in female rounded at apex. Legs not long; hind tarsi in male as long as and one-tenth in female shorter than the width of head, relative length of 1st to 4th segments as following: 1.00 : 0.70 : 0.50 : 0.32, chaetotaxy of claw segment same as that of former new species, *T. iidesanus*. Aedeagus (Fig. 8) moderately stout, gradually thinned apicad, thickened at tip; apical orifice wide and sinuately truncate at apical margin, copulatory piece very small and conical; ventral surface straight, slightly curved ventrad.

Length: 9.3–9.9 mm. Width: 4.0–4.2 mm.

Holotype: ♂, Mt. Choukai, Yamagata, 12. VIII. 1985, N. ITO leg. (preserved in OMNH). Paratypes: 1 ♀, same data as the holotype; 1 ♂, same locality as the holotype, 21–22. VII. 1957, T. HORI leg. (preserved in NIc).

Etymology: This specific name is derived from the type locality, Mt. Choukai-san.

Trichotichnus (*Trichotichnus*) *mizunoi* N. Ito, sp. nov.

(Figs. 4, 9)

Body oblong, rather elongate, black, shiny, with iridescent lustre on elytra; maxillary and labial palpi, antennae and legs reddish brown, middle of mandibles and frons slightly brownish.

Head large, 0.70 times as wide as pronotal width, fairly elevated on frons, with vague and very sparsely punctures; labrum deeply and triangularly emarginate at apex; clypeal suture and frontal impressions alike three former new species; eyes flat or weakly prominent; temples somewhat developed, one-third of eye length; antennae missing apical five segments, relative length of 2nd, 3rd and 4th segments as 1.00 : 2.00 : 1.90; mentum with median tooth small and sharp, epilobes not widened forwards; microsculpture relatively clear, detected as isodiametric meshes in apical area of clypeus and as mixtures with fine square and isodiametric meshes on frons and vertex.

Pronotum cordate, fairly reflected baso-laterally, weakly convex, widest at apical third, 1.44 times as wide as long; sinus before base shallow or rather deep; apex well emarginate, unbordered in middle; base not wide, one-tenth wider than apex, almost straight, feebly arcuate at sides, thickly bordered throughout; apical angles very narrowly rounded; basal angles acute, not or weakly produced laterad at tips; lateral furrows somewhat wide, abruptly expanded basad from apical two-fifths; basal foveae almost flattened, grooved at inner side; both front and hind transverse impressions relatively deep; median line fine and clear, obliterated near both the impression; microsculpture finely and clearly impressed as transverse meshes.

Elytra rather narrowly oval, nearly a half longer than wide, 1.23 times as wide as pronotal width, weakly convex, without punctures; sides smoothly and gently arcuate behind humeri, weakly sinuate before apices which are very narrowly rounded at tips; bases slightly emarginate, angularly meeting with lateral margins; striae relatively deep and finely crenulate, scutellar striole moderately short; intervals weakly raised even on disc, a setiferous pore on 3rd interval situated between middle and apical three-fifths; marginal series consisting of 24–27 umbilicate pores; surface obscurely and finely microlined. Hind wings a little more weakly reduced

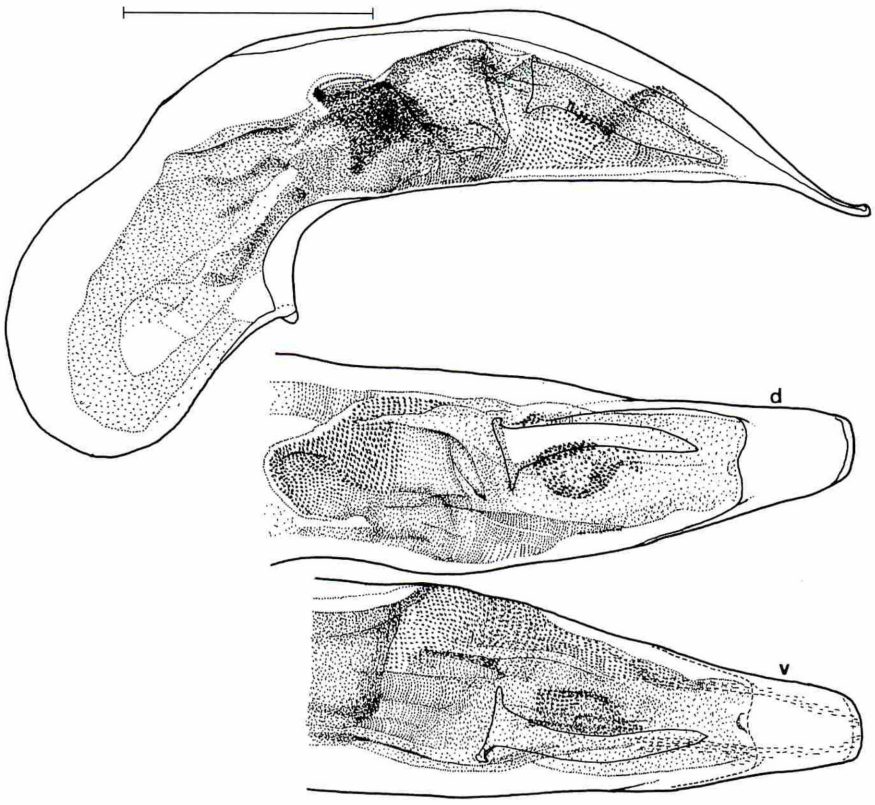


Fig. 9. Male genitalia of *Trichotichnus* (*Trichotichnus*) *mizunoi* N. Ito, sp. nov.
d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

than usual, one-fourth of the elytral length.

Metepisterna 0.93 times as long as wide. Legs long; hind femora bisetose; fore tibiae sulcate, trispinous along apico-external margin; hind tarsi long, 1.20 times in male and 1.10 times in female as long as the width of head, relative length of 1st to 4th segments as 1.00 : 0.70 : 0.55 : 0.42, claw segment ventrally tri- or quadrisetose along inner margin and trispinose along the outer one.

Aedeagus (Fig. 9) stout, gradually tapered forwards from middle, thin at apex, slightly reflected at tip, with large basal bulb; apical orifice widely open, weakly sinuate at distal margin, armed with a copulatory piece peg-shaped, long and robust; apical lobe subtrapezoidal, bordered and weakly rounded at distal margin.

Length: 12.0–12.5 mm. Width: 4.9–5.1 mm.

Holotype: ♂, Gozaishi Spa, Yamanashi, 6. VII. 1992, H. Hosoda leg. (preserved in OMNH). Paratype: 1 ♀, same data as the holotype (preserved in NIc).

Remark: This new species is peculiar in having long and robust copulatry piece on inner sac of aedeagus. The species is similar in shape of body to *Trichotichnus* (*Trichotichnus*) *hiran-*

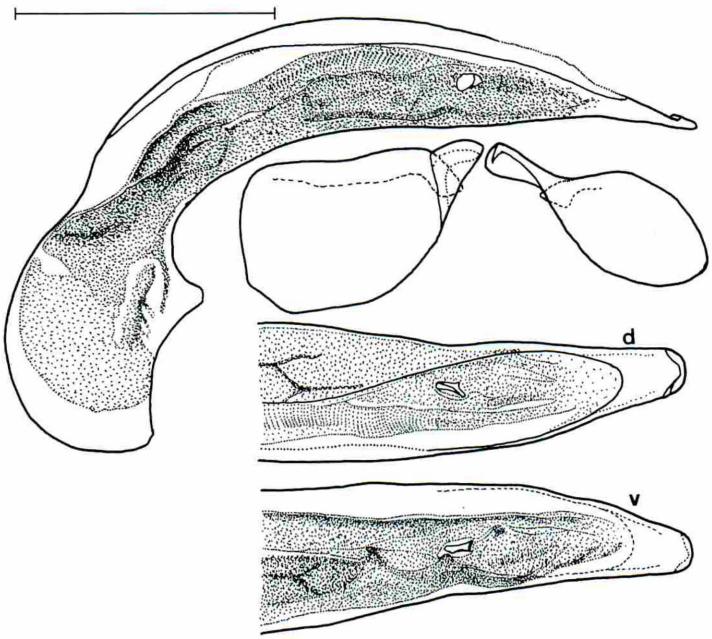


Fig. 10. Male genitalia of *Trichotichnus* (*Trichotichnus*) *hosodai* N. ITO, sp. nov.
d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

ishii MORITA from Hakone, Tanzawa and Mt. Fuji, and it is difficult to distinguish both species by external characteristics, but in new species the pronotum is more weakly sinuate before base and more narrowly covered with punctures, and hind tarsi are shorter.

Etymology: The specific name "*mizunoi*" is dedicated to Mr. Kozo MIZUNO who offers many invaluable material for my study.

Trichotichnus* (*Trichotichnus*) *hosodai N. ITO, sp. nov.

(Figs. 5, 10)

This new species is very similar to *Trichotichnus* (*Trichotichnus*) *daibosatsunis* KASAHARA, but the pronotum is a little narrower in lateral furrows, weakly humped in basal foveae instead of being flattened there and more deeply sinuate before base, the tarsi are wider, and the aedeagus bears copulatry piece wider and acute at its tip instead of rounded.

Body oblong, relatively narrow, black, shiny, iridescent on elytra; maxillary palpi, antennae, and legs light brown, mandibles and head slightly brownish. Head large, 0.71–0.76 times as wide as pronotal width, with narrow interocular space two-thirds of the width of head; eyes comparatively larger and rather prominent than usual species of the *leptopus* group; antennae

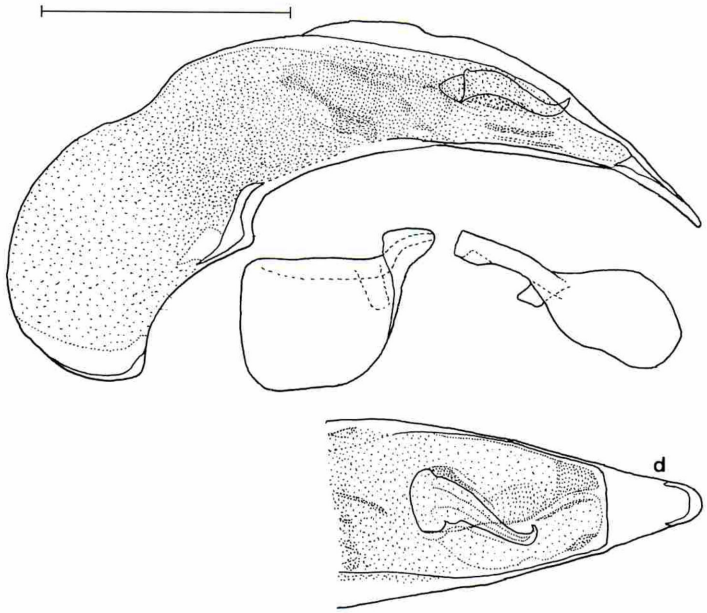


Fig. 11. Male genitalia of *Trichotichnus* (*Trichotichnus*) *tsurugiyamanus* HABU.
d, dorsal aspect. Scale: 1 mm.

slender, long, reaching basal fifth of elytra, epilobes of mentum weakly widened apicad. Pronotum clearly cordate, rather well convex, widest at apical third, one-third wider than long; sides not so strongly sinuate before base; base almost truncate, narrow, 1.14–1.16 times as wide as apex; basal angles rectangular; microsculpture vaguely and partly visible as transverse meshes. Elytra rather well convex, suboval to oblong, approximately a half longer than wide, widest between apical five-ninths and half; sides barely concave behind humeri; apices somewhat widely rounded at distal margins; marginal series continuous, composed of 25–28 umbilicate pores. Hind wings relatively long, three-fourths of the elytral length. Legs long; fore tibiae rather clearly sulcate; hind tarsi 1.11–1.16 times in male and 1.03 times in female as long as the width of head. Aedeagus (Fig. 10) not robust, almost straightly prolonged, thickened at apex; inner sac not wide, armed with copulatory piece widely conical and pointed at its tip; apical lobe subquadrate, longer than wide.

Length: 10.0–11.0 mm. Width: 4.1–4.4 mm.

Holotype: ♂, Gozaishi Spa, Yamanashi, 20. VII. 1990, K. HOSODA leg. (preserved in OMNH). Paratypes: 1♂, 1♀, same locality and collector of the holotype, 28. VI. 1990 (preserved in NIc).

Etymology: This specific name is dedicated to Mr. Kouichi HOSODA, Nirasaki, who is an excellent collector of insects and captured specimens of the type series.

Trichotichnus (*Trichotichnus*) *tsurugiyamanus* HABU

(Fig. 11)

Trichotichnus tsurugiyamanus HABU. 1957, Kontyû, **27**: 131. 1961, Bull. Natn. Inst. Agric. (C), **13**: 154. 1973, Fauna Japnica: 289 (*leptopus* group).

Trichotichnus tsurugiyamanus. ITO, 1996, Ent. Rev. Japan, **51**: 132.

Trichotichnus tsurugiyamanus. MORITA, 1997, Elytra, **25**: 584.

Specimens examined: 1♂, Kuwadaira, Minokoshi, Mt. Tsurugi, Tokushima Pref., 3. V. 1958, N. KAWANO leg.; 1♂, Mt. Yahazu, Awa, 5. VIII. 1961, N. KAWANO leg.; 1_, Mt. Tsurugi, Tokushima Pref., 30. VII. 1960, T. SHIBATA leg.; 3♂♂, 4♀♀, Minokoshi, Mt. Tsurugi, Tokushima, 10–11. VI. 2000, N. ITO leg.; 5♂♂, 13♀♀, ditto, 24. VII. 2004; 3♂♂, 1♀, Mt. Tsurugi, Higashiiyayama-mura, alt. 1,400 m, 8. VI. 2002, M. MORI leg.; 1♂, Mt. Takanosu-yama, Hongawa-mura., Tosa-gun, Kochi, 7–9. VIII. 1998, Y. ITO leg.

HABU (1973) established the *leptopus* group of the genus *Trichotichnus* including this species. I followed this treatment (ITO, 1996). After that, MORITA personally suggested me that the species might not belong to the group, but to the *congruus* species group. As the result of my reexamination, it could be made clear as following: 1, pronotum is not cordate, though transverse, and with punctures more scarce; 2, metepiterna are shortened, though longer than usual species of the *leptopus* group; 3, legs are shorter than those of the *leptopus* group's species; 4, foretibiae are never sulcate; 5, sixth abdominal sternite of male is bisetose at each side; 6, aedeagus (Fig. 11) is straightly tapered distad from basal bulb and with a copulatory piece sinuate instead of being almost straight or conical. As these characteristics agree to those of the *congruus* group. I would like to propose to transfer *T. tsurugiyamanus* from the *leptopus* group to the *congruus* group.

Distributional pattern of the *leptopus* group: The species of the group are diversified very well in narrow areas owing the regression of hind wings. On the other hand, two or more species often occur sympatrically in quite same region, for examples, Kamikôchi, Gozaishi Spa, the mountainous areas of Kii peninsula, Shikoku district and Kwanto district, Ryûto-zan in Shizuoka, Daibosatsu in Yamanshi, and Mt. Hiko-san in Fukuoka, etc. Those sympatric species are genetically isolated to each other and hybrid species are not founded. This phenomenon suggests that different ancestors invaded to the regions in different ages. Detailed taxonomic study and distribution data of species from the not surveyed areas are needed further for the analysis of the phylogenetic relationship of all species.

要　　約

伊藤 昇：中部および東北日本産 Genus *Trichotichnus*（ツヤゴモクムシ属）の*leptopus* group の５新種および *T. tsurugiyamanus* の位置付けについて．―― Genus *Trichotichnus*（ツヤゴモクムシ属）の *leptopus* group は土生が1973年に創設してまとめ，その後1996年に伊藤が西日本の種を，更に翌年，森田が多数の新種記載と共に全種をレビューし６コンプレックスに分けた．その後１種が記載されている．本種群の種は，後翅が退化しており地域ごとの分化が著しく，まだ未調査の地域が残されている．本稿では長野県上高地から *Trichotichnus marubayashiorum*（マルバヤシツヤゴモクムシ），山梨県御座石鉱泉から *T. mizunoi*（ミズノツヤゴモクムシ）および *T. hosodai*（ホウオウツヤゴモクムシ），山形県飯豊山から *T. iidesanus*

（イイデツヤゴモクムシ），秋田県鳥海山から *T. choukaisanus*（チョウカイツヤゴモクムシ）をそれぞれ記載した．上高地，御座石鉱泉には本種群の２種類が同所的に分布している．また紀伊半島や四国の山岳地帯，九州の英彦山，静岡県竜頭山，大菩薩山塊，その他関東周辺の山岳地帯などに数種が同所的に分布している例が見られる．この事実は，本種群の異なる祖先種が複数回にわたって分布を広げたことをうかがわせる．本種群の系統関係を明確にするためには，未調査の地域における種分布の解明と全種の解析が必要である．

一方，筆者が西日本の同種群をまとめた後に，東京在住の虫友，森田誠司氏より私信で“*T. tsurugiyamanus*（ツルギヤマツヤゴモクムシ）は本種群ではなく *congruus* group に所属するのではないか”との示唆をいただいた．そこで再度交尾器を含む詳細な検討を行った結果，本種は *congruus* group に所属する事が判明した．

References

Habu, A., 1957. New species collected by Professor M. Chûjô on Mt. Tsurugiyama in Shikoku, Japan (Coleoptera, Carabidae). *Kontyû*, **27**: 126–133.

———, 1961. Revisional study of the species of the Trichotichni, the subtribe of the tribe Harpalini, from Japan (Coleoptera, Carabidae). *The Bulletin of the National Institute of Agricultural Sciences (C)*, **13**: 127–169.

———, 1973. Carabidae: Harpalini (Insecta: Coleoptera). *Fauna Japnica*. xii + 430 pp., Keigaku Publishing, Tokyo.

Ito, N., 1996. Species of the *leptopus* group of the genus *Trichotichnus* from western Japan including Fukui Pref. (Coleoptera: Carabidae: Harpalini). *The Entomological Review of Japan*, **51**: 121–134.

Kasahara, S., 1991. A new species of the genus *Trichotichnus* (Coleoptera, Carabidae) from central Honshu, Japan. *Elytra, Tokyo*, **19**: 111–114.

Morita, S., 1997. The group of *Trichotichnus leptopus* (Coleoptera, Carabidae) of Japan. *Elytra, Tokyo*, **25**: 521–585.

(Received January 29, 2005; Accepted February 22, 2005)

Ent. Rev. Japan, **60** (1): 53–54, April 30, 2005

Replacement Names for the Junior Homonyms of Two Species of *Trichotichnus* and a Genus of Harpalini (Coleoptera: Carabidae: Harpalini)

Noboru ITO

1–7–18 Higashiuneno, Kawanishi City, Hyôgo Pref., 666–0117 Japan

Trichotichnus* (*Trichotichnus*) *pictipennis N. ITO, nom. nov.

Trichotichnus (*Trichotichnus*) *maculipennis* N. ITO, 1998, Bull. Osaka Mus. nat. Hist., **52**: 52 (nec *Trichotichnus maculipennis* BAEHR, 1997).

Trichotichnus maculipennis N. ITO, which was described in 1998, is a homonym of *T. maculipennis* BAEHR, 1997. So, I would like to give a new name, *Trichotichnus pictipennis*, to the former species.

Trichotichnus* (*Amaroschesis*) *yukii N. ITO, nom. nov.

Trichotichnus (*Amaroschesis*) *imurai* N. ITO, 2002, Ent. Rev. Japan, **57**: 182 [nec *Trichotichnus* (*Trichotichnus*) *imurai* MORITA, 1997, Elytra, Tokyo, **25**: 539].

Trichotichnus imurai N. ITO, which was described in 2002, is a homonym of *T. imurai* MORITA, 1997. Therefore I would like to replace a new name, *Trichotichnus yukii*, to the former.

Genus ***Merklophonus*** N. ITO, nom. nov.

Merklia N. ITO, 2004, Jpn. J. Syst. Ent., **10**: 107 (nec *Merklia* CHEN, 1997, Ent. Sinica, **4**: 306)

Merklia N. ITO described in 2004 is a homonym of lagriid genus *Merklia* CHEN, 1997. I would like to give a new generic name, *Merklophonus*, to the former. Dr. John K. PAGE of the Thomson Zoological Ltd. informed me that *Merklia* was already preoccupied by the generic name of Lagriidae in 1997. I heartily thank him for his kind support.

References

BAEHR, M., 1997. A new species of *Trichotichnus* MORAWITZ from northern Australia (Insecta, Coleoptera, Carabidae, Harpalinae). *SPIXIANA*, **20**: 131–135.

CHEN, B., 1997. Two new genera and two new species of Lagriidae (Coleoptera) from China. *Entomologia Sinica*, **4**: 306–311.

ITO, N., 1998. Three new species of the genus *Trichotichnus* from Seram Is., the Moluccas with a note of distribution (Coleoptera: Carabidae: Harpalini). *The Bulletin of the Osaka Museum of Natural History*, **52**: 49–56.

——— , 2002. Three new species of the subgenus *Amaroschesis* of the genus *Trichotichnus* (Coleptera: Carabidae: Harpalni) from Sichuan, with new record. *The Entomological Review of Japan*, **57**: 181–190.

——— , 2004. A new genus and species of the Selenophori group of tribe Harpalini from India (Coleoptera, Carabidae). *The Japanese Journal of Systematic Entomology*, **10**: 107–112.

MORITA, S., 1997. The group of *Trichotichnus leptopus* (Coleoptera, Carabidae) of Japan. *Elytra, Tokyo*, **25**: 521–585.

(Received February 22, 2005; Accepted March 4, 2005)

Ent. Rev. Japan, **60** (1): 55–58, April 30, 2005

Propsephus nanshanus, a New Species of Elateridae (Coleoptera) from Taiwan

Hisayuki ARIMOTO

Tedukayama-nishi 3–4–21, Sumiyoshi-ku, Osaka, 558–0052 Japan

and

Sergio RIESE

Corso Sardegna 46–11 sc. D, 16142, Genova, Italy

Abstract A new species of the elaterid genus *Propsephus* HYSLOP, 1921, is described from Nantou Hsien, Taiwan, under the name of *P. nanshanus*.

The genus *Propsephus* HYSLOP, 1921, was established on *Psephus beniniensis* CANDÈZE, 1859, and includes a number of species from the African and the Malagasy Regions and a few from the Oriental Tropics at present (SCHENKLING, 1927). We have found a new species of the genus in the course of our recent study on Elateridae of Taiwan. In this paper, we are going to describe it as the first species of the genus from Taiwan.

Before going further, we wish to express our sincere gratitude to Dr. Hitoo ÔHIRA, Okazaki, for his constant guidance and Dr. Hisashi ASHIDA, Ibaraki, for his critically reading the manuscript.

The holotype is preserved in the collection of the Osaka Museum of Natural History.

Propsephus nanshanus sp. nov.

(Figs. 1–4)

Male. Length about 18.5 mm and width 5.5 mm. Body shining, robust, moderately elongate, almost parallel-sided and convex above; dark brown except for ventral surface, antennae and legs more or less paler than dorsal surface. Dorsal surface clothed with recumbent, golden-yellow and rather long setae on head and pronotum but a little shorter on elytra; ventral surface pale yellow, with recumbent setae.

Head subquadrate, with frons weakly and broadly impressed between eyes, clearly impressed between antennae; surface coarsely and densely punctate, each puncture seemingly umbilicate; frontal margin of clypeus rounded and clearly impressed at the middle, but conspicuously ridged above antennal insertions; labrum moderately convex, semicircular and coarsely punctate; front-clypeal area transverse, broad and somewhat narrowed at the middle. Antennae

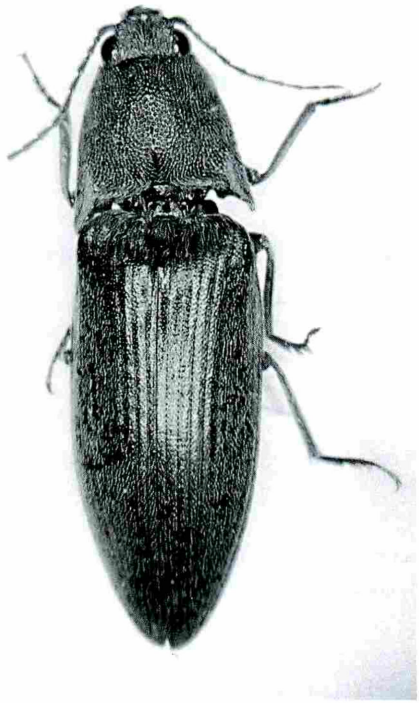


Fig. 1. Habitus of *Propsephus nanshanus* sp. nov., holotype.

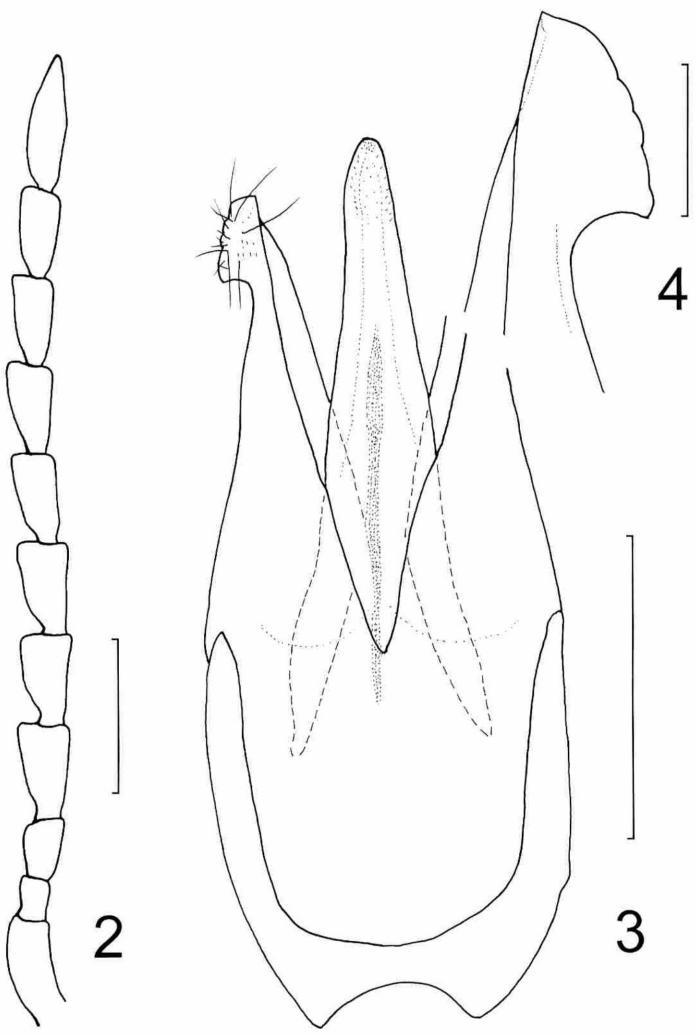
short, not attaining to posterior angle of pronotum, basal segment robust and subclavate; the second short, subquadrate and about 0.9 times as long as its width; the third obconical and about 2.1 times as long as the second; the fourth elongate-triangular and about 1.4 times as long as the third; the fourth to tenth normally serrate; apical segment oblong-ovate and about 3.5 times as long as wide (Fig. 2).

Pronotum trapezoidal, about 1.2 times as long as basal width; sides almost straight in basal half, gently convergent towards middle, then feebly arcuate and clearly convergent towards anterior angles; disc gently convex, coarsely and densely punctuate, each puncture umbilicate; median line smooth and longitudinal, and clearly visible in basal half; posterior angles projecting postero-laterad, each with a distinct carina above. Scutellum lingulate and obtusely pointed; surface coarsely punctate and clearly convex in apical third.

Elytra about 2.3 times as long as its basal width, with sides almost parallel in basal three-fifths, then rounded and gradually convergent towards apices; striae definite, bearing elongate punctures; intervals feebly elevated, sparsely and unevenly punctate and transversely rugose.

Legs stout; apical end of the second tarsal segments distinctly membranous-lobate ventrally; the third more noticeably lobate than the second; claws simple.

Propleura rather shallow, densely and umbilicate-punctate in each apical three-fourths, but the punctures are slightly smaller than those of pronotum. Prosternum densely and umbilicate-punctate, each punctures clearly larger than in propleura. Prosternal process slightly incurved just behind procoxal cavities, then projecting straight towards apex, with clearly emarginated



Figs. 2–4. Right antenna (2) and aedeagus, dorsal views (3–4) of *Propsephus nanshanus* sp. nov., holotype. Scales: 1 mm (2); 1 mm (3), 0.2 mm (4).

extremity on the underside.

Male genitalia as illustrated in dorsal view (Figs. 3–4); median lobe a little longer than lateral lobes, gradually narrowed towards apex, which is obtusely pointed; each apical portion of lateral lobe rather triangular, with outer margin clearly and irregularly sinuate and furnished with many long setae along lateral margin.

Female. Unknown.

Type series. Holotype: ♂, Nanshanchi, Nantou Hsien, Taiwan, 12. VIII. 2000, N. OKUDA leg.

Etymology. The specific name is derived from the type locality, Nanshanchi.

Notes. This new species is somewhat similar to *Propsephus oberthuri* (CANDÈZE, 1882) from Zanzibar, but can be easily distinguished from the later by the following points: 1) body is

distinctly larger and robuster; 2) dorsal surface is dark brown whereas that of *P. oberthuri* is yellowish-brown except for black lateral margins, median longitudinal portion and posterior angles of pronotum; 3) median longitudinal smooth line on the disk of pronotum is evident whereas that of *P. oberthuri* is lacking.

要　　約

有本 久之・Sergio RIESE：台湾から発見された *Propsephus* 属の１新種. ―― *Propsephus* 属の種はアフリカやマダガスカル地方から多くの種類が 記録されており，熱帯アジアからも若干の種が知られているが，台湾からは未記録であった．今回，台湾の南投県南山渓から発見された *Propsephus* 属の１種を新種と認め，*Propsephus nanshanus* と命名して記載した．本種は *Propsephus oberthuri* CANDÈZE, 1881 に似ているが，より大型で体色が異なる点，前胸背板の中央に平滑線が認められる点などにより識別は容易である．雌は未発見である．

References

BASILEWSKY, P., 1958. Les Dicrepidiinae du Congo Belge (Coleoptera Elateridae). *Entomolgischen Arbeiten aus Museum G. Frey*, **9**, Heft 2: 353–477.

CANDÈZE, E., 1859. Monographie des Élatérides 2. *Mémoires de la Societé royaledes Sciences de Liège,* **14**: 543 pp., 7 pls.

――― , 1882. Élatérides Nouveaux 3. *Mémoires de la Societé royaledes Sciences de Liège*, (2), **9**: ii+117pp.

HYSLOP, J. A., 1921. Genotype of the Elaterid beetles of the World. *Proceedings of the United states National Museum*, **58**: 621–680.

SCHENKLING, S., 1927. Elateridae II. *In* JUNK. W. and S. SCHENKLING (eds.), *Coleopteroum Catalogus*, pars **88**: 265–636. W. JUNK, Berlin.

SCHWARZ, O., 1902. Neue Elateriden aus dem tropischen Asien, den malaysischen Inseln und den Inselender Südsee. *Deutsche Entomologische Zeitschift* 1902. Heft II: 305–350.

SUZUKI, W., 1999. Catalogue of the Family Elateridae (Coleoptera) of Taiwan. *Miscellaneous Reports of the Hiwa Museum for Natural History*, (38), 348 pp.

Van ZWALUWENBURG, R. H., 1936. The Elaterid beetles of the Philippine Islands. *The Philippine Journal of Science, Manila*, **59**: 393–432.

(Received February 17, 2005; Accepted March 2, 2005)

Ent. Rev. Japan, **60** (1): 59–62, April 30, 2005

A New Subspecies of *Episcaphula matsumurai* CHÛJÔ (Coleoptera: Erotylidae) from the Yaeyama Group in the Southern Ryukyus, Southwestern Japan

Nobuyuki NARUKAWA

2399 Kida, Suzuka, Mie, 513–0015 Japan

and

Hisashi ASHIDA

7–4–201, Shimeien, Ibaraki, Osaka, 567–0045 Japan
E-mail: BYD01621@nifty.ne.jp

Abstract. A new subspecies of *Episcaphula matsumurai* CHÛJÔ, 1941, is described from the Yaeyama Islands in the southwestern Japan under the name *E. matsumurai kaniei* NARUKAWA et ASHIDA, ssp. nov.

In 1999, the second author reported the first record of the erotylid genus *Episcaphula* from Japan based on a single specimen obtained from the Island of Ishigaki-jima, Okinawa Prefecture, southwestern Japan, although the real status of the species was not determined (ASHIDA, 1999). After that, the first author had an opportunity to examine a series of additional specimens of that species through the courtesy of Mr. Noboru KANIE. Close examination revealed that the Japanese population represent a new subspecies of *Episcaphula matsumurai* CHÛJÔ, 1941, originally described from Taiwan. In this paper, we are going to describe this new subspecies as a new member of the Japanese erotylid fauna.

Before going further, we wish to express our hearty thanks to Mr. Noboru KANIE (Aichi Prefecture), Mr. Atsuhiro NAGANO (Yamaguchi Prefecture) and Mr. Koji HOSOKAWA (Aichi Prefecture) for their kindly offering the valuable materials.

Episcaphula matsumurai kaniei NARUKAWA et ASHIDA, subsp. nov.

(Figs. 1–7)

Episcaphula sp.: ASHIDA, 1999: 11.

Body elongate, oblong-oval, convex on dorsum, about 2.4 times as long as wide, and thinly clothed with short yellowish brown hairs on the whole surface; general color blackish brown; elytra decorated with a pair of red anterior bands and of ante-apical spots; anterior band lying from 2nd interval to shoulder, arcuately emarginate at anterior margin, and undulate at posterior

margin on 3rd, 5th and 7th striae; the ante-apical spot transversely oval, situated at about apical fourth of elytron, and occupying from 2nd to 7th striae; scutellum and legs brown.

Head about half as wide as pronotum; punctures sparse, large, and rough; clypeus rather sharply narrowed towards frontal margin, which is very slightly emarginate at middle; eyes moderate in size; interocular distance 0.76 times as long as width of head across eyes; maxillary palpus with terminal segment (Fig. 3) fusiform and about 1.6 times as long as wide; mentum (Fig. 4) triangular, aciculate apically, with strongly gouged sides in apical two-thirds. Antennae (Fig. 2) eleven-segmented, with four terminal segments forming a club; 1st segment cylindrical, wider than long, weakly constricted near apex; 2nd about 1.4 times as long as wide; 3rd about 1.8 times as long as wide, and about 1.3 times as long as 2nd; 4th about 1.6 times as long as wide; 5th about 1.7 times as long as wide; 6th about 1.4 times as long as wide; 7th about 1.1 times as long as wide; 8th about as long as wide; 9th about 1.2 times as wide as long; 10th about 1.6 times as wide as long; 11th about 1.3 times as wide as long, rounded at apex.

Pronotum about 1.5 times as wide as long, and widest at basal one-third; sides narrowed towards frontal angles, strongly arcuate at anterior half, and nearly straight at basal half; disk coarsely and sparsely punctured; anterior margin deeply emarginate and in middle part gently arched anteriorly; anterior corners roundly projected; posterior corners nearly rectangular.

Elytra elongate, conjointly about 1.5 times as long as wide, widest at basal one-third, and slightly wider than pronotum; sides weakly arcuate from base to middle, then sharply narrowed toward apices, with rows eight of seriate punctures, which are relatively finer than those of pronotum; intervals between rows sparsely and minutely punctured.

Prosternum sparsely punctured; prosternal process (Fig. 5) longer than wide, whose sides are moderately arcuate at middle and posterior margin is slightly arcuate. Metasternum with large and rough punctures, and short and sparse hairs.

Median lobe of male genitalia (Figs. 6 and 7) subcylindical; dorsal margin weakly arcuate, and abruptly declivous in apical ninth, the declivity weakly sinuous; apex pointed in lateral view, and elongate-ovoid in dorsal view; parameres nearly as long as median lobe; median strut long, about 1.2 times as long as median lobe.

Body length: 5.2–5.8 mm; width: 2.1–2.3 mm.

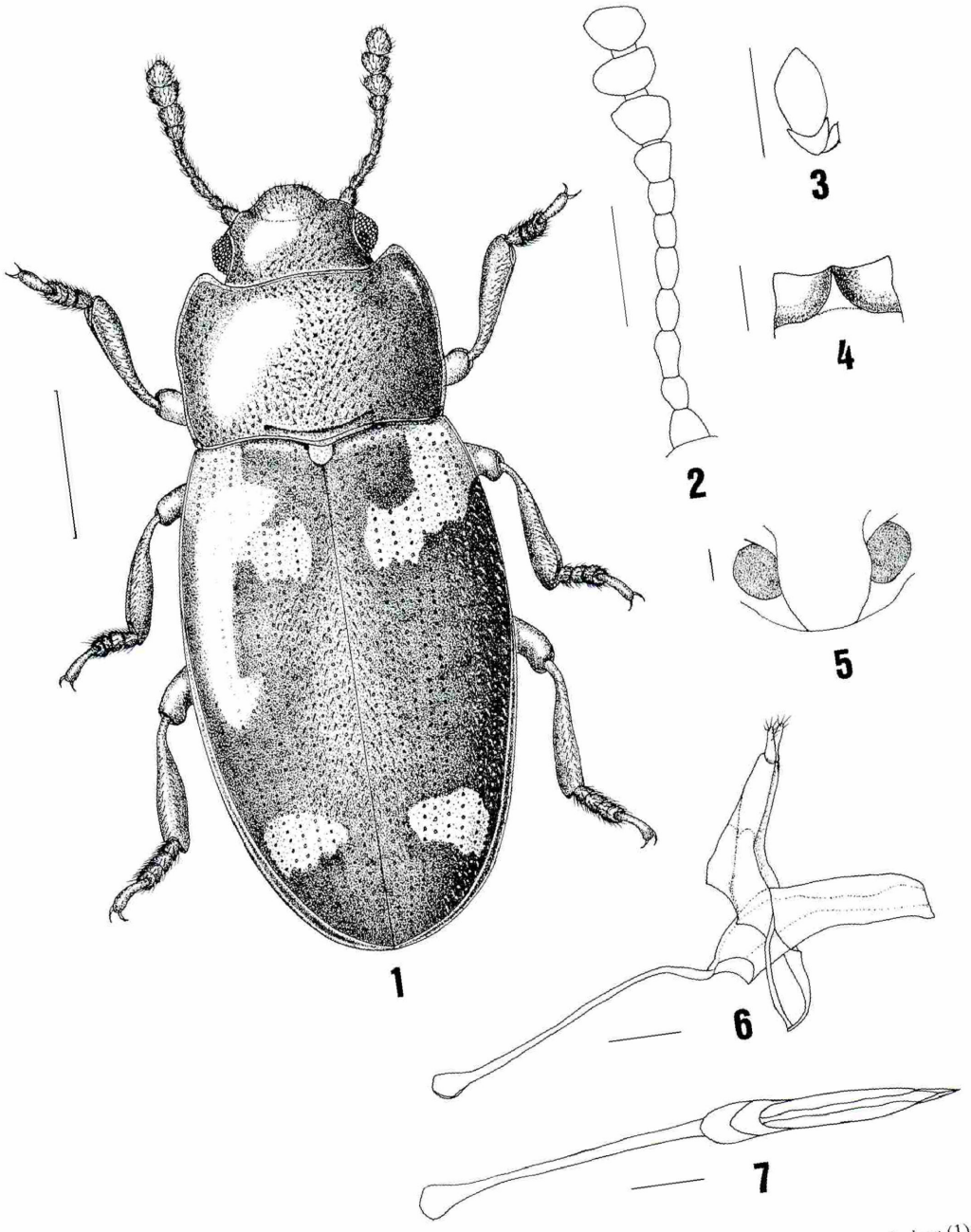
Type series. Holotype: ♂, Yonehara, Ishigaki-jima Is., Okinawa Prefecture, 2. V. 2001, N. KANIE leg. (preserved in the collection of the Osaka Museum of Natural History, Type No. OMNM-TI-202). Paratypes: 5 exs., same data as for the holotype; 1 ex., same locality as for the holotype, 9. VI. 1999, N. KANIE leg.; 1♀, Mt. Omoto-dake, Ishigaki-jima Is., Okinawa Prefecture, 3. IV. 1994, A. NAGANO leg.; 1♀, same locality, 12. III. 1993, K. MATSUMOTO leg.; 1 ex., same locality, 29. IV. 2001, K. HOSOKAWA leg.; 3 exs., Ota, Ishigaki-jima Is., Okinawa Prefecture, 2. VI. 1988, N. KANIE leg.; 1 ex., same locality, 5. VI. 1988, N. KANIE leg.; 7 exs., same locality, 25. VI. 1990, N. KANIE leg.; 1♀, Shiiminato, Iriomote-jima Is., Okinawa Prefecture, 5~18. IX. 1996, K. EBI leg. Holotype and four paratypes are preserved in the collection of the Osaka Museum of Natural History and other paratypes are in authors' collection.

Distribution. Yaeyama group (Ishigaki-jima Is. and Iriomote-jima Is.) in the southern Ryukyus, Southwest Japan.

Food-fungus. Unknown.

Etymology. The specific name of the new subspecies is dedicated to Mr. Noboru KANIE.

Notes. The genus *Episcaphula* CROTCH, 1876, is widely distributed in the Southeast Asian and the Australian Regions and more than 90 species have been described to date (CHÛJÔ and



Figs. 1–7. *Episcaphula matsumurai kaniei* NARUKAWA et ASHIDA, subsp. nov. — Dorsal view (1); antenna (2); maxillary palpus (3); mentum (4); prosternal process (5); aedeagus, lateral (6) and dorsal (7) views. Scales: 1.0 mm for 1; 0.5 mm for 2; 0.1 mm for 3–7.

CHÛJÔ, 1988). So far as we are aware, the nominotypical subspecies *E. matsumurai matsumurai* is known from only Taiwan and is one of the northernmost species in the genus. Although the Yaeyama group are closely related to Taiwan in biogeographical viewpoint, this new subspecies *E. matsumurai kaniei* from those islands is easily distinguished from the nominotypical subspecies by blackish-brown coloration of body and separated ante-apical spots on elytra.

要　　約

生川 展行・芦田 久：琉球南部八重山群島から発見されたマルムネエグリオオキノコムシ属の1新亜種. ——— 著者の一人，芦田は石垣島で採集された1個体のオオキノコムシを，日本から未記録のマルムネエグリオオキノコムシ属（新称）Genus *Episcaphula* の1種として報告した（芦田，1999）．その後，著者らは，石垣島と西表島で採集された多数の標本を検した結果，台湾から記載された *Episcaphula matsumurai* CHÛJÔ, 1941 の新亜種であると認められたので，ヤエヤマエグリオオキノコムシ *Episcaphula matsumurai kaniei* NARUKAWA et ASHIDA として命名，記載した．本亜種は，体が黒褐色で，かつ上翅後方の赤色紋がつながらなず相離れることにより，基亜種と区別できる．

References

ASHIDA, H., 1999. A new record of erotylid genus *Episcaphula* from the Island of Ishigakijima. *Nejirebane, Osaka,* (83): 11. (In Japanese.)

CHÛJÔ, M., 1941. Descriptions of six new erotylid-beetles from Formosa and the Mariana Islands. *Mushi, Fukuoka,* **13**: 84–92.

——— and CHÛJÔ, M. T., 1988. A catalog of the Erotylidae (Insecta, Coleoptera) from the Old World (excl. the Ethiopian Region). *Esakia, Fukuoka,* (26): 139–185.

CROTCH, G. R., 1876. A revision of the coleopterous family Erotylidae. *Cistula Entomology,* **1**(13): 377–572.

(Received February 24, 2005; Accepted March 4, 2005)

Ent. Rev. Japan, **60** (1): 63–67, April 30, 2005

A New Genus and Species of Coprophilini (Coleoptera: Staphylinidae: Oxytelinae) from Japan

Yasuhiko HAYASHI

Suimeidai 3–1–73, Kawanishi City, Hyôgo, 666–0116 Japan

Abstract A new genus and a species of Coprophilini is described from Japan under the name *Coprotrichus kameii*.

The members of the tribe Coprophilini are consisting of three genera (HERMAN, 2001; SMETANA, 2004), which are distributing in Nearctic, Palaearctic, Australian and Neotropical Regions. *Coprophilus* LATREILLE has been known only from Palaearctic Region including Japan. Recently, I found a peculiar species from Japan, which is well similar in structures of the gular suture to the genera *Homalotrichus* SOLIER from Neotropical and Australian Regions and *Coprostygnus* SHARP from New Zealand, but the species is well similar in general appearance to a Coprophilus species, especially to *C. adachii* (Y. WATANABE et Y. SHIBATA) from Japan. After careful examination, I concluded that the species should be placed in the new genus. In this paper I am going to describe a new genus for the new species under the name of *Coprotrichus kameii*. All type specimens are preserved in the collection of the Osaka Museum of Natural History, Osaka.

I am very grateful to Dr. Juro KAMEI (Akita Pref.) for his kind gift of this interesting material and to Dr. Katsura MORIMOTO, the Emeritus Professor of the Kyushu University, Fukuoka, for his kindness in critically reading the manuscript of this paper.

Coprotrichus gen. nov.

(Figs. 1–4)

Type species. *Coprotrichus kameii* sp. nov.

Diagnosis. The present new genus is very similar in facies to a *Coprophilus*- or a *Homalotrichus*-species, but it is easily distinguishable from the latter two by absence of distinct neck. This new genus can be recognized by the combination of the confluent gular suture, the suborbiculate eyes in lateral view, the single laterosclerite in each side of 3rd to 6th abdominal segments in appearance in dorsal view, the carinate pro- and mesosternal processes, the contiguous mesocoxae and 2 rows of spines on dorsum of each tibia.

Description. Body rather small in size, stout, elongate, nearly parallel-sided, flattened above and well shiny. Elytra and abdomen wider than head and prothorax. Head, pronotum and elytra with setae scattered sparsely over surface. Abdomen more densely pubescent than fore-

body.

Head (Fig. 2) nearly rounded, uniformly and gently narrowed posteriad, weakly constricted at base but without distinct neck, depressed inside supra-antennal ridge and without transverse groove near posterior margin of eyes on dorsum; epistomal suture absent. Eyes relatively small, much shorter than postgenae, hemispherically prominent but not extending beyond width of head and suborbiculate in lateral view. Antennae filiform, moderately long. Labrum short, strongly transverse, feebly emarginate at apical margin, finely impressed medially, sparsely and coarsely punctured and fringed with several long and slender setae of various length at apical margin. Mandibles wide, gently curved ventrad, strongly incurved in apical portion, with a small tooth near apex and at about the middle of inner margin. Maxillary palpi (Fig. 3) with the first segment small, nearly as long as wide; second strongly dilated apicad, much longer than the first; 3rd strongly transverse, much shorter than 2nd, with a few long setae in apical portion; 4th segment subfusiform, thick, much longer than wide and 3rd, as wide as apex of 3rd in the base. Labial palpi (Fig. 2) elongate, 1st segment a little wider than long; 2nd much shorter than 1st, much wider than long; 3rd subconical, much longer than wide and 1st, slightly narrower at the base than 2nd and subacute at the tip. Ligula wide, weakly emarginate at apical margin. Paraglossae rather long, extending near to the tip of labial palpi and fringed with sparse short pubescence in apical portion. Mentum subtrapezoidal, long, nearly twice as wide as long, flat, coarsely and sparsely punctured, straight at anterior margin, with a long fine seta in antero-lateral portion. Gular sutures confluent in short length before the middle, divergent anteriad and posteriad from the confluent portion.

Pronotum obtrapezoidal, narrowed posteriad, weakly sinuate and crenulate at lateral margins; disc bearing 3 pairs of depressions, a median ridge and a pair of plaques. Prohypomeron strongly deflexed and wide. Protergosternal suture present. Procoxal fissure present and open, and protrochantin well exposed. Postprocoxal lobe (hypomeral projection) present. Prosternal process carinate in a short distance and extending between coxae.

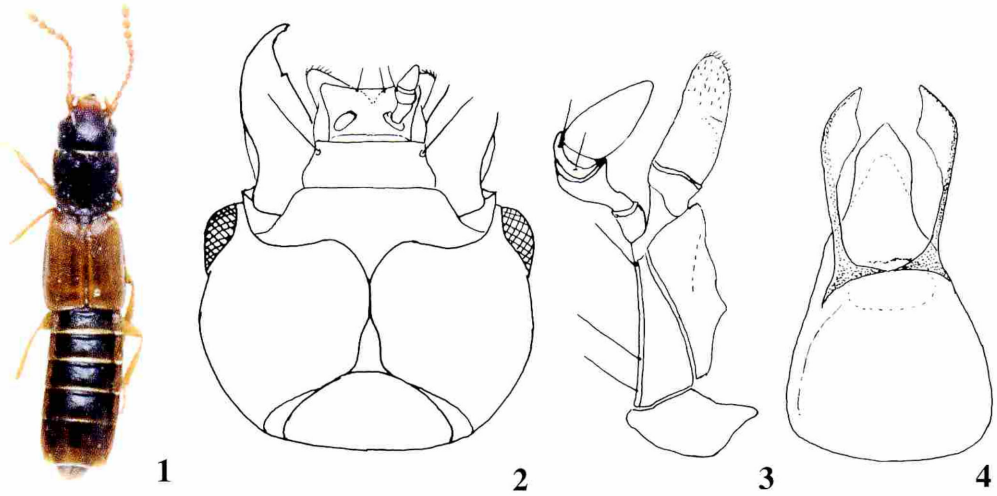
Scutellum exposed in hind half, tongue-shaped, very shallowly depressed and obsoletely punctate.

Elytra with epipleural ridge and obscure longitudinal punctate striae. Mesosternal process elongate, spiniform, short carinate and not strongly extending between mesocoxae, which are contiguous to each other. Metasternum with a low ridge between mesocoxae. Metasternal process absent.

Abdomen with 2nd segment not so strongly sclerotized as third, three-fourths as long as 3rd, closely associated with third and apparently not movable on 3rd; 2nd and 3rd sternites without longitudinal median carina; 3rd to 6th abdominal segment with 2 laterosclerites in each lateral side but inner laterosclerite not visible in dorsal view; 8th tergite with posterior margin straight; 8th sternite weakly emarginate at hind margin in male.

Femora with fine pubescence. Tibiae subtrapezoidal in a cross section, bearing two rows of spines on dorsum and a few longitudinal rows of setae. Mesocoxae not strongly exposed from mesocoxal cavities and contiguous to each other. Tarsal formula 5-5-5, all segment distinct, under side of basal 4 segments with long setae, and 5th segment the longest.

Male genitalia trilobed and symmetrical. Penis subglobular in basal amplitude, strongly swelling and weakly sclerotized on dorsum, and the apical third abruptly narrowed, parallel-sided in the basal half, triangulate in the apical third and acute at the tip. Parameres stout, elongate and dilated in apical portion.



Figs. 1–4. *Coprotrichus kameii* sp. nov. — 1, Habitus; 2, ventral view of head; 3, right maxilla; 4, ventral view of male genitalia.

Distribution. Japan, Honshû.

Etymology. The generic name is formed by combining parts of the related genera *Coprophilus* and *Homalotrichus*. Both are derived from Greece, and gender of the new name is masculine.

Discussion. In spite of similar structures of the gular sutures, meso- and metasternal process of the present new genus it must be placed more closely to the genus *Coprophilus* LATREILLE than to the genus *Coprostygnus* SHARP. Because *Coprostygnus* has distinct epistomal suture, but in the present genus it is absent as in the genera *Coprophilus* and *Homalotrichus*.

Coprotrichus kameii sp. nov.

(Figs. 1–4)

Body elongate, subparallel-sided, rather flattened above and well shiny; colour reddish brown to dark reddish brown, elytra, antennae, palpi and legs pale yellow, elytra sometimes with brownish tinge, and mandibles pitchy. Length: 3.5–4.2 mm.

Head subelliptical, a little longer than wide (in a state well producing in front), gently roundly narrowed posteriad, gently convex above, vaguely impressed at the top of vertex, rather deeply depressed inside of antennal ridge, the depression becoming shallower posteriorly, finely and longitudinally striate in the hind portion, with an obscure and glabrous oblique ridge at the posterior-most portion; upper surface glabrous in clypeal region, sparsely and coarsely punctured in frontal region, coarsely and moderately densely punctured in the rest, with striate microsculpture on postgenae, which is spreaded towards subgenae. Eyes strongly convex, suborbiculate in lateral view and nearly half as long as postgenae (in a state the head well produced

anteriad).

Pronotum a little wider than long (19.5 : 17.0), widest at about anterior fourth, coarsely crenulate at sides, a little wider than head (19.5 : 17.0); anterior margin weakly bisinuate and posterior one gently arcuate; from the widest point, sides narrowed posteriad on a straight line; anterior angles protuberant in front, and posterior ones obtuse; disc gently convex, coarsely and sparsely punctured, medially with a pair of small depressions just behind the anterior margin, a pair of shallow longitudinal median depressions in hind two-thirds, and a shallow and large depression at hind two-thirds of each lateral side which is extending at lateral and basal margin in the hind half; median ridge between the median depressions glabrous, and a oblique short glabrous plaque in each lateral side of hind portions of median depressions.

Elytra subtrapezoidal, a little widened posteriad, slightly longer than wide (25.0 : 23.5), nearly straight at sides except near shoulders and latero-apical angles, which are weakly arcuate, weakly emarginate at apical margin, with latero-apical angles nearly rounded and inner apical ones rectangular; surface with 4 obscure longitudinal ridges, which are not reaching base and apex, and interstices rather densely scattered with small obscure punctures, the punctures somewhat arranged in a row in lateral 2 interstices.

Abdomen with 3rd to 6th tergites transversely deeply depressed at each base, covered with distinct fine reticulate microsculpture and sparse and small punctures in a whole, the punctures a little denser on sternites than on tergites. In female the 8th sternite roundly protuberant behind and subangulate at the tip.

Legs short and moderately thick; tibiae subtrapezoidal in a cross section, each with 2 rows of strong spines on dorsal surface, closely setose at under margins and with a longitudinal row of fine setae on inner and outer surface; each row of spines on protibia consisting of about 7 in number, those on mesotibiae of about 10, and rather thin and multiple on metatibia.

Penis (Fig. 4) somewhat pear-shaped, abruptly narrowed and strongly curved ventrad in apical third, which is nearly parallel-sided in the basal half, triangular in distal half and subacute at the tip; paramere short, curved inward near apex, half length of penis, extending a little beyond penis and widened inward in distal half.

Type series. Holotype: ♀, Mt. Izumigatake, Miyagi Pref., Japan, 9. V. 1965, J. KAMEI leg. Paratypes: 1♂, 1♀, Shizushi, Mizuho-cho, Kyoto Pref., Japan, 13. V. 1982, Y. HAYASHI leg.; 1♂, Ushiroyama, Awakura-mura, Okayama Pref., Japan, 5. V. 1988, A. WATANABE leg.

Etymology. The present species is named in honor of Dr. Juro KAMEI, who is an eager coleopterist in Akita Pref.

要　　約

林　靖彦：日本産キノカワハネカクシ族の１新属・新種．——— キノカワハネカクシ族 Coprophilini は３属からなる小さな１群であり，旧北区には *Coprophilus* キノカワハネカクシ属のみが分布していて，他の２属は南半球に分布している．今回記載する新属の外見は一見 *Coprophilus adachii* (Y. WATANABE et Y. SHIBATA) アカバキノカワハネカクシの小型個体にそっくりで，両者は同日・同所でも採集されている．同定のために詳細に検討した結果，種の特徴はむしろオーストラリアや中南米に分布する *Homalotrichus*属およびニュージーランドに分布する *Coprostygnus*属によく似ていることが判明した．頭部上面の構造から前者に近いものと考えられたので新属・新種 *Coprotrichus kameii* ニセキノカワハネカクシと命名，記載した．

References

HERMAN, L. H., 1970. Phylogeny and reclassification of the genera of the rove-beetle subfamily Oxytelinae of the World (Coleoptera, Staphylinidae). *Bulletin of the American Museum of Natural History*, **142**: 343–454.

———, 2001. The Catalog of Staphylinidae, III, Oxyteline Group. *Ibid.*, **265**: 1067–1806.

SMETANA, A., 2004: pp. 237–698. *In* I. LÖBL and A. SMETANA (ed.): Catalogue of Palaearctic Coleoptera, Vol. **2**. *Stenstrup*: Apollo Books, 942 pp.

WATANABE, Y. and Y. SHIBATA, 1961. A revision of the genus *Elonium* LEACH in Japan (Coleoptera, Staphylinidae). *Journal of Agriculture Science, (Tokyo)*, **7**: 43–45.

(Received February 8, 2005; Accepted February 12, 2005)

Ent. Rev. Japan, **60** (1): 68, April 30, 2005

New Records of Staphylinidae from Taiwan, 4

Yasuhiko HAYASHI

Suimeidai 3–1–73, Kawanishi City, Hyôgo, 666–0116 Japan

1. *Philonthus flavipes* KRAATZ

Specimens examined. 1 ex., Liukuei, 12. VIII. 1972, Y. MAEDA leg.; 1 ex., Kenting Park, 3. VIII. 1972 (light trap), Y. MAEDA leg.; 6 exs., Is. Lanyu, 24. IV. 1971 (light trap), Y. HAYASHI leg.; 1 ex., 2. VI. 1972, Y. KIYOYAMA leg.

The species is widely distributed in Southern region of Asia and North Africa.

2. *Philonthus fauvelianus* BERNHAUER

Specimens examined. 1 ex., Kenting Park, 12. VIII. 1969, Y. MAEDA leg.; 1 ex., Is. Lanyu, 8. X. 1970, Y. KIYOYAMA leg.

This species have been known only from Myanmar until now.

3. *Philonthus eustilbus* KRAATZ

Specimens examined. 1 ex., Nanshanchi, 22. IX. 1970, Y. KIYOYAMA leg. (light trap); 1 ex., ditto, 5. III. 1970, T. KOBAYASHI leg.; 1 ex., Fungchiifo, 17. VIII. 1969, Y. MAEDA leg.; 1 ex., Mt. Yangming, 30. IV. 1982, T. ITO leg.

This species is widely distributed in Oriental Region. This and *P. rutiliventris* SHARP, *P. gastralis* SHARP (perhaps *P. hesperiformis* CAMERON, too) are well similar in general appearance to each other and forming a species group in the genus *Philonthus* by the structures of the pronotum and the protarsi. However, they are not true *Philonthus*-species, because the protarsi are simply slender, without modified hairs on the undersides as in the genus *Gabrius* STEPHENS or *Bisnius* STEPHENS. In consideration of the other characteristics, these species do not belong to these genera, therefore, I consider they should be transferred to an appropriate genus.

References

BERNHAUER, M. and K. SCHUBERT, 1914. Staphylinidae IV. *In* JUNK, W. & S.SCHENKLING (eds.), Coleopterolum Catalogus, pars 57: 29–408.

CAMERON, M., 1932. Coleoptera. Staphylinidae III. *In* The Fauna of British India including Ceylon and Burma: xiii+443 pp., 4 pls. Tayler & Francis, London.

FAUVEL, A., 1895. Staphylinides nouvaux de l'Inde et de la Malaisie. *Revue d'Entomologie* **14**: 180–286.

HERMAN, L. H., 2001. Catalog of Staphylinidae V. *Bulletin of the American Museum of Natural History*, **265**: 2441–3020.

KRAATZ, G., 1859. Staphylinen-Fauna von Ostindien, insbesondere der Insel Ceylon. *Archiv für Naturgeschichte*, **25**: 1–196.

(Received February 28, 2005; Accepted March 4, 2005)

Ent. Rev. Japan, **60** (1): 69–74, April 30, 2005

Notes on the Coprophagous Scarab-beetles (Coleoptera: Scarabaeidae) from Southeast Asia (VI)
— Three New Taxa of the Tribe Coprini from Borneo —

Teruo OCHI

Kohudai 5–21–6, Toyono-chô, Toyono-gun, Osaka, 563–0104 Japan

and

Masahiro KON

School of Environmental Science, The University of Shiga Prefecture,
Hassaka-chô 2500, Hikone, Shiga, 522–8533 Japan

Abstract *Copris* (*Copris*) *poggii* sp. nov., *C.* (*C.*) *gibbulus borneensis* subsp. nov. and *Microcopris fujiokai poringensis* subsp. nov. are described from Sabah State, Malaysia.

We had an opportunity to examine *Copris* specimens collected by T. KIKUTA from Kinabalu National Park, Sabah. As a result, among them, we found a species distinct from any other species of this genus recorded from Borneo. After a close examination and comparison, we have concluded that this form is new to science. Thus, we describe a new species of *Copris* from Borneo. In addition, we herewith describe two new subspecies of *Copris gibbulus* LANSBERGE and *Microcopris fujiokai* OCHI et KON from Borneo, respectively.

Copris* (*Copris*) *poggii sp. nov.
(Figs. 1, 4–6)

Length: 13.4–19.5 mm; width: 7.0–9.7 mm (n=382).

Body moderate-sized, strongly convex above; dorsal side shining, entirely glabrous; ventral side also shining; prosternum sparsely clothed with short to long erect yellowish-brown hairs; mesosternum sparsely clothed with short recumbent yellowish-brown hairs; metasternum very sparsely clothed with short recumbent yellowish-brown hairs except for glabrous metasternal shield; abdominal sternites clothed with short recumbent yellowish-brown hairs in basal portion along margin. Color uniformly black, often somewhat reddish; mouth parts, palpi, and antennae reddish-brown to dark reddish-brown.

Male. Head distinctly transverse; clypeal margin widely emarginated in the middle and gently rounded on either side, broadly bordered, with a short upturned process at the middle, which is truncated at apex; apical median portion just below clypeal margin forming a transverse broad area surrounded by lower and upper (=anterior) margins; the lower margin with

three obtuse contiguous teeth in the middle, the median tooth clearly shorter than the outer two; genae strongly produced laterad, with genal corners right-angled, margin almost straight and broadly bordered in front, weakly sinuate and finely bordered behind; cephalic horn placed a little behind the middle, short, at most 3 mm or so in length, tapering and pointed distally, clearly curved backwards; area posterior to the base of cephalic horn almost simple, without a pair of teeth; vertex transversely and a little shallowly excavated; surface shining, smooth and impunctate in apical half, densely, coarsely and a little shallowly punctate in basal half except for anterior portion of eye and vertexal excavation almost impunctate.

Pronotum moderately convex, about 1.6–1.7 times as wide as long (n=3), with a distinct longitudinal impression along midline in basal two-thirds; anterior margin bisinuate, distinctly bordered, with marginal border widest in the middle and finest laterally; lateral margins gently rounded in front, slightly sinuous behind, finely bordered; anterior angle rectangular, strongly produced forwards, with rather sharp corner; basal margin rounded, widely bordered; disc strongly convex, rather gently declivous in apical third, with the upper edge of the declivity very obtusely ridged; surface somewhat sparsely covered with coarse and a little shallow punctures, the punctures becoming very coarse at sides, and also becoming finer on median basal portion and either side of the declivity.

Elytra strongly convex, about 1.1 times as long as wide (n=3), each with ten striae; 9th and 10th striae confluent in basal third; 1st and 10th, 2nd and 9th, 3rd and 8th, and 4th and 5th joined at apex respectively; 6th and 7th not distinctly joined at apex; 8th often interrupted behind the middle; all the striae strongly and rather deeply impressed; strial punctures distinct, with clearly notching intervals; intervals weakly convex, lightly micro-reticulate though shining, sparsely and very finely punctate.

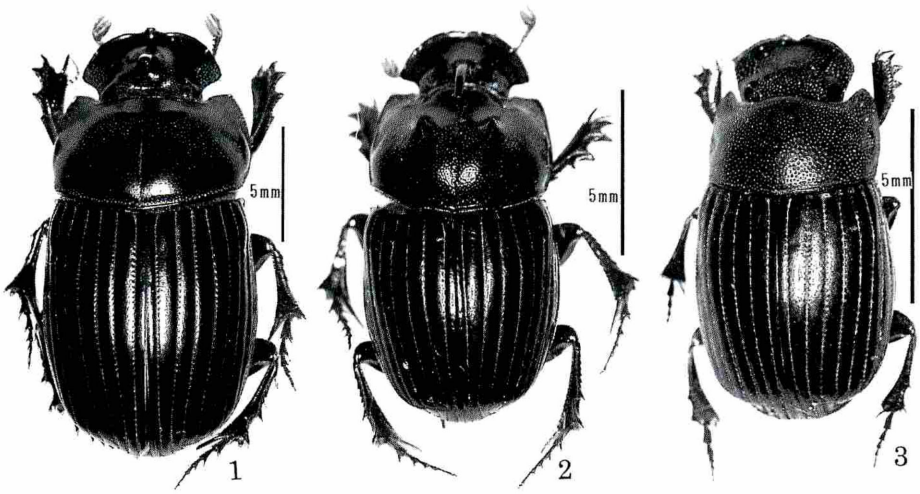
Pygidium weakly convex, shining, densely, coarsely, and a little transversely punctate. Metasternum with shield almost smooth and impunctate in the middle, sparsely and coarsely punctate in front and marginal portions. Meso- and metatibiae covered with transverse punctures, the punctures becoming smaller towards each base though distinct. Protibiae with four external teeth; the 1st and 2nd teeth contiguous.

Aedeagus rather elongate, about 4.0–4.3 mm (n=3) in total length. Phallobase about 2.1–2.3 mm (n=3) in length, 1.0 mm (n=3) in apical width. Parameres about 1.9–2.0 mm (n=3) in length; both dorsal lobes forming a short circle, the circle a little opened basad; dorsal membraneous areas narrow, not developed.

Female. Head with clypeal margin bidentate at the middle, the two teeth small and slightly reflexed. Pronotum with a slight but distinct depression behind anterior margin.

Type series. Holotype: ♂, Headquarter, 1500 m altitude, Mt. Kinabalu, Sabah State, Malaysia, 3. III. 1995, T. KIKUTA leg. Paratypes: 55 exs., Poring, Sabah State, Malaysia, 13. IV. 1995, T. KIKUTA leg.; 9 exs, ditto, 17. V. 1995; 4 exs., ditto, 700 m alt., 16. V. 1995; 44 exs., Headquarter, Kinabalu Park, Sabah State, Malaysia, 3. IV. 1995, T. KIKUTA leg.; 1 ex., ditto, 6. IV. 1995; 6 exs., ditto, 2. V. 1995; 11 exs., ditto, 28. II. 1995: 10 exs., ditto, 3. III. 1995; 51 exs., ditto, 12. X. 1997; 21 exs., Tahubang, Sabah State, 19. IV. 1995, T. KIKUTA leg.; 32 exs., ditto, 20. IV. 1995; 10 exs., ditto, 24. II. 1995; 2 exs., ditto, 24. I. 1995; 115 exs., Sayap, nr. Kinabalu, Sabah State, Malaysia, 25. III. 1995, T. KIKUTA leg.; 10 exs., ditto, 12. V. 1995; 2 exs., ditto, 12. V. 1995.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.



Figs. 1–3. 1, *Copris* (*Copris*) *poggii* sp. nov., male, habitus, dorsal view; 2, *C.* (*C.*) *gibbulus borneensis* subsp. nov., male, habitus, dorsal view; 3, *Microcopris fujiokai poringensis* subsp. nov., male, habitus, dorsal view.

Distribution. Sabah State, Malaysia (Northern Borneo).

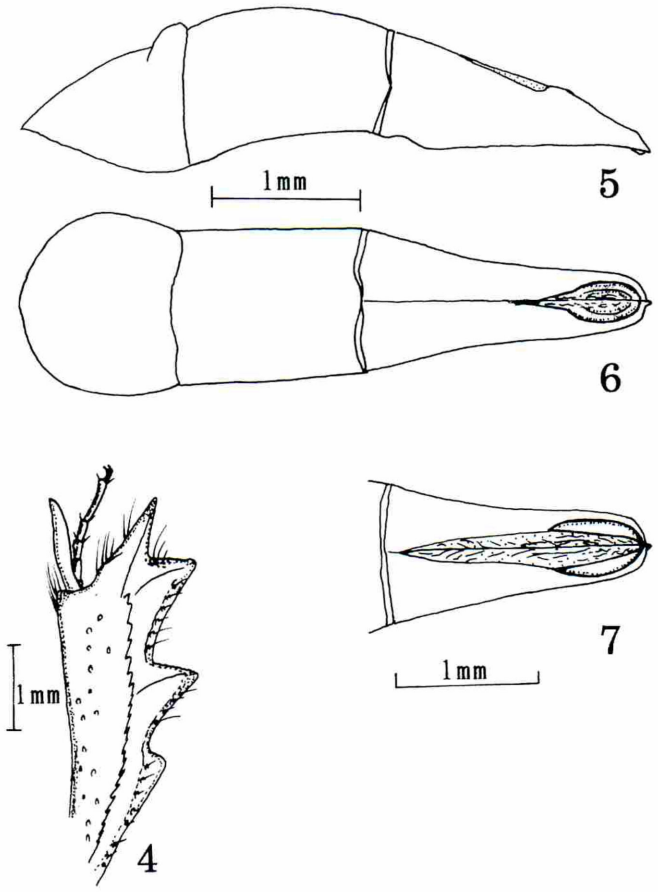
Etymology. This species is named in honor of Dr. Roberto POGGI, Museo Civico di Storia Naturale di Genova (Giacomo Doria), who has been giving the first author invaluable help for his researches.

Notes. The present new species is closely related to *Copris* (*Copris*) *agnus* SHARP, from Malay Peninsula and Borneo, but can be distinguished from the latter by the following characteristics: 1) pronotum declivous in front, with a distinct depression at the middle of the declivity in both sexes, whereas in *C. agnus*, it is simple without a distinct depression in front; 2) meso- and metatibiae with each ventral side clearly punctate near basal part, whereas in *C. agnus*, they are almost impunctate near basal part; 3) in the male, head with clypeal margin bearing a short upturned process instead of being a pair of strongly reflexed teeth at the middle of clypeal margin; 4) in the male, head with cephalic horn short but clearly curved backwards, whereas in *C. agnus*, it is very short, conical, and vertical; 5) in the male genitalia, the parameres with both dorsal lobes forming a short circle, and dorsal membraneous areas are very short and narrow, whereas in *C. agnus*, the parameres with the dorsal lobes form an elongate circle and the dorsal membraneous areas are long and wide (cf. Fig. 7).

Copris* (*Copris*) *gibbulus borneensis subsp. nov.

(Fig. 2)

The present new subspecies differs from the nominotypical one from Borneo as follows: 1) body larger (11.0–14.0 mm), whereas in the nominotypical subspecies, the body length is a little smaller (9.0–12.0 mm); 2) head with clypeus distinctly punctate on the posterior portion,



Figs. 4–7. *Copris* (*Copris*) spp. — 4, *C.* (*C.*) *poggii* sp. nov., male, right protibia; 5, aedeagus, lateral view; 6, aedeagus, dorsal view. — 7, *C.* (*C.*) *agnus* SHARP, parameres, dorsal view.

whereas in the nominotypical subspecies, it is almost impunctate or provided with ill-defined small punctures; 3) pronotum with anterior angle less produced forwards, with corner rounded in small male and female, whereas in the nominotypical subspecies, the anterior angle of pronotum is more strongly produced forwards with the corner distinctly sharp in small male and female; 4) elytra with intervals distinctly convex and very finely punctate to almost impunctate instead of being weakly convex and finely punctate; 5) elytra with striae clearly wider.

Length: 11.0–14.4 mm; width: 5.1–7.2 mm (n=6).

Type series. Holotype. ♂, Keningau, Sabah State, Malaysia, V. 1997. Paratypes: 2♀♀, the same data as the holotype; 1♀, Crocker Range, Sabah State, Malaysia, 12. VI. 1994; 2♂♂, Mt. Bawang, Kalimantan, Indonesia, VII. 1991.

Type depository. The holotype is at present preserved in the collection of the National Science Museum (Natural History), Tokyo.

Distribution. Sabah State, Malaysia; West Kalimantan, Indonesia (Northern and Western

Borneo).

Etymology. The subspecies is named after Borneo.

Microcopris fujiokai poringensis subsp. nov.

(Fig. 3)

The present new subspecies differs from the nominotypical one from Kalimantan, Indonesia, West Borneo as follows: 1) body size clearly larger (9.5–11.2 mm), whereas in the nominotypical subspecies, the body is relatively smaller (7.7–9.9 mm); 2) elytra with interval mostly opaque, rarely a little lustrous, and distinctly micro-granulose to micro-reticulate instead of being strongly shining; 2) body more distinctly suffused with purplish luster, especially on elytra, whereas in the nominotypical subspecies, the body is usually suffused with slight purplish luster on head and pronotum, without metallic luster on elytra; 3) head with median tubercle on frons stronger; 4) head and pronotum less coarsely and more sparsely punctate.

Length: 9.5–11.2 mm; width: 5.0–5.9 mm (n=14).

Type series. Holotype: ♂, Poring, 1200 m alt., Sabah State, Malaysia, 13. IV. 1995, T. KIKUTA leg. Paratypes: 8 exs., the same data as the holotype; 9 exs., 16. I. 1997, the same locality as the holotype.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.

Distribution. Sabah State, Malaysia (Northern Borneo).

Etymology. The subspecies is named after a place name, Poring, Sabah State.

Acknowledgments

We wish to express our cordial thanks to Mr. T. KIKUTA for giving us the opportunities of examining invaluable specimens. This study was supported in part by a Grant-in-Aid from the Japan Society for the Promotion of Science (No. 14405013).

要　　約

越智 輝雄・近　雅博：東南アジア産コガネムシ科甲虫（第6報）―ボルネオ産ダイコクコガネ族の3新種―．――― ボルネオ産コガネムシ科甲虫として，ダイコクコガネ属の1新種 *Copris* (*Copris*) *poggii* sp. nov. と，同属の種 *C.* (*C.*) *gibbulus* LANSBERGE の1新亜種 *C.* (*C.*) *gibbulus borneensis* subsp. nov. およびマメダイコクコガネ属の種 *Microcopris fujiokai* OCHI et KON の1新亜種 *M. fujiokai poringensis* subsp. nov. をボルネオ北部から記載した．

References

BALTHASAR, V., 1963. Monographie der Scarabaeidae und Aphodiidae der palaearktischen und orientalische Region, **1**: 1–391. Prag.

BOUCOMONT, A., 1914. Les Coprophages de l'Archipel Malais. Annales de la Societe. *Entomologique de France*, **83**: 238–350.

LANSBERGE, J. W. v., 1886. Les Coprides de la Malaisie. *Tijdschrift voor Entomologie,* **29**: 1–25.

OCHI, T. and M. KON, 1994. Dung beetles (Coleoptera, Scarabaeoidea) collected from Sabah, Borneo (1). *Elytra, Tokyo*, **22**: 281–298.

——— and ——— , 1996. Studies on the coprophagous scarab beetles from East Asia. IV (Coleoptera, Scarabaeidae). *Giornale italiano di Entomologia*, **8**: 17–28.

SHARP, D., 1875. IV. Description of some new genera and species of Scarabaeidae from tropical Asia and Malaysia, Part I. *Coleopterologische Hefte*, **13**: 33–54.

(Received March 18, 2005; Accepted April 11, 2005)

Ent. Rev. Japan, **60** (1): 75–82, April 30, 2005

Notes on the Coprophagous Scarab-beetles (Coleoptera: Scarabaeidae) from Southeast Asia (VII)

— Three New Species of *Onthophagus* (*Phanaeomorphus*) from Borneo —

Teruo OCHI

Kohudai 5–21–6, Toyono-chô, Toyono-gun, Osaka, 563–0104 Japan

and

Masahiro KON

School of Environmental Science, The University of Shiga Prefecture,
Hassaka-chô 2500, Hikone, Shiga, 522–8533 Japan

Abstract Three new species of the genus *Onthophagus* (*Phanaeomorphus*) are described from Borneo under the names of *O.* (*P.*) *quasijohkii* sp. nov., *O.* (*P.*) *maryatiae* sp. nov. and *O.* (*P.*) *quasitagal* sp. nov.

IN 1935, BALTHASAR erected the subgenus *Phanaeomorphus* in the genus *Onthophagus* LATREILLE based on a Chinese species, *Onthophagus* (*Phanaeomorphus*) *sycophanta* FAIRMAIRE. As far as we are aware, ten or so species are known from Asia. From Borneo, we recorded two species belonging to this subgenus, *O.* (*P.*) *bangueyensis* BOUCOMONT and *O.* (*P.*) *johkii* OCHI et KON in 1994.

When we examined *Onthophagus* specimens collected by T. KIKUTA from Mt. Kinabalu, we found three undescribed species of the subgenus *Phanaeomorphus* among them. Thus, we describe three new species of *Phanaeomorphus* from Borneo.

Onthophagus (*Phanaeomorphus*) *quasijohkii* sp. nov.

(Figs. 1, 4–6)

Length: 6.6–8.8 mm; width: 3.5–4.2 mm (n=388).

Body small-sized, rather elongate-oval, strongly convex; dorsal side mat, a little densely clothed with short suberect yellowish-white hairs, except for glabrous head. Color blackish-brown to grayish-black, with a weak greenish tinge; mouth organs, palpi, antennal foot-stalks, and legs somewhat reddish; club segments of antenna dark yellowish-brown.

Male. Head almost simple, polygonal in outline; clypeus strongly produced forwards as a reflexed rounded subtriangular lobe at the middle, the lobe about 0.5 mm in length in large males; in small males, the lobe reduced to a blunt small tooth; clypeo-frontal suture completely effaced, clypeo-genal suture fine and not carinate though barely perceptible; genae produced lat-

erad, with genal corner obtusely angulate at the middle; vertex slightly raised at the middle in the posterior most part; surface micro-granulose except for a little shining clypeus, and closely covered with coarse punctures, the punctures uneven and weakly wrinkled at clypeus, and changing into more crowded annular ones towards vertex.

Pronotum strongly convex, about 1.30–1.37 times as wide as long (n=5), with an obsolete longitudinal impression along midline in basal half; anterior margin weakly bisinuate, distinctly bordered; lateral margins gently rounded in front, very weakly sinuate behind, finely bordered; anterior angles strongly produced forwards, with apices slightly expanded outwards; posterior angles obtuse; basal margin gently rounded, or very obtusely angulate at the middle, finely bordered; disc declivous towards both anterior angles in front, leaving the posterior part triangularly elevated; upper edge of the declivity sharply carinate on both sides, the carina becoming gradually obsolete towards the median angle, which is very blunt; in small males, the triangular part of disc almost reduced; surface distinctly micro-granulose, and densely covered with rather coarse ocellate shallow punctures, the punctures becoming denser and larger towards sides and base.

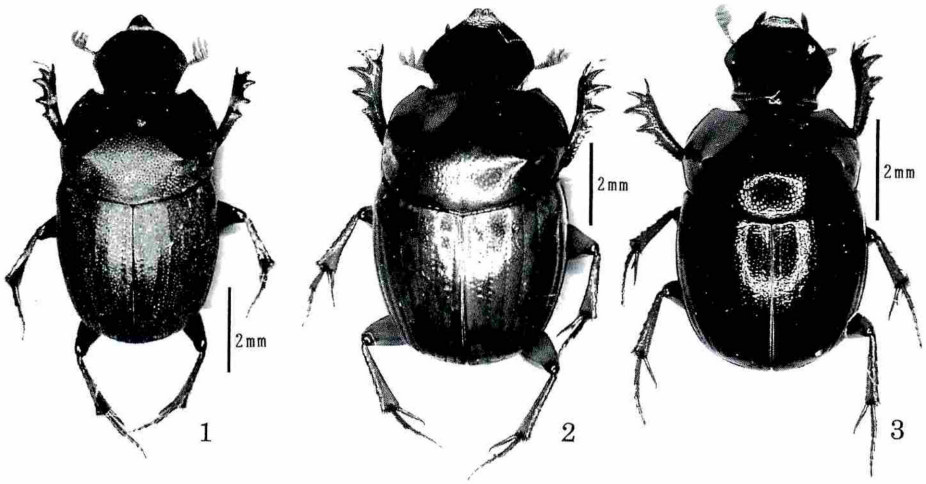
Elytra about 1.13–1.21 times as wide as long (n=3), with eight striae including one along epipleural margin; each stria rather widely, a little shallowly, and strongly impressed, with fine ridge on both sides throughout, also becoming fairly deep at the 5th to 8th striae; 7th not distinctly curved; strial punctures obviously transverse, with clearly notching intervals; each puncture separated into two round bottoms; intervals almost flat, strongly micro-granulose, and somewhat sparsely covered with small granules or asperate-punctures.

Pygidium well convex, carinate at base, weakly micro-granulose, densely covered with coarse ocellate round punctures. Meso- and metatibiae a little densely covered with transverse coarse punctures throughout on each ventral side. Protibiae rather elongate, with four external teeth; 1st and 2nd teeth contiguous, 3rd a little separated from the 2nd; terminal spur finger-like, slightly decurved, pointed apically.

Aedeagus clearly larger than those in the related species. Phallobase about 1.5–1.6 mm in length (n=3), about 0.7 mm in apical width (n=3). Parameres about 0.7–0.8 mm in length, with apices a little expanded and toothed outwards in dorsal view.

Female. Head widely emarginated in the middle, with the median portion strongly produced as a reflexed short process, the process forked into two sharp apices distally; surface more densely punctate than in male. Pronotum also declivous towards both anterior angles, though the upper edge of the declivity more obtuse and not sharply carinate on both sides; surface more densely and coarsely punctate than in male.

Type series. Holotype: ♂, Headquarter, Kinabalu Park, Sabah State, Malaysia, 12. II. 1995, T. KIKUTA leg. Allotype: ♀, the same data as for the holotype. Paratypes: 15 exs., the sama data as for the holotype; 10 exs., ditto, X. 1994, T. KIKUTA leg.; 27 exs., ditto, 2. II. 1995; 10 exs., ditto, III. 1995. T. KIKUTA leg.; 18 exs., ditto, 3. IV. 1995; 4 exs., ditto, 28. II. 1995; 11 exs., ditto, 3. III. 1995; 30 exs., ditto, 4. III. 1995; 4 exs., ditto, 1. V. 1995; 1 ex., Liwagu, Sabah State, Malaysia, X. 1994, T. KIKUTA leg.; 1 ex., ditto, VI. 1995, T. KIKUTA leg.; 2 exs., ditto, 4. VI. 1995; 1 ex., ditto, 6. IV. 1995; 1 ex., 9. IV. 1995; 78 exs., Tahubang, Sabah State, Malaysia, 24. I. 1995, T. KIKUTA leg.; 37 exs., ditto, 20. IV. 1995; 2 exs., ditto, 19. IV. 1995; 18 exs., ditto, 19. IV. 1995; 93 exs., Sayap, nr. Kinabalu, Sabah State, Malaysia, 12. V. 1995, T. KIKUTA leg.; 8 exs., ditto, 25. III. 1995; 7 exs., ditto, 8. XI. 1995; 6 exs., ditto, 11. V. 1995; 1 ex., Poring, Sabah State, Malaysia, 13. IV. 1995, T. KIKUTA leg.; 1 ex., ditto, 17. V. 1995.



Figs. 1–3. *Onthophagus* (*Phanaeomorphus*) spp., male, habitus, dorsal views. — 1, *O.* (*P.*) *quasijohkii* sp. nov.; 2, *O.* (*P.*) *maryatiae* sp. nov.; 3, *O.* (*P.*) *quasitagal* sp. nov.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.

Distribution. Sabah State, Malaysia (Northern Borneo).

Etymology. The specific name means that the present new species is similar to *Onthophagus* (*Phanaeomorphus*) *johkii* OCHI et KON.

Notes. The present new species is closely related to *Onthophagus johkii* OCHI et KON from Borneo, but can be distinguished from the latter by the following characteristics: 1) punctures on basal portion of pronotum coarser and clearly shallower, whereas in *O. johkii*, they are fairly coarse and rather deep; 2) meso- and metatibiae with each ventral side densely covered with transverses coarse punctures throughout, whereas in *O. johkii*, it is sparsely punctate on basal half, not dense throughout; 3) elytra with stria rather wide instead of being clearly wide; 4) in the male, frons entirely flat, whereas in *O. johkii*, it is obtusely and transversely raised; 5) in the female, head with the median process forked into two sharp apices distally; 6) male genitalia larger and different in shape.

Onthophagus* (*Phanaeomorphus*) *maryatiae sp. nov.

(Figs. 2, 7)

Length: 7.7–9.0 mm; width: 4.1–5.0 mm (n=4).

Body a little larger in size, oval, strongly convex; dorsal side shining, almost glabrous; ventral side also shining, partly clothed with reddish-brown hairs. Color uniformly black to reddish-brown; mouth organs, palpi, legs more or less reddish; antennae reddish-brown with club segments dark yellowish-brown.

Male. Head subpentagonal; clypeus strongly and sub-triangularly produced forwards, with

apex upturned as a small and obtusely bidentate lobe at the middle; genae strongly protrudent laterad, with genal corner rounded; clypeal suture clearly and straightly carinate at frontal section, not carinate at genal sections; vertex with a short transverse carina at the middle in the posteriormost part; surface shining in front, weakly micro-granulose behind, densely, coarsely, and a little vaguely punctate except for clypeus where the punctures are becoming finer, sparser, and transversely wrinkled.

Pronotum strongly convex, about 1.34–1.39 times as wide as long (n=3), with an obsolete longitudinal impression along midline in basal third; anterior margin bisinuate, rather thickly bordered; lateral margins strongly rounded at the middle, sinuate behind, thinly bordered; anterior angles strongly projected anteriad, subrectangular, with corner rounded and a little expanded outward; posterior angles obtuse; basal margin obtusely angulate in the middle, finely bordered; disc declivous towards both anterior angles in front, leaving the posterior part widely and triangularly elevated; the upper edge of the declivity briefly carinate on both sides, the carina gradually becoming obsolete towards the obtuse median angle; surface distinctly shining on triangular posterior portion, weakly micro-granulose at anterior declivities, and regularly with sparse fine punctures intermixed with rather sparse, coarse, and annular ones, and both punctures becoming denser and larger at the declivities.

Elytra about 1.28–1.39 times as wide as long (n=3), strongly convex, with eight striae including one along epipleural margin; each stria rather finely, shallowly impressed, with fine ridge on both sides throughout; strial punctures obviously transverse, with slightly notching intervals; each puncture separated into two bottoms; 7th stria almost parallel to 6th; intervals weakly convex, slightly micro-granulose though shining, rather sparsely covered with ill-defined small punctures.

Pygidium slightly convex near apex, carinate at base, very uneven, weakly micro-granulose, sparsely covered with a little transverse ocellate punctures. Meso- and metatibiae shining, smooth, very sparsely and finely punctate on each ventral side, with a few coarse and scattered punctures. Protibiae rather elongate, with four external sharp teeth; terminal spur ordinarily sharp, well decurved.

Aedeagus rather small. Phallobase about 1.2 mm in length (n=1), about 0.6 mm in apical width (n=1). Parameres about 0.7 mm (n=1), each with ventral tooth near apex from lateral view; from dorsal view, each apical portion a little expanded outwards.

Female. Head with clypeus less produced forwards and less reflexed; front-clypeal suture gently and evenly curved; clypeus more weakly rugose. Pronotum with triangular part of disc a little obtusely ridged in front. Elytra less lustrous. Protibiae with four external teeth stronger.

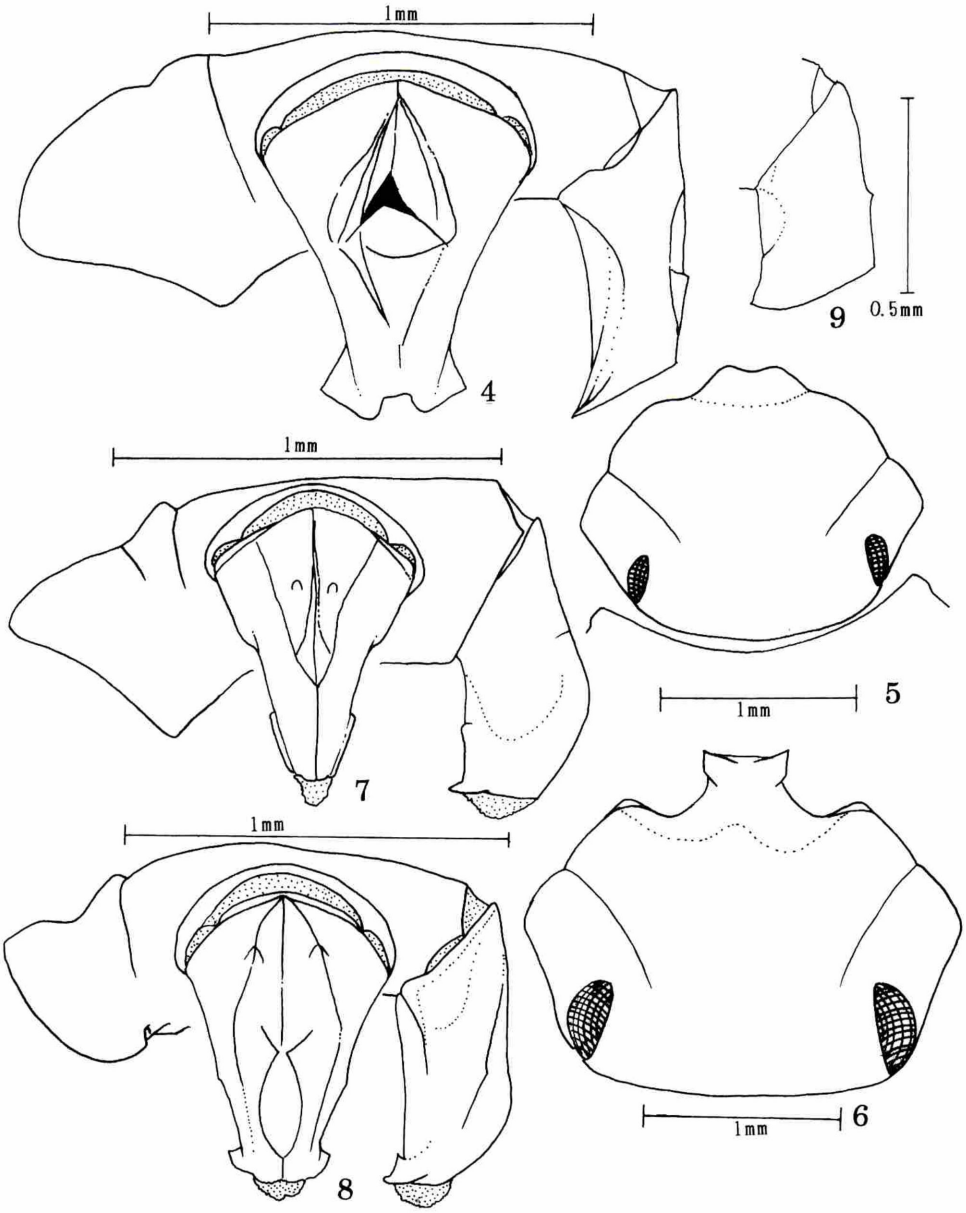
Type series. Holotype: ♂, Headquarter (Liwagu), 1450 m, Kinabalu Park, Sabah State, Malaysia, X. 1994, T. KIKUTA leg. Paratypes: 1 ♂, the same data as the holotype; 1 ♂, ditto, 2. III. 1995, T. KIKUTA leg.; 1 ♀, ditto, 29. X. 1998.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.

Etymology. This species is named in honor of Prof. Maryati MOHAMED, University Malaysia Sabah, who has been giving us invaluable help for our researches in Sabah.

Distribution. Sabah State, Malaysia (Northern Borneo).

Notes. The present new species is closely related to *Onthophagus* (*Phanaeomorphus*) *tagal* BOUCOMONT from the Philippines, but can be distinguished from the latter by the following characteristics: 1) body distinctly larger; 2) pronotum with lateral margins not strongly



Figs. 4–9. *Onthophagus* (*Phanaeomorphus*) spp. — 4, *O.* (*P.*) *quasijohkii* sp. nov., aedeagus, dorsal and lateral views; 5, male, head and anterior part of pronotum, dorsal view; 6, female, head, dorsal view. — 7, *O.* (*P.*) *maryatiae* sp. nov., aedeagus, dorsal and lateral views. — 8, *O.* (*P.*) *quasitagal* sp. nov., aedeagus, dorsal and lateral views. — 9, *O.* (*P.*) *tagal* BOUCOMONT, aedeagus, lateral view.

rounded in the middle, whereas in *O. tagal*, it is strongly rounded in the middle; 3) in the male, head with vertex slightly raised at the middle, whereas in *O. tagal*, it is strongly raised at the middle; 4) in the male, aedeagus clearly different in shape (cf. Fig. 9).

Onthophagus* (*Phanaeomorphus*) *quasitagal sp. nov.

(Figs. 3, 8)

Length: 5.4–7.9 mm; width: 3.1–4.3 mm (n=364).

Body moderate-sized, oval, strongly convex above; dorsal side fairly shining, entirely glabrous; ventral side also shining, partly clothed with reddish-brown hairs. Color uniformly black to reddish-brown, frequently with a slight purplish tinge on head; mouth organs, palpi, legs more or less reddish; antennae reddish-brown with club segments dark yellowish-brown.

Male. Head sub-pentagonal; clypeus strongly and subtriangularly produced anteriad, with apex reflexed as a small lobe at the middle, the lobe almost truncated distally in large males; in small males, the lobe reduced to short bidentate teeth; genae strongly protrudent laterad, with genal corner obtusely angulate; clypeal suture with frontal section completely effaced, genal section not carinate; vertex with a short transverse carina at the middle in the posteriormost part, the carina not strongly raised; surface shining, fairly densely and strongly punctate, the punctures becoming more and transversely wrinkled.

Pronotum strongly convex, about 1.40–1.50 times as wide as long (n=5); median longitudinal impression not distinct; anterior margin bisinuate, rather thickly bordered; lateral margins strongly rounded at the middle, almost straight in front, sinuate behind, and thinly bordered; anterior angles strongly produced forwards, sub-rectangular, with corner rounded and a little expanded outwards; posterior angles obtuse; basal margin obtusely angulate in the middle, thinly bordered; disc declivous towards both anterior angles in front, leaving the posterior part more widely and triangularly elevated than in the proceeding species, though the upper edge of the declivities more obtusely carinate; median angle of the triangular disc very obtuse; in smaller males, the triangular disc becoming almost simple; surface very shining on triangular posterior portion, weakly micro-granulose at anterior declivities, rather sparsely covered with shallow annular punctures, the interspaces between punctures bearing fine and sparse punctures, both punctures becoming denser and stronger towards sides.

Elytra strongly convex, about 1.21–1.36 times as wide as long (n=5); disc with eight striae including one along epipleural margin; each stria rather shallowly impressed with fine ridge on both sides throughout; strial punctures a little transverse, with slightly notching intervals; each puncture separated into tow round buttoms; 7th stria almost parallel to the 6th; intervals almost flat, shining, rather sparsely covered with small punctures.

Pygidium gently convex near apex, carinate at base, a little uneven, shining, moderately densely covered with transverse ocellate punctures. Meso- and metatibiae with each ventral side shining smooth, sparsely and finely punctate. Protibiae elongate, with four external sharp teeth; terminal spur ordinarily sharp, well decurved.

Aedeagus rather slender. Phallobase about 1.1–1.5 mm in length (n=3), about 0.5–0.7 mm in apical width (n=3). Parameres about 0.7–0.8 mm (n=1), each with ventral small sharp tooth near apex from lateral view; from dorsal view, each apex distinctly produced outwards.

Female. Head with clypeal margin rather broadly truncated or slightly emarginated at the

middle. Pronotum very weakly declivous towards both anterior angles, the triangular disc barely perceptible. Protibiae with four external teeth stronger; terminal spur more sharply pointed.

Type series. Holotype: ♂, Sayap, nr. Kinabalu, Sabah State, Malaysia, 8. XI. 1994, T. KIKUTA leg. Paratypes: 2 exs., Poring, Sabah State, Malaysia, 13. IV. 1995, T. KIKUTA leg.; 52 exs., Headquarter, Kinabalu Park, Sabah State, Malaysia, X. 1994, T. KIKUTA leg.; 32 exs., ditto, 2. II. 1995; 19 exs., ditto, 12. II. 1995; 1 ex., ditto, III. 1995, T. KIKUTA leg.; 27 exs., ditto, 3. IV. 1995; 4 exs., ditto, 2. V. 1995; 11 exs., ditto, 2. III. 1995; 7 exs., ditto, 4. III. 1995; 92 exs., Liwagu, Sabah State, Malaysia, X. 1994, T. KIKUTA leg.; 1 ex., ditto, VI. 1995; 2 exs., ditto, 4. VI. 1995; 4 exs., Tahubang, Sabah State, Malaysia, 20. IV. 1995, T. KIKUTA leg.; 4 exs., ditto, 19. IV. 1995; 10 exs., ditto, 24. I. 1995; 17 exs., Sayap, nr. Kinabalu, Sabah State, Malaysia, 12. V. 1995, T. KIKUTA leg.; 7 exs., ditto, 25. III. 1995; 8 exs., ditto, 7. XI. 1995; 29 exs., ditto, 8. XI. 1995; 3 exs., ditto, 11. V. 1995.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.

Distribution. Sabah State, Malaysia (Northern Borneo).

Etymology. The specific name means that the present new species is similar to *Onthophagus* (*Phanaeomorphus*) *tagal* BOUCOMONT.

Notes. The present new species is closely related to *Onthophagus* (*Phanaeomorphus*) *tagal* BOUCOMONT from the Philippines, but can be distinguished from the latter by the following characteristics: 1) body distinctly larger; 2) head without a transverse carina on frons in both sexes, whereas in *O. tagal*, head with a distinct transverse carina on frons in the small male and female; 3) head with vertex transversely and rather weakly raised at the middle, whereas in *O. tagal* it is strongly raised at the middle; 4) in the male, aedeagus clearly different in shape (cf. Fig. 9).

Acknowledgments

We wish to express our cordial thanks to Mr. T. KIKUTA for giving us the opportunities of examining invaluable specimens. This study was supported in part by a Grant-in-Aid from the Japan Society for the Promotion of Science (No. 14405013).

要　　約

越智 輝雄・近　雅博：東南アジア産コガネムシ科甲虫（第７報）―ボルネオ産エンマコガネ属の３新種―．――― ボルネオ産コガネムシ科甲虫として，エンマコガネ属の１亜属，*Phanaeomorphus*亜属の３新種，*Onthophagus* (*Phanaeomorphus*) *quasijohkii* sp. nov.，*O.* (*P.*) *maryatiae* sp. nov.，*O.* (*P.*) *quasitagal* sp. nov. を記載した．

References

BALTHASAR, V., 1935. *Onthophagus*-Arten Chinas, Japans, und der angrenzenden Länder. *Folia Zoologica et Hydrobiologica,* **8**: 303–353.

――― , 1963. Monographie der Scarabaeidae und Aphodiidae der palaearktischen und orientalische Region, **2**: 1–628. Prag.

BOUCOMONT, A., 1914. Les Coprophages de l'Archipel Malais. *Annales de la Societe Entomologique de France,* **83**: 238–350.

BOUCOMONT, A., 1914. *Onthophagus* asiatiques nouveaux ou peu connus. *Annali Museo Civico di Genova*, **46**: 210–243.

——— , 1924. Les *Onthophagus* (Coleoptera, Scarabaeidae) des Iles Philippines. *Philippine Journal of Science,* **24**: 669–681.

OCHI, T. and M. KON, 1994. Dung beetles (Coleoptera, Scarabaeoidea) collected from Sabah, Borneo (1). *Elytra, Tokyo*, **22**: 281–298.

(Received March 18, 2005; Accepted April 11, 2005)

Ent. Rev. Japan, **60** (1): 83–98, April 30, 2005

Notes on the Coprophagous Scarab-beetles (Coleoptera: Scarabaeidae) from Southeast Asia (VIII) — Six New Species of *Onthophagus* (*Parascatonomus*) and a New Subspecies of *O.* (*P.*) *katoi* from Borneo —

Teruo OCHI

Kohudai 5–21–6, Toyono-chô, Toyono-gun, Osaka, 563–0104 Japan

and

Masahiro KON

School of Environmental Science, The University of Shiga Prefecture,
Hassaka-chô 2500, Hikone, Shiga, 522–8533 Japan

Abstract Six new species of *Onthophagus* (*Parascatonomus*) are described from Borneo under the names of *O.* (*P.*) *riekoae* sp. nov., *O.* (*P.*) *liewi* sp. nov., *O.* (*P.*) *kikutai* sp. nov., *O.* (*P.*) *anitidus* sp. nov., *O.* (*P.*) *sayapensis* sp. nov., and *O.* (*P.*) *gunsalami* sp. nov. In addition, a new subspecies of *O.* (*P.*) *katoi* is also described from Borneo under the name of *O.* (*P.*) *katoi poringensis* subsp. nov.

PAULIAN (1932) originally described *Parascatonomus* as a genus in the tribe Onthophagini AFTERWARD, and he (1945) placed it as a subgenus of the genus *Onthophagus* LATREILLE. Later, OCHI and ARAYA (1992) revised the definition of this subgenus. According to their definition, KON *et al.* (2000) recorded 12 species of *Parascatonomus* from Borneo.

When we examined Bornean specimens of *Parascatonomus* in our hands, we found six undescribed species among them. In addition, we found that the Bornean specimens that had previously been identified with *O.* (*P.*) *pilularius* LANSBERGE were distinct from the topotype of *O.* (*P.*) *pilularius* from Java. After a close examination, this Bornean form was identified with *O.* (*P.*) *katoi* OCHI et ARAYA, although it is slightly different from the holotype of *O.* (*P.*) *katoi* from the Philippines. Thus, we describe six new species of *Parascatonomus* and a new subspecies of *O.* (*P.*) *katoi* from Borneo.

Onthophagus (*Parascatonomus*) *riekoae* sp. nov.

(Fig. 1)

Length: 13.2 mm; width: 6.3 mm (n=1).

Female. Body large-sized, rather depressed dorsally, and shallowly constricted between pronotum and elytra; dorsal surface shining, sparsely clothed with short yellowish hairs; ventral surface also shining, clothed with similar hairs as those on dorsum. Color almost black, partly with slight purplish luster, especially on pygidium and abdominal sternites.

Head subpentagonal; clypeus a little produced forwards, with anterior margin parabolic in outline, slightly reflexed at the middle; clypeo-frontal suture completely effaced though obtusely raised at the middle; genae well produced laterad, with genal angle a little wider than a right angle; vertex with a well curved transverse obtuse carina whose both sides are strongly raised, and with a round shallow concavity in front of the carina at the middle; surface transversely rugose in apical half, the rugosities changed into round granules in basal half. Antennae short and compact; scape fairly short, invisible from dorsal aspect; the 1st segment large, a little longer than *O. discedens*, enclosing basal portion of the 2nd; 4th to 6th closely joined, not strongly broadened distally as in *O. discedens*; antennal club small.

Pronotum somewhat convex though a little depressed dorsally, about 1.4 times as wide as long (n=1), with a slight impression in basal two-thirds along midline; anterior margin emarginated, finely bordered; lateral margins gently and evenly rounded in front, not distinctly sinuate behind, finely bordered throughout; anterior angle rounded though well protrudent forwards; posterior angle rounded; base very obtusely angulate and slightly raised at the middle, not distinctly bordered; disc declivous in anterior third, with the declivity weakly and obtusely raised along midline and a little depressed laterally; surface shining, evenly and rather sparsely covered with shallow setiferous punctures, the punctures small at the middle, and changing into a round granules anteriorly and towards sides.

Elytra rather elongate and a little depressed dorsally, about 1.2 times as wide as long (n=1), with eight striae including one along epipleural margin; each stria distinctly impressed though a little shallow, clearly wider than in *O. discedens*; 7th stria clearly curved near base; intervals flat, shining, evenly and somewhat sparsely covered with small setiferous punctures.

Pygidium carinate at base, densely and strongly punctate. Prosternum with anterior angle broadly and not so deeply excavated on the ventral side. Metasternum with antero-median portion very slightly raised and briefly keeled along midline a little behind the elevation. Protibiae clearly broad and short, with four lateral blunt teeth; 4th tooth very obtuse. Meso- and metatarsi with 2nd to 5th segments clearly short.

Male. Unknown.

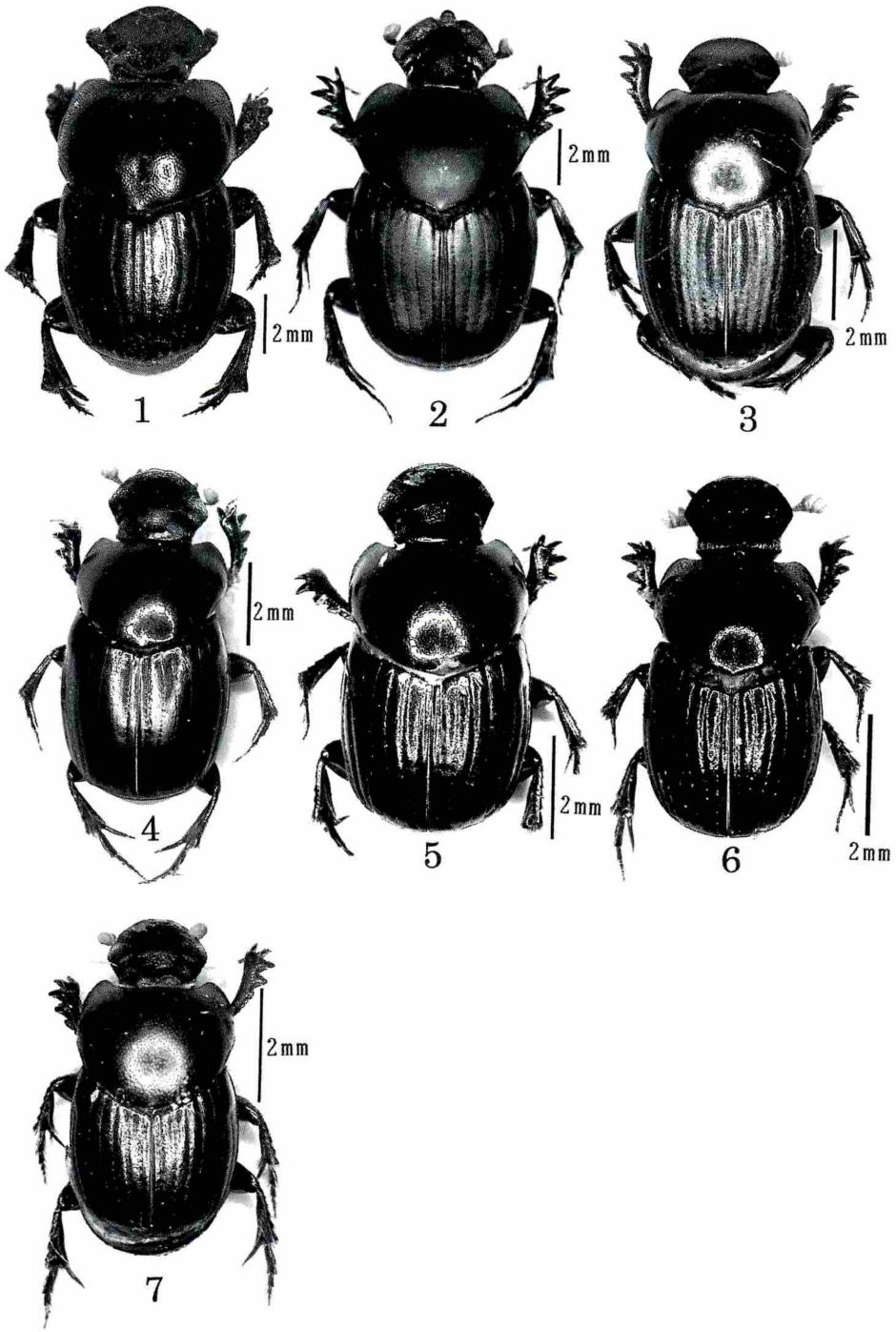
Type specimen. Holotype: ♀, Mt. Bawang, W. Kalimantan, VIII. 1993, N. NISHIKAWA leg.

Type depository. The holotype is preserved in the Osaka Museum of Natural History.

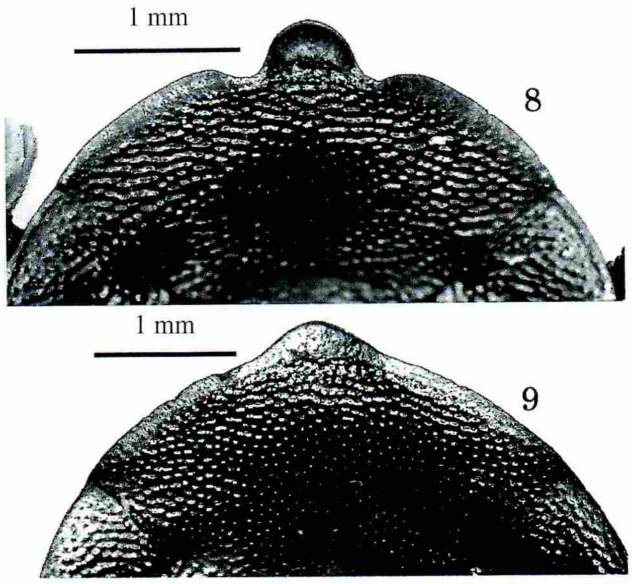
Distribution. West Kalimantan, Indonesia (Southwestern Borneo).

Etymology. This species is named in honor of Professor Rieko MURAMOTO.

Notes. The present new species is somewhat related to *Onthophagus discedens* SHARP from the Sunda Islands, but can be distinguished from the latter by the following characters; 1) head with anterior margin simple; 2) head with vertex strongly carinate instead of being simple; 3) pronotum with a declivity in front, whereas in *O. discedens*, it is entirely simple; 4) meso- and metatarsi clearly shorter.



Figs. 1–7. *Onthophagus* (*Parascatonomus*) spp., habitus, dorsal views. — 1, *O.* (*P.*) *riekoae* sp. nov., female; 2, *O.* (*P.*) *liewi* sp. nov., male; 3, *O.* (*P.*) *kikutai* sp. nov., male; 4, *O.* (*P.*) *anitidus* sp. nov., male; 5, *O.* (*P.*) *gunsalami* sp. nov., male; 6, *O.* (*P.*) *sayapensis* sp. nov., male; 7, *O.* (*P.*) *katoi poringensis* subsp. nov., male.



Figs. 8–9. *Onthophagus* (*Parascatonomus*) spp., male clypeal margin, dorsal views. — 8, *O.* (*P.*) *liewi* sp. nov.; 9, *O.* (*P.*) *sarawacus* HAROLD.

Onthophagus* (*Parascatonomus*) *liewi sp. nov.

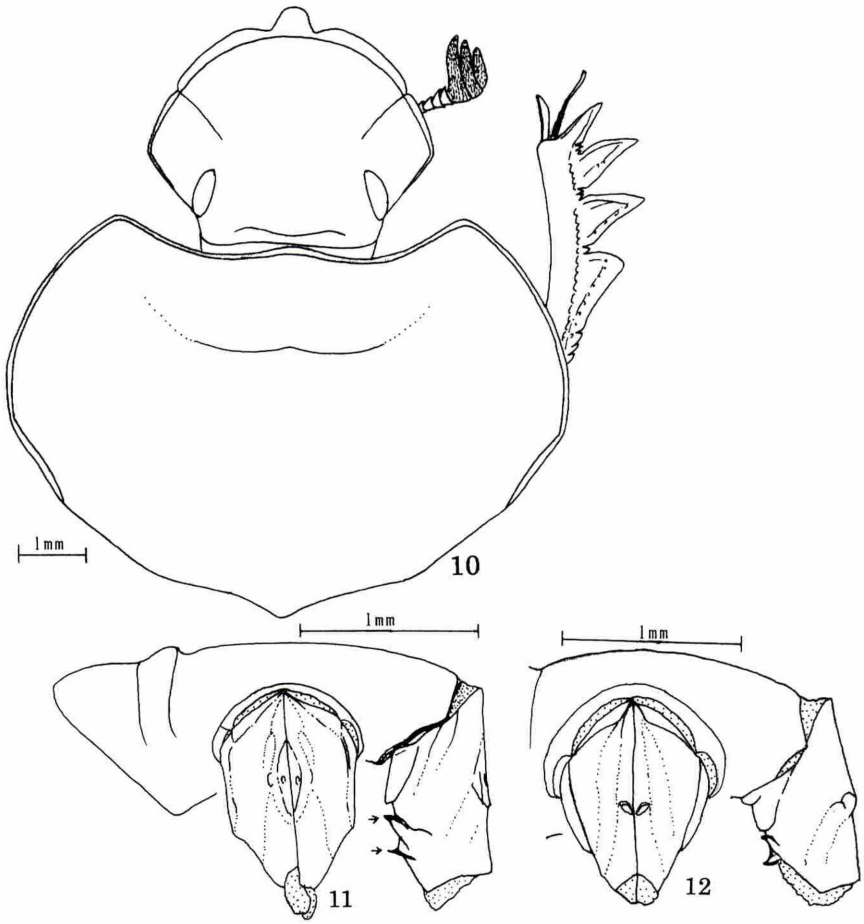
(Figs. 2, 8, 10–11)

Length: 10.4–14.4 mm; width: 6.2–8.4 mm (n=248).

Body large, oblong-oval, strongly convex; dorsal side mat, almost glabrous, with pronotum often bearing several semirecumbent long hairs on each side near base; ventral side slightly shining, partly and densely clothed with reddish hairs. Color black; mouth organs, palpi and legs more or less reddish; antennae reddish-brown with club segments yellowish-brown on apical half.

Male. Head about 1.23 to 1.29 times as wide as long (n=10); clypeus strongly produced forwards as a reflexed, slightly prolonged and rounded tooth in the middle, with basal sides of the tooth shallowly but clearly incised; clypeal margin except for the median tooth reflexed and broadly bordered; clypeo-frontal suture barely perceptible or almost effaced; genae well produced laterad, obtusely angulate at the middle; vertex with a transverse obtuse carina a little before posterior margin, which is only slightly postcurved, clearly raised; surface densely and transversely rugose and strongly punctate, the rugosities partly changing into granules. Antennae short and compact; scape short, invisible from dorsal aspect; club segments successively diminishing the size in breadth and length.

Pronotum strongly convex, about 1.40 to 1.50 times as wide as long (n=10), with an obsolete longitudinal impression along midline; anterior margin bisinuate for receiving the posterior



Figs. 10–12. *Onthophagus* (*Parascatonomus*) spp. — 10, *O.* (*P.*) *liewi* sp. nov., male, head and pronotum, dorsal view; 11, aedeagus, dorsal and lateral views. — 12, *O.* (*P.*) *sarawacus* HAROLD, aedeagus, dorsal and lateral views.

portion of head, finely bordered; lateral margins evenly and rather strongly rounded in front, sinuate behind, with distinct marginal line; basal margin slightly produced posteriad and angulate at the middle, with marginal line bordered at the middle and unbordered laterally; anterior angles bluntly subangulate; posterior angles obtuse; disc somewhat gently declivous in anterior third, with the declivity slightly depressed in major males; whereas in minor males, the declivity becoming smaller and indistinct; surface strongly micro-granulose, sparsely and finely punctate on disc, the punctures gradually changing into dense asperate ones or granules towards sides.

Elytra about 1.39 to 1.47 times as wide as long (n=10), with eight striae including one along epipleural margin; striae shallowly and finely impressed and ridged on both sides throughout; strial punctures sparse and very weak, without distinctly notching intervals; 7th stria almost parallel to the 6th; intervals nearly flat, clearly micro-granulose, sparsely and finely punctate, the punctures becoming coaser towards the outer intervals.

Pygidium carinate at base, weakly convex, micro-granulose, densely covered with transverse ocellate punctures. Prothorax with anterior angles shallowly hollowed on the ventral side. Metasternum subtriangularly elevated in front, and then gently sloping downwards, with the apex of the elevation produced anteriad and keeled along midline. Protibiae relatively slender, curved inwards, armed with four strong teeth; terminal spur spatulate and rather elongate.

Aedeagus elongate. Phallobase about 2.2 to 2.5 mm in length (n=10), about 1.0 to 1.1 mm in apical width (n=10). Parameres about 1.2 to 1.3 mm in length, each with two ventral teeth from lateral aspect.

Female. Head with the median clypeal tooth more elongate and the basal incisions of the tooth distinctly deeper; rugosities on clypeus stronger. Pronotum almost simple as in minor males. Protibiae broader, with stronger lateral teeth.

Type series. Holotype: ♂, Malaysia, Sabah State, Mt. Kinabalu, Sayap, 1200 m alt., 8. XI. 1994, T. KIKUTA leg. Paratypes: 34 exs., Poring, Sabah State, Malaysia, 13. IV. 1995, T. KIKUTA leg.; 39 exs., Tahubang, Sabah State, 19. IV. 1995, T. KIKUTA leg.; 6 exs., ditto, 20. IV. 1995; 65 exs., 24. II. 1995; 25 exs., ditto, 24. I. 1995; 61 exs., Sayap, Sabah State, Malaysia, 25. III. 1995, T. KIKUTA leg.; 5 exs., ditto, 11. VIII. 1995; 12 exs., ditto, 7. XI. 1995.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.

Distribution. Sabah State, Malaysia (Northern Borneo).

Etymology. This species is named in honor of Mr. Francis LIEW, Sabah Parks, who gave us invaluable help for our researches in the Kinabalu National Park.

Notes. The present new species is closely related to *Onthophagus sarawacus* HAROLD from Borneo, but can be distinguished from the latter by the following characters; 1) body more strongly mat on the dorsal side; 2) head with clypeal margin strongly produced as a strong tooth at the middle and clearly notched on both sides of the protrusion, whereas in *O. sarawacus* the clypeal margin is also produced as a strong tooth but clearly not notched on either side of the protrusion (cf. Fig. 9); 3) head with vertex strongly and widely carinate instead of being weakly and rather briefly carinate; 4) in large indivisuals, pronotum with a distinctly depressed declivity in front, whereas in *O. sarawacus*, it is almost simple or at most very slightly depressed; 5) in the male genitalia, parameres rather long, each with two ventral teeth larger (cf. Fig. 12).

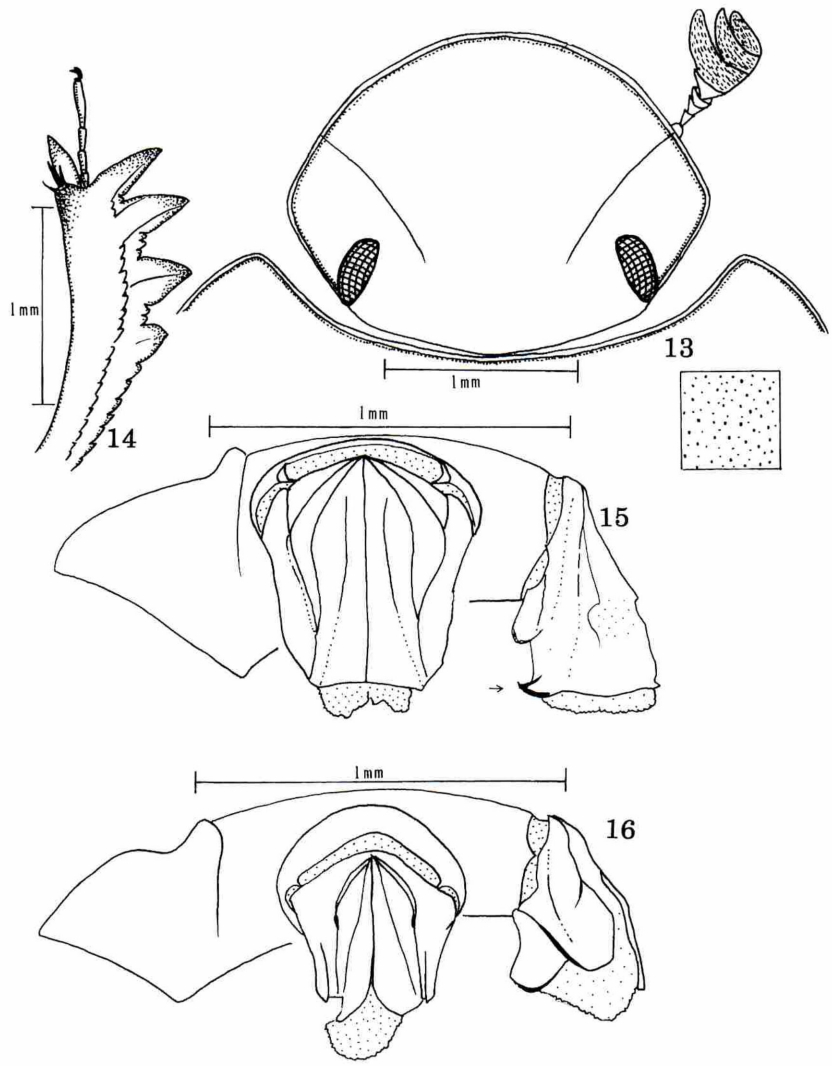
Onthophagus* (*Parascatonomus*) *kikutai sp. nov.

(Figs. 3, 13–15)

Length: 4.6–8.5 mm; width: 3.5–4.4 mm (n=4).

Male. Body small-sized, oblong-oval, strongly convex above, and deeply constricted between pronotum and elytra; dorsal side with head and pronotum shining and almost glabrous except for the slightly setiferous sides of the latter, elytra almost opaque, somewhat sparsely clothed with semi-recumbent short yellowish hairs; ventral side weakly shining, partly densely clothed with yellowish hairs. Color brownish-black; head and pronotum suffused with blight cupreous luster; elytra, pygidium, legs and ventral surface tinged with weak cupreous luster; mouth organs, palpi, antennal foot-stalks reddish-brown; antennae yellowish-brown.

Head simple, distinctly transverse; clypeal margin rounded and weakly reflexed though slightly truncated at the middle; clypeo-frontal suture completely effaced; genal suture fine, not



Figs. 13–16. *Onthophagus* (*Parascatonomus*) spp. — 13, *O.* (*P.*) *kikutai* sp. nov., male, head and anterior part of pronotum, dorsal view; 14, right protibia, dorsal view; 15, aedeagus, dorsal and lateral views. — 16, *O.* (*P.*) *semicupreus* HAROLD, aedeagus, dorsal and lateral views.

carinate; genae well produced laterally, rounded at apex; vertex also simple, without a carina or tubercle; surface strongly, somewhat rugosely, and densely punctate on clypeus, the punctures becoming smaller and sparser on the middle of clypeus and vertex. Antennae short and compact; scape short, invisible in dorsal view; club segments successively diminishing the size in breadth and length.

Pronotum simple, strongly convex, about 1.24 to 1.33 times as wide as long (n=4); a median longitudinal impression along midline almost imperceptible; anterior margin emarginated, finely bordered throughout; lateral margins evenly rounded in front, clearly sinuate behind, finely bordered; basal margin obtusely angulate at the middle and only slightly raised at the tip,

without distinct marginal line; anterior angles bluntly subangulate, rounded apically; posterior angles obtuse; surface sparsely and finely punctate, the interspaces between punctures sparsely punctulate and almost shining, the punctures becoming denser, coarser and a little asperate towards sides.

Elytra about 1.24 to 1.35 times as wide as long (n=4), with eight striae including one along epipleural margin; striae strongly and distinctly impressed, and ridged on both sides throughout; strial punctures sparse and a little strong, with weakly notching intervals; 7th stria almost parallel to the 6th; intervals weakly convex, clearly micro-granulose, sparsely, finely, and somewhat asperately punctate.

Pygidium well convex near apex, carinate at base, weakly shining though micro-granulose, densely covered with transverse ocellate punctures. Prothorax with anterior angles excavated on the ventral side. Metasternum subtriangularly elevated in front, and then sloping downwards anteriad, with the apex of the elevation sharply defined. Protibiae moderately elongate, curved inwards, armed with four strong teeth; terminal spur somewhat spatulate, not so short.

Aedeagus a little robust. Phallobase about 1.4 mm in length (n=1), about 0.6mm in apical width (n=1). Parameres about 0.7 mm in length (n=1), each with a strong ventral tooth near apex.

Female. Unknown.

Type series. Holotype: ♂, Poring, 800 m, Sabah State, Malaysia, 13. IV. 1995, T. KIKUTA leg. Paratypes: 1 ♂., ditto, 17. V. 1995; 2 exs., Tahubang, Sabah State, 20. IV. 1995, T. KIKUTA leg.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.

Distribution. Sabah State, Malaysia (Northern Borneo).

Etymology. This species is named in honor of Mr. Toru KIKUTA who made intensive researches on dung beetles at Mt. Kinabalu.

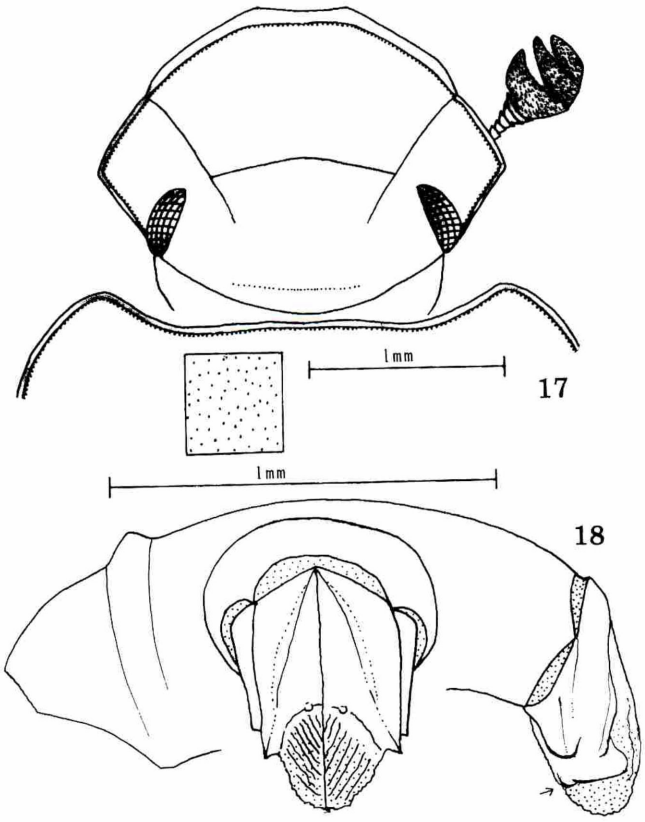
Notes. The present new species is closely related to *Onthophagus* (*Parascatonomus*) *semicupreus* HAROLD from the Sunda Islands, but can be distinguished from the latter by the following characters: 1) head simple, without two transverse carinae on frons and vertex, whereas in *O. semicupreus*, it has two distinct carinae on frons and vertex; 2) elytra with intervals more densely and more strongly punctate; 3) pygidium distinctly micro-granulose instead of being shining and smooth to weakly shining; 4) male protibiae with rather elongate terminal tooth, whereas in *O. semicupreus*, it is distinctly shorter and broader; 5) male genitalia is different in shape (cf. Fig. 16).

Onthophagus* (*Parascatonomus*) *anitidus sp. nov.

(Figs. 4, 17–18)

Length: 6.1–7.5 mm; width: 3.4–4.0 mm (n=238).

Body moderately convex, obviously constricted between pronotum and elytra; dorsal side shining on head and pronotum, opaque on elytra, almost glabrous; ventral side shining, partly clothed with pale white-yellowish hairs. Color usually uniformly black, with weak purplish luster near anterior angles of pronotum; palpi, antennal foot-stalks reddish-brown, club segments of antennae yellowish-brown.



Figs. 17–18: *Onthophagus* (*Parascatonomus*) *anitidus* sp. nov., male. — 17, Head and anterior part of pronotum, dorsal view; 18, aedeagus, dorsal and lateral views.

Male. Head distinctly transverse, subpolygonal in outline; clypeus subtrapezoidal, emarginated at the middle, gently rounded on both sides, finely bordered; genae well produced laterad, obtusely angulate at the middle; front-clypeal suture weakly and finely carinate, a little procurved; vertex with a barely perceptible weak carina in major male, often effaced in minor males; surface weakly micro-granulose, densely and strongly punctate, the punctures becoming smaller and sparser on vertex, transversely wrinkled on anterior part of clypeus. Antennae short and compact; scape short, invisible in dorsal view; club segments successively diminishing the size in breadth and length.

Pronotum simple, evenly convex dorsally, about 1.35–1.40 times as wide as long (n=5), with a very slight longitudinal impression in basal fourth along midline; anterior margin emarginated, finely bordered laterad, not distinctly so in the middle; lateral margins gently rounded in front, sinuate behind, finely bordered; basal margin obtusely angulate at the middle and only slightly raised at the tip, not distinctly bordered; anterior angles roundly subangulate, though

well produced forwards; posterior angles obtuse; surface usually shining, frequently opaque weakly, sparsely and finely punctate, the interspaces between punctures sparsely punctulate, the punctures becoming denser and coarser towards sides.

Elytra about 1.13 to 1.18 times as wide as long (n=4), with eight striae including one along epipleural margin; striae shallowly impressed though rather wide and ridged on both sides throughout; strial punctures sparse and very weak, with slightly notching intervals; 7th stria weakly curved; intervals almost flat, clearly micro-granulose, sparsely and fairly finely punctate.

Pygidium convex near apex, carinate at base, weakly shining, densely covered with transverse ocellate punctures. Prothorax with anterior angles excavated on the ventral side. Metasternum subtriangularly elevated in front, and then sloping downwards anteriad, with the apex of the elevation sharply defined. Protibiae moderately elongate, curved inwards, armed with four strong teeth; terminal spur rather broad, briefly lanceolate, and decurved though well toothed in dorsal view.

Aedeagus elongate. Phallobase about 1.3–1.4 mm in length (n=3), about 0.5 mm in apical width (n=1). Parameres about 0.6 mm in length (n=1), each with a ventral tooth obtuse, not strongly produced in lateral view though the tooth distinct in dorsal view.

Female. Head less transverse; clypeus a little strongly produced forwards; surface distinctly rugose on clypeus and frons; vertex more strongly and closely punctate. Elytra with intervals more strongly micro-granulate.

Type series. Holotype: ♂, Headquarter, Kinabalu Park, 1800 m, Sabah State, Malaysia, 12. II. 1995, T. KIKUTA leg. Paratypes: 6 exs., the same data as the holotype; 2 exs., ditto, 13. X. 1994, T. KIKUTA leg.; 3 exs., ditto, 21. X. 1994; 2 exs., ditto, X. 1994; 28 exs., ditto, 2. II. 1995; 6 exs., ditto, 12. II. 1995; 2 exs., ditto, 3. IV. 1995; 4 exs., ditto, 28. II. 1995; 11 exs., ditto, 2. III. 1995; 12 exs., ditto, 3. III. 1995; 15 exs., ditto, 4. III. 1995; 2 exs., ditto, 1. V. 1995; 15 exs., ditto, 14. XI. 1997; 46 exs., ditto, 12. X. 1997; 20 exs., ditto, 27. VII. 1998; 12 exs., 23. XII. 1998; 8 exs., ditto, 24. XII. 1998; 3 exs., Liwagu, Sabah State, Malaysia, X. 1994, T. KIKUTA leg.; 1 ex., ditto, 4. IV. 1995; 2 exs., ditto, 6. IV. 1995; 15 exs., Sayap, nr. Kinabalu, Sabah State, Malaysia, 12. V. 1995, T. KIKUTA leg.; 13 exs., ditto, 25. III. 1995; 4 exs., ditto, 25. III. 1995; 5 exs., ditto, 11. V. 1995.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.

Distribution. Sabah State, Malaysia (Northern Borneo).

Etymology. The specific name means that the present new species is similar to *Onthophagus* (*Parascatonomus*) *nitidus* WATERHOUSE.

Notes. The present new species is somewhat related to *Onthophagus* (*Parascatonomus*) *semicupreus* HAROLD from the Sunda Islands, but can be distinguished from the latter by the following characters: 1) body uniformly black, whereas in *O. semicupreus*, head and pronotum have strong cupreous luster; 2) head with one weak transverse carina, whereas in *O. semicupreus* it has two strong transverse carinae; 3) elytra with intervals flat instead of being weakly convex; 4) parameres of male genitalia different in shape.

Onthophagus* (*Parascatonomus*) *gunsalami sp. nov.

(Figs. 5, 19–22)

Length: 6.6–7.7 mm; width: 3.5–4.0 mm (n=3).

Body moderately convex above, rather shallowly constricted between pronotum and elytra; dorsal side shining, completely glabrous; ventral side shining, partly clothed with yellowish hairs. Color uniformly black, frequently with slight purplish luster on head and pronotum; palpi, antennal foot-stalks reddish-brown, club segments of antenna yellowish-brown to dark yellowish-brown.

Male. Head somewhat transverse, subpentagonal in outline; clypeal margin subtrapezoidal though slightly truncated at the middle, gently rounded on both sides, a little broadly bordered; genae well produced laterad, obtusely angulate at the middle; front-clypeal suture clearly and rather thickly carinate, the carina weakly arched forwards; vertex weakly and transversely raised, though not distinctly carinate; surface shining, densely covered with small punctures on vertex, rugosely punctate on frons and clypeus, densely and vaguely on ganae. Antennae short and compact; scape short, invisible in dorsal view; club segments successively diminishing the size in length and breadth.

Pronotum simple, evenly convex dorsally, rather wide, about 1.29–1.32 times as wide as long (n=3), with a very slight longitudinal impression in basal half along median line; anterior margin emarginated, finely bordered laterad, not distinctly so in the middle; lateral margins evenly rounded in front, sinuate behind, finely bordered; anterior angles produced forwards, rounded at tip; posterior angles obtuse; basal margin obtusely angulate at the middle, only slightly raised at the tip, without a distinct marginal line; surface shining, moderately densely and evenly punctate, the interspaces between punctures not distinctly punctulate, the punctures becoming denser and coarser towards sides

Elytra about 1.21 to 1.32 times as wide as long (n=3); striae strongly and rather broadly impressed and ridged on both sides throughout; strial punctures sparse and transverse, with slightly notching intervals; 7th stria slightly curved; intervals weakly but clearly convex, shining, sparsely and finely punctate.

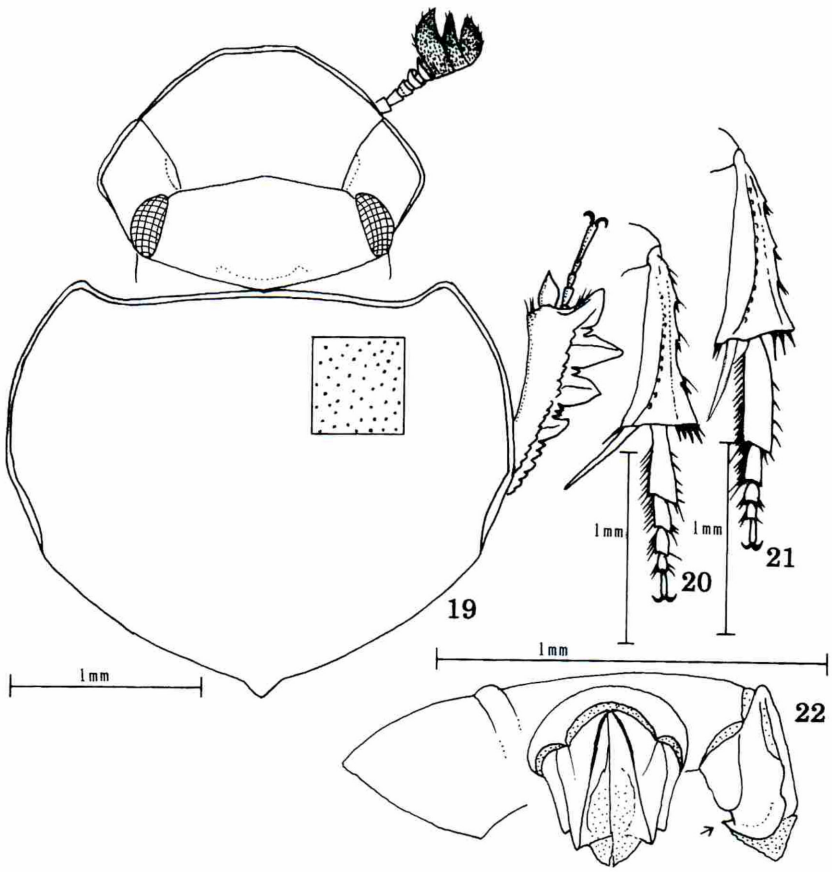
Pygidium clearly convex in the middle, carinate at base, strongly shining, densely covered with strong punctures though a little ocellate; apical margin fairly broadly bordered at the middle. Prothorax with anterior angles excavated on the ventral side. Metasternum subtriangularly elevated in front, and then sloping downwards anteriad, with the apex of the elevation obtuse, not sharp. Protibiae a little elongate, incurved, armed with four strong teeth; terminal spur broadened at the middle, briefly lanceolate, and decurved.

Aedeagus relatively small, elongate. Phallobase about 1.2 mm in length (n=1), about 0.5 mm in apical width (n=1). Parameres about 0.5 mm in length (n=1), each with a ventral tooth sharp in lateral view.

Female. Head with clypeus more strongly produced forwards, and more densely rugose; front-clypeal suture more thickly carinate than in male; vertex a little distinctly and transversely raised. Protibiae with four external teeth stronger; terminal spur sharp and a little decurved.

Type series. Holotype: ♂, Poring 900 m, Sabah State, Malaysia, 16. I. 1997, T. KIKUTA leg. Paratypes: 1 ♂, 1 ♀, Poring, 1200 m, 13. IV. 1995, T. KIKUTA leg.; 1 ♂, ditto, 28. III. 1997, T. KIKUTA leg.

Type depository. The holotype is deposited in the collection of the Institute for Tropical



Figs. 19–22. *Onthophagus* (*Parascatonomus*) *gunsalami* sp. nov., male. — 19, Head and pronotum, dorsal view; 20, right mesotibia, dorsal view; 21, right metatibia, dorsal view; 22, aedeagus, dorsal and lateral views.

Biology and Conservation, University Malaysia Sabah.

Distribution. Sabah State, Malaysia (Northern Borneo).

Etymology. This species is named in honor of Mr. Gnik GUNSALAM who gave us invaluable help for our researches in Sabah.

Notes. The present new species is closely related to *Onthophagus* (*Parascatonomus*) *tamijii* KON, OCHI et SAKAI from Borneo, but can be distinguished from the latter by the following characters: 1) body much larger; 2) in the female, head with clypeal margin truncate at the middle, whereas in *O. tamijii*, it is weakly bidentate; 3) pronotum less coarsely punctate; 4) elytra with interval more coarsely punctate.

Onthophagus* (*Parascatonomus*) *sayapensis sp. nov.

(Figs. 6, 23–25)

Length: 4.1–6.1 mm; width: 2.0–3.1 mm (n=15).

Body moderately convex above, distinctly constricted between pronotum and elytra; dorsal side shining, entirely glabrous; ventral side shining, partly clothed with yellowish hairs. Color uniformly black to blackish-brown, sometimes partly with slight purplish luster; palpi, antennal foot-stalks reddish-brown, club segments of antenna yellowish-brown.

Male. Head transverse, subpentagonal in outline; clypeus subtrapezoidal, slightly truncated at the middle, gently rounded on both sides, finely bordered; genae well produced laterad, obtusely angulate at the middle; front-clypeal suture clearly and a little finely carinate, the carina slightly curved forwards, frequently forming an obtuse angle at the middle; vertex obtusely and transversely raised, though not distinctly carinate; surface shining, densely and transversely rugose or granulate on clypeus, closely and vaguely punctate or sculptured on the remaining portions. Antennae short and compact; scape short, invisible in dorsal view; club segments successively diminishing the size in length and breadth.

Pronotum simple, evenly convex dorsally, about 1.24–1.37 times as wide as long (n=5), with a very slight longitudinal impression in basal half along midline; anterior margin emarginated, finely bordered laterad, not distinctly so in the middle; lateral margins well rounded in front, sinuate behind, finely bordered; anterior angles produced forwards, rounded at tip; posterior angles obtuse; basal margin obtusely angulate at the middle, only slightly raised at the tip, without distinct marginal lines; surface shining, sparsely and finely punctate, the interspaces between punctures not distinctly punctulate as in the proceeding species, the punctures becoming denser and fairly coarser towards sides.

Elytra about 1.17 to 1.22 times as wide as long (n=4); striae rather strongly impressed and ridged on both sides throughout; strial punctures sparse and distinct, with slightly notching intervals; 7th stria almost parallel to the 6th; intervals weakly convex, usually strongly shining, frequently very slightly micro-granulose, sparsely and finely punctate.

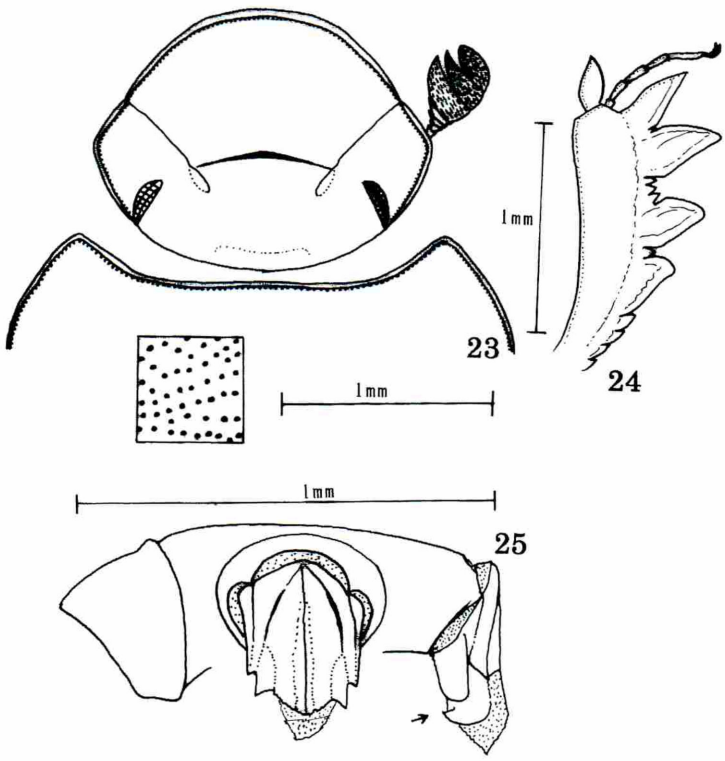
Pygidium clearly convex near apex, carinate at base, strongly shining, densely covered with strong punctures though a little small; apical margin fairly broadly bordered. Prothorax with anterior angles excavated on the ventral side. Metasternum subtriangularly elevated in front, and then sloping downwards anteriad, with the apex of the elevation obtuse, not pointed. Protibiae moderately elongate, curved inwards, armed with four strong teeth; terminal spur broadened at the middle, briefly lanceolate, and decurved.

Aedeagus elongate. Phallobase about 1.0 mm in length (n=3), about 0.4 mm in apical width (n=1). Parameres about 0.4 mm in length (n=1).

Female. Head less transverse; clypeus a little strongly produced forwards, surface distinctly rugose on clypeus and frons; vertex more strongly and closely punctate. Elytra with intervals more strongly micro-granulate.

Type series. Holotype: ♂, Sayap, nr. Kinabalu, Sabah State, Malaysia, 8. XI. 1995, T. KIKUTA leg. Paratypes: 11 exs., the same data as for the holotype; 1♂, Headquarter, 1500 m, Mt. Kinabalu, Sabah State, Malaysia, X. 1995, T. KIKUTA leg.; 2 exs., Tahubang, nr. Kinabalu, Sabah State, Malaysia, 24. II. 1995, T. KIKUTA leg.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Biology and Conservation, University Malaysia Sabah.



Figs. 23–25. *Onthophagus* (*Parascatonomus*) *sayapensis* sp. nov., male. — 23, Head and anterior part of pronotum, dorsal view; 24, right protibia, dorsal view; 25, aedeagus, dorsal and lateral views.

Distribution. Sabah State, Malaysia (Northern Borneo).

Etymology. The species is named after a place name, Sayap, near Mt. Kinabalu.

Notes. The present new species is closely related to *Onthophagus* (*Parascatonomus*) *tamijii* KON, OCHI, et SAKAI from Borneo, but can be distinguished from the latter by the following characters: 1) elytra with striae more strongly and broadly impressed instead of being shallower and finer; 2) elytra with intervals more strongly punctate, whereas in *O. tamijii*, they are very finely punctate; 3) pygidium with apical margin more broadly bordered; 4) in the female, head with clypeal margin truncated at the middle, whereas in *O. tamijii*, it is slightly but clearly emarginated at the middle; 5) in the female, head with vertex clearly less transversely raised, whereas in *O. tamijii*, it is distinctly and transversely raised; 6) in the female, head with clypeus more strongly rugose on anterior portion. The present new species is also closely related to *O. niasensis* BOUCOMONT from the Nias Island, Indonesia, but can be easily distinguishable from the latter by the finely bordered apex of pygidium, the elongate terminal spur of protibiae in the male, and differently shaped male genitalia.

Onthophagus (*Parascatonomus*) *katoi poringensis* subsp. nov.

(Fig. 7)

Onthophagus (*Parascatonomus*) *pilurarius*: BALTHASAR, 1963, Monogr. Scarab., **2**: 480; KON *et al.*, 2000, Ent. Sci., **3**: 371 (**synonymy**) [nec LANSBERGE 1883].

The present new subspecies differs from the nominotypical one from the Philippines as follows: 1) body smaller (4.5–5.7 mm), whereas in the nominotypical species, the body is a little larger (4.6–6.8 mm); 2) head with clypeus less produced forwards, and more strongly and closely rugose; 3) head with vertexal carina more distinctly carinate; 4) elytra with stria more widely and strongly impressed, whereas in the nominotypical subspecies, it is rather finely and a little shallowly impressed.

Length: 4.5–5.7 mm; width: 2.5–3.5 mm (n=15).

Type series. Holotype: ♂, Poring, 900 m, Sabah State, Malaysia, 9. I. 1998, T. KIKUTA leg. Paratypes: 13 exs., the same data as for the holotype; 2 exs., Mt. Bawang, Kalimantan, Indonesia, IX. 1990; 1 ex., ditto, VIII. 1990.

Type depository. The holotype is deposited in the collection of the Institute for Tropical Botany and Conservation, University Malaysia Sabah.

Distribution. Borneo.

Etymology. The species is named after a place name, Poring, Sabah State.

Notes. The distributional records of *Onthophagus* (*Parascatonomus*) *pilurarius* LANSBERGE from Borneo may be those of *O.* (*P.*) *katoi poringensis* subsp. nov. We have not examine the specimens of the true *O.* (*P.*) *pilurarius* from Borneo.

Acknowledgments

We wish to express our cordial thanks to Messrs. M. FUJIOKA and T. KIKUTA for giving us the opportunities of examining invaluable specimens. This study was supported in part by a Grant-in-Aid from the Japan Society for the Promotion of Science (No. 14405013).

要　　約

越智 輝雄・近　雅博：東南アジア産コガネムシ科甲虫（第８報）―ボルネオ産エンマコガネ属の６新種１新亜種―．――――ボルネオ産コガネムシ科甲虫として，エンマコガネ属の１亜属，*Parascatonomus*亜属の６新種，*Onthophagus* (*Parascatonomus*) *riekoae* sp. nov., *O.* (*P.*) *liewi* sp. nov., *O.* (*P.*) *kikutai* sp. nov., *O.* (*P.*) *anitidus* sp. nov., *O.* (*P.*) *sayapensis* sp. nov., *O.* (*P.*) *gunsalami* sp. nov. および *O.* (*P.*) *katoi* OCHI et KON の１新亜種 *O.* (*P.*) *katoi poringensis* subsp. nov. を記載した．

References

BALTHASAR, V., 1963. Monographie der Scarabaeidae und Aphodiidae der palaearktischen und orientalische Region, **2**: 1–628. Prag.

BOUCOMONT, A., 1914. Les Coprophages de l'Archipel Malais. *Annales de la Societe Entomologique de France,* **83**: 238–350.

BOUCOMONT, A. and J. GILLET, 1921. Faune entomologique de l'Indochine française. Fam. Scarabaeidae (Laparosticti): 1–76. Saigon.

HAROLD, E., von, 1877. Enumeration des Lamellicornes Coprophages rapportés de l'Alchipel Malais, de la Nouvelle Guinée de l'Austrailie boreale par M. M. J. DORIA, O. BECCARI et L. M. D'ALBERTIS, par le Baron E. de HAROLD. *Annali Museo civico di Storia naturale di Genova*, **10**: 38–109.

KON, M., S. SAKAI and T. OCHI, 2000. A new species of the genus *Onthophagus* (Coleoptera: Scarabaeidae) from Sarawak, Borneo. *Entomological Science,* **3**: 367–371.

NOMURA, S., 1976. On the subgenus *Parascatonomus* from Japan and Taiwan. *The Entomological Review of Japan*, **29**: 25–33.

OCHI, T. and K. ARAYA, 1992. Studies on the coprophagous scarab beetles from East Asia. II (Coleoptera, Scarabaeidae). *Giornale italiano di Entomologia,* **6**: 79–108.

——— and ——— , 1996. Studies on the coprophagous scarab beetles from East Asia. III (Coleoptera, Scarabaeidae). *Giornale italiano di Entomologia,* **8**: 1–15.

PAULIAN, R., 1945. Coléoptères Scarabéides de l'Indochine. *Faune de l'Empire Francaise,* **3**: 1–225. Larose, Paris.

SHARP, D., 1875. Descriptions of some new genera and species of Scarabaeidae from tropical Asia and Malaysia, Part II. *Coleopterologische Hefte,* **14**: 47–66.

(Received March 18, 2005; Accepted April 11, 2005)

原稿作成の要領

1. 原稿はプリントアウトしたもの２部（１部はコピー可）と，CD，MO，フロッピーディスクに保存したMS-Word形式またはテキスト形式のデータを提出する．用紙はＡ４判を用い，左右に３cmの余白をあけ，行間はダブルスペースとする．表題，見出し，人名など，いかなる場合も大文字だけでは入力しない．また和文要約および♂♀記号を除いて日本語フォントを用いてはならない．
2. 原稿には表紙をつけ，これに表題，ランニング・タイトル（簡略化した論文表題，欧文50字以内），代表著者名，連絡先（住所，電話番号，E-mail）を明記し，原稿及び図表の枚数，別刷りの必要部数（50部単位），その他連絡事項などを記入する．
3. 本文は，表題，著者名，所属機関とその所在地または住所，E-mail（任意），刷り上がり10行程度まで（約150語）の英文要約（Abstract），本文，和文要約，参考文献，表，図の説明，図の順に配列する．
4. 動植物の属以下の学名，参考文献中の雑誌名などはイタリック体で，人名のうち姓のイニシャル以外はスモールキャピタル体で，雑誌の巻などはボールド体で表記する．それが不可能の場合はローマン体で表記し，イタリック体は下線，スモールキャピタル体は二重下線，ボールド体は波下線で示す．
5. 参考文献は著者名のアルファベット順に並べ，雑誌名は略さずフルタイトルで表記する．

   Blackwelder, R. E., 1936. Morphology of the coleopterous family Staphylinidae. Smithsonian miscellaneous Collections, **94** (13): 1–102

   —, 1952. The generic names of the beetle family Staphylinidae with an essay on genotypy. Bulletin of United States National Museum, **200**: i-iv+1–483.

   Müller, J., 1925. Terzo contributo alla conoscenza del genere Staphylinus L. Bollettino Societa entomologica Italiana, **57**: 40–48.
6. 標本のデータは以下のように表記する．

   （例）3♂♂, 2♀♀, Amaishi, Hyôgo, 28. V. 1995, Y. Hayashi leg.
7. 図（線画）は耐水性黒色インクで鮮明に描き，そのまま印刷出来るようにする．写真はプリントした鮮明なものを台紙に貼り付ける．図の拡大（縮小）率を示したい場合は図中にスケールを入れる．原図には薄紙のカバーをかけ，これに著者名，図の番号，上の方向を示す．もし図中に文字を入れる場合には，カバーの指定位置に赤字で示す．原図の大きさは，台紙を含めてＡ４判（210 mm × 295 mm）以内とする．また原図の返送が必要な場合は，カバーにその旨を記入する．
8. 図をデータ入稿する場合はAdobe Photoshop，Adobe Illustrator，EPS，TIFF，PICT，JPEGなどの各形式にて，写真は350 dpiのグレーまたはカラーモードで，線画は800～1800 dpiのモノクロ２階調モードで作成する．それぞれ刷り上がり希望サイズに調整して作成するが，最終的な縮尺は編集部に一任されたい．図をデータ入稿する場合も，かならずプリントアウトを添付すること．

編集委員からのお願い

最近の投稿原稿には投稿規定を大きく逸脱したものが見受けられます．投稿される原稿については，投稿規定ならびに原稿作成の要領をよく参照したうえで作成してください．いちじるしく不備のある原稿は受け付けません．また，原稿はできる限り英文校閲をお受けになられたうえでお送り下さい．英文のスペルチェック等も著者自身で必ず行っておいて下さい．

参考文献については，59巻より雑誌名を略記せずにフルタイトルで記入するスタイルに変更しております．編集部でチェックできないものもあるので，よくご確認のうえ投稿してください．

人名はイニシャルのみ大文字に，残りは全て小文字で打ち込んで下さい（例：Yasuhiko Hayashi）．編集部でスモールキャピタル化する際，全て大文字で入力されているとスモールキャピタル化できません．中国，韓国，タイなど，日本と同じ順序による姓名表記の場合も，欧米式の姓名表記とします（つまり名，姓の順）．

著者負担について

16ページを超える超過ページの印刷経費，カラー写真の印刷経費は著者負担となります．別刷は全て表紙付きとして，表紙代のみ学会負担とし，他の経費は著者負担とします．

和文要約について

短報を除く原著論文には和文要約を付けて下さい．学術用語で打ち出せない漢字もありますが，できるだけ努力します．

著 作 権

1. 昆虫学評論および“ねじればね”に掲載された論文の著作権は原則として日本甲虫学会（以下，本学会）に属する．
2. 著者自身が自分の著作の一部を複製・翻訳などの形で利用する場合，これに対して本学会では原則的に意義申し立てしたり妨げることはしない．ただし，著者自身でも全文を複製の形で他の著作物に利用する場合に限り，事前に本学会へ文書で申し出を行い，許諾を求めなければならない．
3. 第三者から論文の複製あるいは転載に関する許諾の要請があり，本学会において必要と認めた場合は，著者に代わって許諾することがある．

昆虫学評論　投稿規定

1. 昆虫学評論に投稿する原稿は，日本およびその近隣地域における甲虫（コウチュウ）目に関する新規の知見を含み，未発表のものに限る．
2. 投稿は原則として本学会会員に限る．原稿は１名以上のレフェリーにより審査され，その意見に基づき編集委員が採択の可否を決定する．編集委員は著者に質問や意見の回答や原稿の修正を求める場合がある．掲載は原則的に採択順となるが，全額実費負担の場合は優先的に取り扱うことが可能である．
3. 使用言語は原則として英語とし，短報を除く原著論文については和文要約をつけることとする．原稿の長さは刷り上がり16ページ以内とし，超過ページの印刷経費は著者負担とする．
4. 原稿（本文，図，表および表紙）は別記の要領で作成し，プリントアウト２部（１部はコピー可）と本文のテキストデータを保存したCD，MO，またはフロッピーディスクを編集委員に書留で郵送する．その他の詳しい原稿作成の要領については別ページを参照のこと．
5. 新規の分類学的処理に関しては，最新の国際動物命名規約を遵守したものでなければならない．
6. 原稿の掲載上の体裁については編集委員に一任されたい．
7. 著者校正は原則として初校のみとする．校正での大幅な変更や追加は認めない．
8. 別刷は50部単位で作成し，費用は全額著者負担とする．
9. 原稿の送付，問い合わせ先は下記とする．

ねじればね　投稿規定

1. “ねじればね”誌には和文原稿を掲載する．分類学的な解説やノート，分布や生態などの短報，同定の手引き，その他役に立つ情報など幅広い内容の原稿を随時受けつける．なお，新しい分類学的処理を含む内容の論文は“ねじればね”誌には掲載できない．
2. 原稿の作成は昆虫学評論に準じる．

昆虫学評論
吉川鮎美　〒534–0023　大阪市都島区都島南通 1–17–1（株）大榮商会　Tel (代表) 06–6922–1346
芦田　久　〒567–0045　茨木市紫明園 7–4–201　Tel 072–623–8774
林　靖彦　〒666–0116　川西市水明台 3–1–73　Tel 072–793–3712　Fax 0771–86–0863（編集事務局）
ねじればね
水野弘造　〒611–0002　宇治市木幡熊小路 19–35　Tel & Fax 0774–32–4929　E-mail: kzmizuno@oak.ocn.ne.jp
保科英人　〒910–8507　福井市文京 3–9–1　福井大学教育地域科学部地域環境講座　Tel 0776–27–8692
初宿成彦　〒546–0034　大阪市東住吉区長居公園 1–23　大阪市立自然史博物館 昆虫研究室
Tel 06–6697–6221　Fax 06–6697–6225　E-mail: shiyake@mus-nh.city.osaka.jp
学会本部・担当：初宿成彦（上記）

昆虫学評論　The Entomological Review of Japan
第60巻1号　Vol. 60, No. 1
平成17年4月30日発行
Published on April 30, 2005
会費納入振替口座：00990–8–39672

発行者　佐々治寛之
発行所　日本甲虫学会
〒546–0034　大阪市東住吉区長居公園1–23
大阪市立自然史博物館・昆虫研究室気付
印刷所　株式会社 NPCコーポレーション
〒530–0043　大阪市北区天満1–9–19

The Entomological Review of Japan Vol. 60, No. 1

CONTENTS

HAYASHI, M. and O. TOMINAGA: Records of Donaciinae from Primorsky Province in 2004, with Notes on the Distribution of *Plateumaris shirahatai* KIMOTO (Coleoptera: Chrysomelidae). ····· 1

MORITA, S.: A New *Pterostichus* (Coleoptera: Carabidae) from the Islands of Tsushima, West Japan. ····· 9

HOSHINA, H. and M. SATÔ: Synonymic Notes on Two Species of the Families Hydrophilidae and Leiodidae (Coleoptera) from Japan. ····· 13

ASHIDA, H.: The Complex of *Trechiama fujitai* (Coleoptera: Trechinae) from Hyôgo Prefecture, West Japan (III) — A New Relative of *Trechiama latilobatus* ASHIDA —. ····· 17

TOMINAGA, O., Y. IMURA, M. OKAMOTO, Z.-H. SU, T. OJIKA, N. KASHIWAI and S. OSAWA: Origin of *Ohomopterus uenoi* (Coleoptera: Carabidae: Carabinae) as Deduced from Comparisons of DNA Sequences of Mitochondrial ND5 Gene and Nuclear Internal Transcribed Spacer I (ITS I) with Morphological Characters. ····· 23

IMURA, Y., K. AKITA, M. OKAMOTO, O. TOMINAGA, N. KASHIWAI, Z.-H. SU, T. OJIKA and S. OSAWA: On *Ohomopterus arrowianus kirimurai* (Coleoptera: Carabidae) as Examined by Phylogenetic Trees of Mitochondrial ND5 Gene and Nuclear ITS I DNA as well as Morphology of Genital Organs. ····· 35

ITO, N.: Five New Species of the *leptopus* Group of Harpaline Genus *Trichotichnus* (Coleoptera: Carabidae) from Central and Northeastern Japan, with Note on Taxonomic Position of *T. tsurugiyamanus*. ····· 39

ITO, N.: Replacement Names for the Junior Homonyms of Two Species of *Trichotichnus* and a Genus of Harpalini (Coleoptera: Carabidae: Harpalini). ····· 53

ARIMOTO, H. and S. RIESE: *Propsephus nanshanus*, a New Species of Elateridae (Coleoptera) from Taiwan. ····· 55

NARUKAWA, N. and H. ASHIDA: A New Subspecies of *Episcaphula matsumurai* CHÛJÔ (Coleoptera: Erotylidae) from the Yaeyama Group in the Southern Ryukyus, Southwestern Japan. ····· 59

HAYASHI, Y.: A New Genus and Species of Coprophilini (Coleoptera: Staphylinidae: Oxytelinae) from Japan. ····· 63

HAYASHI, Y.: New Records of Staphylinidae from Taiwan, 4. ····· 68

OCHI, T. and M. KON: Notes on the Coprophagous Scarab-beetles (Coleoptera: Scarabaeidae) from Southeast Asia (VI) — Three New Taxa of the Tribe Coprini from Borneo —. ····· 69

OCHI, T. and M. KON: Notes on the Coprophagous Scarab-beetles (Coleoptera: Scarabaeidae) from Southeast Asia (VII) — Three New Species of *Onthophagus* (*Phanaeomorphus*) from Borneo —. ····· 75

OCHI, T. and M. KON: Notes on the Coprophagous Scarab-beetles (Coleoptera: Scarabaeidae) from Southeast Asia (VIII) — Six New Species of *Onthophagus* (*Parascatonomus*) and a New Subspecies of *O.* (*P.*) *katoi* from Borneo —. ····· 83

原稿作成の要領 ····· 99