



Formosan Entomologist

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Taxonomic Notes on Trichiine Beetles of Taiwan (Coleoptera: Scarabaeoidea: Cetoniinae) 【Research report】

臺灣產長腳花金龜之分類註釋(鞘翅目：金龜子總科：花潛金龜亞科) 【研究報告】

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*通訊作者E-mail:  Trichius signatus, holotype, new combination, new synonym, Taiwan.

Received: 1998/12/16 Accepted: 1999/03/10 Available online: 1999/06/01

Abstract

The holotype of *Trichius signatus* Chûjô is rediscovered and transferred to *Gnorimus* Serville. *Gnorimus sumizome* Kobayashi is regarded as a junior synonym of *G. signatus*. The diagnostic characters of larger trichiine genera, *Trichius* Fabricius, *Tibiotrichius* Miyake, *Agnorimus* Miyake and *Iwase* and *Gnorimus* Serville, are listed. Each species of the latter three genera' s taxonomic status from Taiwan is also reviewed.

摘要

本文敘述字紋虎斑花金龜(*Trichius signatus* Chûjô, 1940)之正模式標本的再發現經過，由此而確認墨翅長腳花金龜(*Gnorimus sumizome* Kobayashi, 1993)為本種之同物異名，再者，其亦應為長腳花金龜屬之一員。本文提供三個已知的大型長腳花金龜屬(*Tibiotrichius* Miyake, *Agnorimus* Miyake and *Iwase*, and *Gnorimus* Serville)臺灣產種類之分類現況，表列各屬與虎斑花金龜屬(*Trichius* Fabricius)間之鑑別性徵並簡論其關係。

Key words: *Trichius signatus*, holotype, new combination, new synonym, Taiwan.

關鍵詞: 字紋虎斑花潛、正模式標本、新組合、新同物異名、臺灣

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Taxonomic Notes on Trichiine Beetles of Taiwan (Coleoptera: Scarabaeoidea: Cetoniinae)

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ABSTRACT

The holotype of *Trichius signatus* Chûjô is rediscovered and transferred to *Gnorimus* Serville. *Gnorimus sumizome* Kobayashi is regarded as a junior synonym of *G. signatus*. The diagnostic characters of larger trichiine genera, *Trichius* Fabricius, *Tibiotrichius* Miyake, *Agnorimus* Miyake and Iwase and *Gnorimus* Serville, are listed. Each species of the latter three genera's taxonomic status from Taiwan is also reviewed.

Key words: *Trichius signatus*, holotype, new combination, new synonym, Taiwan.

Introduction

The trichiine genera *Trichius* Fabricius and *Gnorimus* Serville are widely distributed in Eurasia and adjacent areas. Two closely related genera, *Tibiotrichius* Miyake and *Agnorimus* Miyake and Iwase are newly designated and found only in montane areas of the Oriental region. Members of the three genera, *Tibiotrichius*, *Agnorimus*, and *Gnorimus*, usually have larger body sizes (taxa on average body length usually over 15.0 mm) than other genus groups in the Trichiini and have been focused on since they are active pollen feeders on canopy.

In their Chinese name-list to Taiwanese phytophagous scarabaeids, Kobayashi *et al.* (1995) listed three species of both *Trichius* and *Gnorimus*. However, absent from their list is one species, *Tri-*

chius signatus, which was described by Chûjô (1940) based on a unique male collected in the northern montane area of Taiwan. Approximately seven years ago, through the courtesy of Professor Pen-Peng Lee (retired-National Taiwan University), we rediscovered the label-bearing holotype of this species in a cabinet in the corner of his laboratory where a considerable number of collections had been left by the former Japanese employees of the department. We take this opportunity to discuss the recent taxonomic status of trichiines from Taiwan as listed below.

Gnorimus signatus (Chûjô), comb. n.
(Figs. 1, 2, 3, 4)

Trichius signatus Chûjô, 1940. Trans. Nat. Hist. Soc. Formosa XXX(206/207): 426.

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Gnorimus sumizome Kobayashi, 1993. Chinese J. Entomol. Soc. 13: 78; Kobayashi, Yu and Chu, 1995. Chinese J. Entomol. 15: 183 (list). **Syn. n.**

Upon examination of the holotype (Fig. 1) of *Gnorimus signatus*, we consider this species to be within the morphological limits of *Gnorimus*. This is based on the combination of diagnostic characters listed in Table 1. The holotype of *T. signatus* was in good condition with full data labels (Fig. 2) and was dissected for male genitalia and attached with one of label. The body shape and external characters of this specimen completely agree with the descriptions within the original literature of Chûjô (1940), particularly the only illustration appearing in Chûjô's paper for the type habitus. Kobayashi and Yu (1993) named their new species, *sumizome*, after the Japanese word for dark referring to the black body and elytra. However, with the exception of the holotype of *Trichius signatus*, we have encountered additional specimens with distinctively irregular yellowish pale markings of varying degrees on the pronotum, elytra, and pygidium. These trichiines also have highly similarly shaped male genitalia as well as other external characters consistent with *G. sumizome* as diagnosed and illustrated by the designers. There is no doubt that they all represent one species.

Specimens examined. With exception of the holotype (placed in the Insect Museum of Department of Entomology, National Taiwan University), three additional specimens were also examined and labeled as follows: NANTOU: Tzui Feng, 2 males, 12-VIII-1991 (in Iwaze's coll.); TAITUNG: Lii Yuan, South Cross-Island Highway, 1 male, 18-VIII-1995 (in Chang's coll.).

Remarks. Howden (1968) has pointed out that a number of American species of trichiines exhibit a large amount of variation and that the male genitalia usually are diagnostic. We have also observed

that variations in color and markings exist among many trichiine genera as well as species from Taiwan and neighboring areas. Therefore, we can not exclude the possibility that there has been misidentification of some trichiines caused by merely relying on marking distributions of individual surfaces and without comparing with similar species. The melanistic individuals of *G. signatus* (Figs. 3, 4) appropriately exemplify for this point.

The distributions of known species of *Gnorimus* are currently restricted to the Palaearctic region. This record of *G. signatus* is probably the southernmost boundary of the genus.

Tibiotrichius miwai (Chûjô)

Trichius miwai Chûjô, 1941. Trans. Nat. Hist. Soc. Formosa XXXI(208): 37; Tesar, 1942. Mitt. Munch Entmol. Ges. 32: 214 (diagnosis); Miyake and Nakamura, 1991. Miscell. Rep. Hiwa Mus. Nat. Hist. 29: 28 (list, note).

Gnorimus miwai: Kobayashi and Yu, 1993. Chinese J. Entomol. Soc. 13: 82 (key); Kobayashi, Yu and Chu, 1995. Chinese J. Entomol. 15: 183 (list).

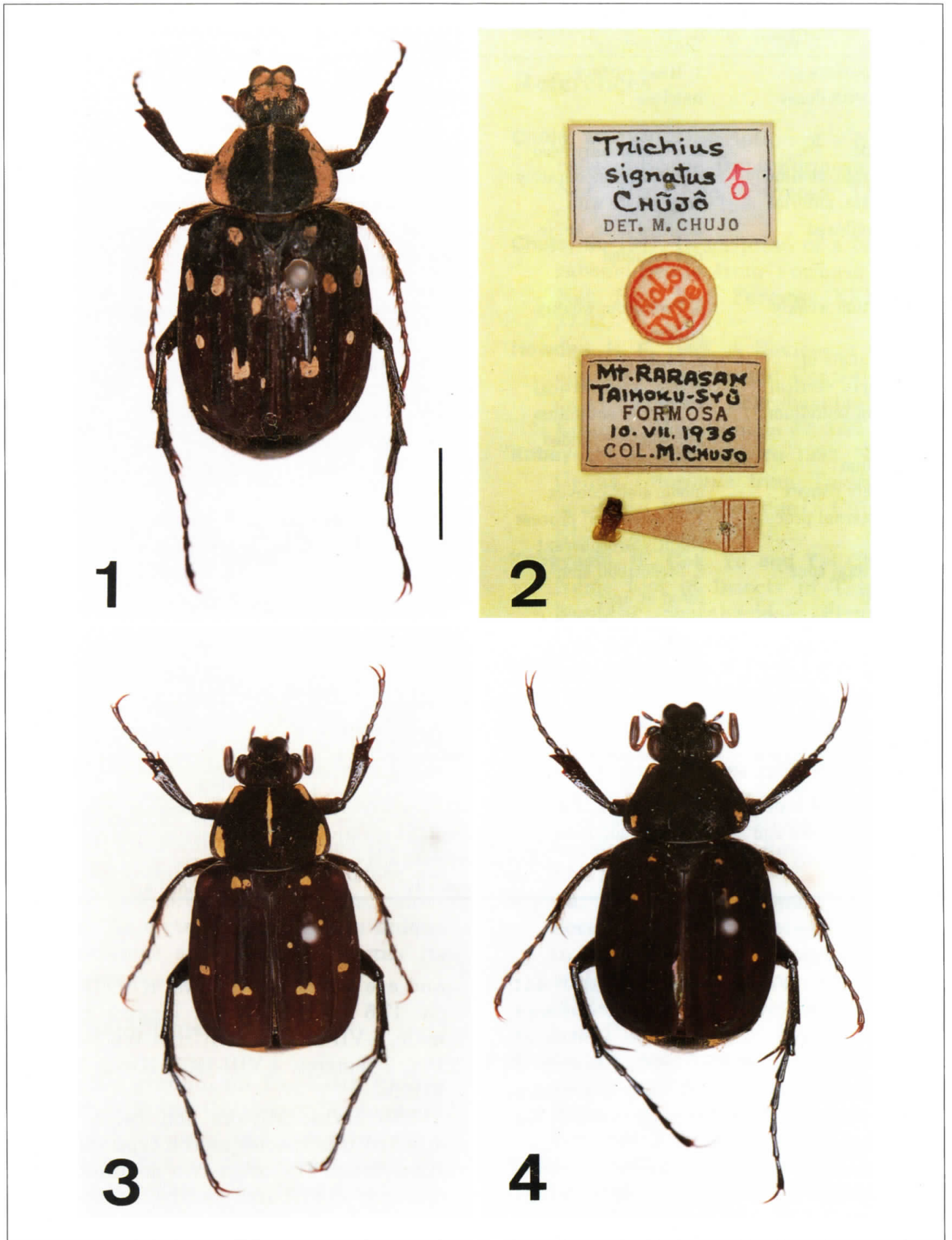
Tibiotrichius miwai: Miyake, 1994. Entomol. Rev. Japan XLIX(1): 49 (key).

Specimens examined. Four specimens are deposited in authors' laboratory and are labeled as follows: NANTOU: Sung Kang, 1 male 1 female, 28-VII-1986; ILAN: Yuan Yang Hu, 1 male, 29-VI-1994; HWA-LIEN: Wan Jung logging track, 1 male, 4-VII-1998.

Remarks. Miyake (1994) defined the new genus and assigned *T. fujiokai* Miyake, 1991, as the type species. The six species now included in this genus are widely distributed through southern and southwestern China, the northern Indochina Peninsula, eastern Tibet, and Taiwan.

Agnorimus tibialis (Chûjô)

Gnorimus tibialis Chûjô, 1938. Trans. Nat.



Figs 1-4. *Gnorimus signatus* (Chûjô): 1, holotype 2, labels attached with the holotype. 3-4, melanistic male. Scale bar = 5.0 mm.

Table 1. Diagnostic characters for *Trichius*, *Tibiotrichius*, *Gnorimus*, and *Agnorimus*

<i>Trichius</i>	<i>Tibiotrichius</i>	<i>Agnorimus</i>	<i>Gnorimus</i>
1. Head surface covered with dense setae	1. Head surface hairless	1. Head surface hairless	1. Head surface covered with scattered long hairs
2. Clypeus subquadrate, shallowly emarginate, anterior margin reflexed	2. Clypeus narrowed anteriorly, moderately emarginate with notched base, angle not rounded	2. Clypeus broadened at middle, strongly emarginate with notched base, angle not rounded	2. Clypeus subquadrate, moderately emarginate with rounded base, angle rounded
3. Pronotum weakly convex	3. Pronotum weakly convex	3. Pronotum convex	3. Pronotum weakly convex
4. Inner angle of elytral apex vertical	4. Inner angle of elytral apex vertical	4. Inner angle of elytral apex rounded	4. Inner angle of elytral apex vertical
5. Apex of scutellum rounded	5. Apex of scutellum not widely rounded	5. Apex of scutellum not widely rounded	5. Apex of scutellum widely rounded
6. Pygidium moderately convex	6. Pygidium moderately convex	6. Pygidium strongly convex	6. Pygidium flat
7. Mesosternal process absent	7. Mesosternal process slightly protuberant	7. Mesosternal process slightly protuberant	7. Mesosternal process vestigial
8. Mesotibial spur separated	8. Mesotibial spur fused at apex	8. Mesotibial spur separated	8. Mesotibial spur separated
9. Male hind tibia straight and with a well-defined external protrusion	9. Male hind tibia straight and with a vestigially external protrusion	9. Male hind tibia arched and with a well-defined external protrusion	9. Male hind tibia straight and with a well-defined external protrusion
10. Apical segment of tarsus thinly elongate	10. Apical segment of tarsus swollen at apex	10. Apical segment of tarsus swollen at apex	10. Apical segment of tarsus swollen at apex
11. Paramere of male genitalia elongate and expanded apically	11. Paramere of male genitalia bifurcate	11. Paramere of male genitalia slightly reflexed and expanded apically	11. Paramere of male genitalia slightly reflexed and expanded apically

Hist. Soc. Formosa XXVIII(138): 444; Miwa et Chûjô, 1939. Cat. Coleopt. Japonicorum Pars 5: 94 (catalog); Kobayashi and Yu, 1993. Chinese J. Entomol. Soc. 13: 80 (key); Kobayashi, Yu and Chu, 1995. Chinese J. Entomol. 15: 183 (list).

Agnorimus tibialis: Miyake and Iwase, 1991. Entomol. Rev. Japan XLVI(2): 189 (key).

Specimens examined. Four specimens are deposited in the authors' laboratory

and are labeled as follows: KAOSHIUNG: ca. 17.5 km., Mei Larn logging track, 1 male, 4-VII-1998; HSINCHU: Wu Feng, Da Pin, 2 females, 4-VIII-1991; Kwan Wu, 26-V-1998.

Remarks. Miyake and Iwase (1991) selected this species as the type species of *Agnorimus*. The other two nominated species are distributed in the northern Indochina Peninsula and southwestern China. We consider this genus more closely related to *Gnorimus* than to *Tibiotrichius*

because the first two genera share relative similarity in the shape of the male genitalia. Diagnostic characters of these three genera listed in Table 1 are mainly modified from Miyake and Iwase (1991) and Miyake (1994).

Discussion

According to observations, the above-mentioned three species are sympatric and occur in middle elevations (ca. 1200-2100 m) and warm-temperate montane areas of Taiwan. Adults of *Tibiotrichius miwai* and *Agnorimus tibialis* usually commonly appear from the middle of May to the end of August. However, *Gnorimus signatus* has only been collected in July and August and the female is still unknown.

Gnorimus sensu Kobayashi *et al.* (1995) broadly included both *Tibiotrichius* and *Agnorimus*, while we treat both independently herein. Certainly, until a well-defined phylogenetic analysis on the trichiines is conducted, it will be very difficult to obtain a stable generic system. However, *Tibiotrichius* exhibits a set of autapomorphic characters of narrowed clypeus, fused mesotibial spur, and bifurcate male genitalia. Regarding *Agnorimus*, the similar shape of the male genitalia with *Gnorimus* does weaken the status of the former as an independent genus, but its broadened clypeus, inner angle of the elytral apex, and the unique body markings and color may justify its consideration as a unique genus.

Acknowledgments

We are grateful for Dr. Keith Philips (The Ohio State University, Columbus) for helpful revisions and comments on a primary version of this manuscript. We also thank Professor Pen-Peng Lee for allowing the senior author to check his collections, as well as Mr. Kazuo Iwase (Tokyo) and Mr. Yung-Jeng Chang (Taipei)

for kindly loaning invaluable materials which made this study possible.

References

- Chújō, M.** 1940. Description of a New Scarabaeid-Beetle from Formosa. *Trans. Nat. Hist. Soc. Formosa* XXX(206/207): 426-427.
- Chújō, M.** 1941. Description of a New Scarabaeid-Beetle from Formosa. *Trans. Nat. Hist. Soc. Formosa* XXXI(208): 37-38.
- Howden, H. F.** 1968. A Review of the Trichiinae of North and Central America (Coleoptera: Scarabaeidae). *Mem. Entomol. Soc. Canada* 54: 1-77.
- Kobayashi, H. and C.-k. Yu** 1993. Notes on Genus *Gnorimus* from Taiwan (Coleoptera: Scarabaeidae). *Chinese J. Entomol. Soc.* 13: 77-82.
- Kobayashi, H., C.-k. Yu and Y.-i Chu** 1995. Name List of Insects in Taiwan-Coleoptera: Scarabaeidae: Pleurosticti. *Chinese J. Entomol. Soc.* 15: 181-201.
- Miwa, Y. and M. Chújō** 1939. *Catalogus Coleopterorum Japonicorum, Scarabaeidae, Pars 5.* Noda Shobo, Taihoku, 94 pp.
- Miyake, Y. and K. Iwaze** 1991. A new genus and a new species of Trichiini from southern Asia (Coleoptera, Scarabaeidae). *Entomol. Rev. Japan* XLVI (2): 187-193.
- Miyake, Y. and S. Nakamura** 1991. The Scarabaeoidea of Taiwan preserved in Hiwa Museum for Natural History, with description of two new species (Coleoptera: Polyphaga). *Miscell. Rep. Hiwa Mus. Nat. Hist.* 29: 1-41.
- Miyake, Y.** 1994. A new genus and a new species of Trichiini from the Oriental Region (Coleoptera, Scarabaeidae). *Entomol. Rev. Japan* XLIX(1): 47-54.
- Tesar, Z.** 1942. Neue und wenig bekannte ostasiatische *Trichius* Arten. *Mitt. Munch Entomol. Ges.* 32: 213-219.
- Received Dec. 16, 1998*
Accepted Mar. 10, 1999

臺灣產長腳花金龜之分類註釋(鞘翅目：金龜子 總科：花潛金龜亞科)

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摘 要

本文敘述字紋虎斑花金龜(*Trichius signatus* Chûjô, 1940)之正模式標本的再發現經過，由此而確認墨翅長腳花金龜(*Gnorimus sumizome* Kobayashi, 1993)為本種之同物異名，再者，其亦應為長腳花金龜屬之一員。本文提供三個已知的大型長腳花金龜屬(*Tibiotrichius* Miyake, *Agnorimus* Miyake and Iwase, and *Gnorimus* Serville)臺灣產種類之分類現況，表列各屬與虎斑花金龜屬(*Trichius* Fabricius)間之鑑別性徵並簡論其關係。

關鍵詞：字紋虎斑花金龜、正模式標本、新組合、新同物異名、臺灣。