

Taxonomic Study on the Genus *Psilopholis* BRENSKE  
(Scarabaeidae, Melolonthinae, Melolonthini) with  
Consideration of Divisions of the Subtribe Melolonthina

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**Abstract** A new species of the genus *Psilopholis* is described from the mountainous areas of Borneo, East Malaysia under the name of *P. gigantea*. *Tricholepis vestita* is synonymized with *Psilopholis grandis*, the type species of this genus. So-called generic characters of the genus *Psilopholis* are scrutinized. Division of the subtribe Melolonthina into two lineages by only the difference in the number of segments of the antennal club is not sustainable. The subtribe Melolonthina cannot be reasonably divided into the two lineages by any other morphological characters.

Up to the present, the melolonthine genus *Psilopholis* has been monotypical, represented by the species, *Psilopholis grandis* alone, which has been known from the Malay Peninsula to Borneo via Java. In the course of my activities for collecting SE Asian melolonthines, I have accumulated a series of remarkably large specimens closely resembling the type species from Borneo. Lately, I searched for accounts that fit for these large specimens, but was unable to find any. I have noticed from these scrutinies that this species belongs to a new species. Therefore, I decided to describe it herein. Because neither BRENSKE nor the succeeding researchers pointed out the generic characteristics in detail, I would like to describe them at this place. Furthermore, I will synonymize a SHARP's species with *P. grandis*.

The subtribe Melolonthina has been divided into two lineages only by the difference in the number of segments of the antennal club by European and American researchers as in LÖBL & SMETANA (2006) without adequate discussions. This subtribe includes so many genera of various shapes, and therefore it is doubtful whether or not this subtribe can be divided into two groups only by the difference in the antennal configuration.

Thus, I have searched for other new characters which may be useful for dividing this subtribe and for confirming if the above division is surely valid or not.

Before going further, I would like to express my cordial gratitude to Messrs. K. HARUSAWA, Osaka, A. ABE, Aomori and M. FUJIOKA, Tokyo for offering me their related materials.

Genus *Psilopholis* BRENSKE

*Psilopholis* BRENSKE, 1892, Berl. ent. Z., 37: 38.

Body moderately to extremely large, elongate and convex. Both dorsal and ventral surfaces densely covered with thick minute hairs, without any roundish or oval scales.

Clypeus quadrate, gently rounded at antero-lateral corners, with anterior margin straight; antennae 10-segmented with three small lamellae; mentum transverse and pot-shaped with lateral margin strongly emarginate in anterior half.

Prosternum with triangular process just posterior to the intercoxal space of pro-coxae; mesosternum without any intercoxal process. Lateral sides of abdominal sternites each devoid of whitish patches of short thick hairs.

Protibia with three distinct denticles; the 2nd denticle clearly approaching to the 1st one; 3rd denticle rather sharp.

Aedeagus depressed and wide; phallobase twice as long as or longer than parameres in dorsal view, widely cleft and gently concave in each of apico-lateral triangular portions.

*Psilopholis grandis* (CASTELNAU, 1840)

(Fig. 1)

*Rhizotrogus grandis* CASTELNAU, 1840, Hist. nat. 2, 1840, p. 133. (Java).

*Tricholepis grandis*: BRENSKE, 1892, Berl. ent. Z., 37: 38.

*Psilopholis grandis*: BRENSKE, 1892, Berl. ent. Z., 37: 61.

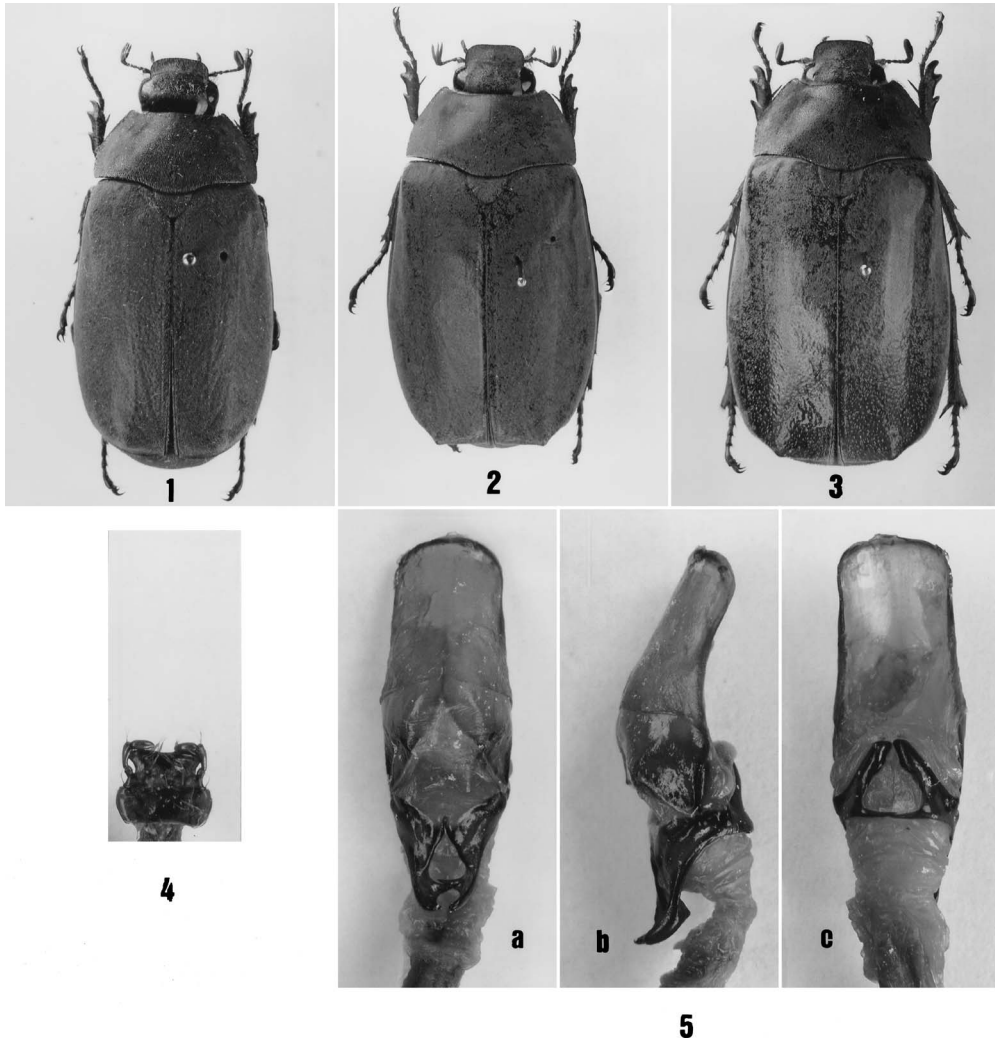
*Tricholepis vestita* SHARP, 1881, Notes Leyden Mus., 3, 232-233 (Sumatra). (*Syn. nov.*)

*Distribution.* Java, Sumatra, Borneo, Malay Peninsula.

*Specimens examined.* [Borneo] 1 ♂, Kimanis road (15 mi.), near Keningau, Sabah, 25-III-1992, K. HARUSAWA leg.; 3 ♂♂, Kimanis road (14 mi.), near Keningau, Sabah, 26-III-1992, K. HARUSAWA leg.; 1 ♂, near Kinabalu, N. Borneo, 24-VII-1988; 1 ♂, Keningau, Sabah, 24-III-1980, K. SUGINO leg. [Sumatra] 1 ♂, 2 ♀♀, Bukit Tinggi, W. Sumatra, VIII-1993; 2 ♀♀, Lembah Anai, near Bukit Tinggi, C. Sumatra, 26-XI-1987. [Malay Peninsula] 1 ♂, Tanah Rata, Cameron Highlands, 1-IV-1979; 1 ♂, 1 ♀, Cameron Highlands; 2 ♂♂, same locality as for the preceding specimens, 1987. All specimens belong to my personal collection.

*Notes.* I carefully read SHARP's original description of his *Tricholepis vestita*. It agrees well with the female characteristics of *Psilopholis grandis*. Accordingly, I regard *Tricholepis vestita* as a junior synonym of *Psilopholis grandis*.

In JUNK's Coleopterorum Catalogue, Pars 49 (1912), this species was recorded also from the Philippines and Amboina. I have examined many melolonthine materials from the Philippines up to the present, but I have never seen any specimen of this species from the area. Thus, the record of this species from the Philippines is doubtful, and therefore, I omit them from the distributional area of *P. grandis*. The record of *P. grandis* from



Figs. 1-5. — 1-3. Habitus of *Psilopholis* spp, ♂. — 1, *P. grandis*; 2, *P. gigantea*, ♂; 3, ditto, ♀.  
 — 4, Mentum of *P. gigantea*; 5, Male genitalia of *P. gigantea*; (a) dorsal side; (b) lateral side;  
 (c) ventral side.

Amboina is also perhaps based on misidentification. Accordingly, I also omit Amboina from the distributional area of *Psilopholis grandis*.

*Psilopholis gigantea* MATSUMOTO, sp. nov.

(Figs. 2, 3, 4, 5a, b, c)

*Description.* Length: 40.3–48.0 mm

*Male.* Body large and elongate. Dorsal surface bright brown to dark brown or dark reddish brown and almost covered with short yellowish hairs. Ventral surface dark brown or dark reddish brown.

Clypeus quadrate, rather strongly reflexed forward, almost straight along anterior margin and gently rounded at each antero-lateral corner; frons weakly convex, densely covered with short to long hairs, some of long hairs erect.

Pronotum wide, moderately produced laterad, strongly narrowed forward; lateral margin gently curved and serrate throughout. Elytra smooth, with five costae; only sutural and 5th costae conspicuous, 2nd to 4th inconspicuous or vestigial; apical knob becoming rather sharply raised tubercle. Pygidium with weak longitudinal sulcus from base to the middle.

Prosternum with feebly convex, triangular postcoxal process. Metasternum and metacoxae shining, densely with long hairs. Abdomen smooth, densely with short hairs, very sparsely so in medial portion and hairless in apical portion of the 6th sternite.

Metacoxa quadrate; lateral side arcuate and produced; upper and lower lateral corners much rounded. Metafemur with short and larger hairs on surface except in basal to median, long elliptical portion. Third denticle of protibia situated approximately medially; longer one of metatibial apical spurs sharp, pointed apically and far longer than the 1st metatarsal segment.

Parameres of male genitalia becoming less sclerotized apically on both dorsal and ventral sides, branching toward apex; ventral side especially reduced, giving an appearance of obtriangular sclerotized frame; internal sac very long and stout.

*Female.* Closely resembling male in almost all characters. Elytra densely covered with fine minute hairs in basal halves, rather sparsely with thicker hairs in apical halves; apical knob more weakly raised; apical two-fifths area rather strongly shining in medial rounded portion. Metafemur more or less stout; protibial denticles more rounded.

*Distribution.* Borneo Island (Sabah and Sarawak in the mountainous regions).

*Type series.* Holotype: 1 ♂, near Keningau, Sabah, 15-III-1988 (OMNH TI-483). Paratypes: 2 ♂♂, same data as for the holotype; 1 ♂, same locality as for the preceding specimens, 9~11-III-1988; 2 ♂♂, Mt. Kinabalu, N. Borneo, 28-IV-1984; 2 ♀♀, same locality as for the preceding specimens, IV-1994; 2 ♀♀, Kimanis road (15 mi.), near Keningau, Sabah, N. Borneo, 25-III-1992, K. HARUSAWA leg.; 2 ♂♂, 1 ♀, Kimanis road (14 mi.), near Keningau, Sabah, N. Borneo, 26-III-1992, K. HARUSAWA leg.; 1 ♂, Kimanis Road, Keningau, Borneo, 1-V-1988, M. YAGI leg.; 1 ♂, Mesilau, Sabah, N. Borneo, 14-IV-2006, A. ABE leg.; 1 ♂, Mt. Serapi, near Kuching, Sarawak, Borneo, 1-IX-1990; 1 ♀, same locality as for the preceding specimen, 20-IX-1990; 1 ♀, same locality as for the preceding specimen, 14-X-1989. The holotype is deposited in the Osaka Museum of Natural History, Osaka City and the remaining paratypes are all

housed in my personal collection.

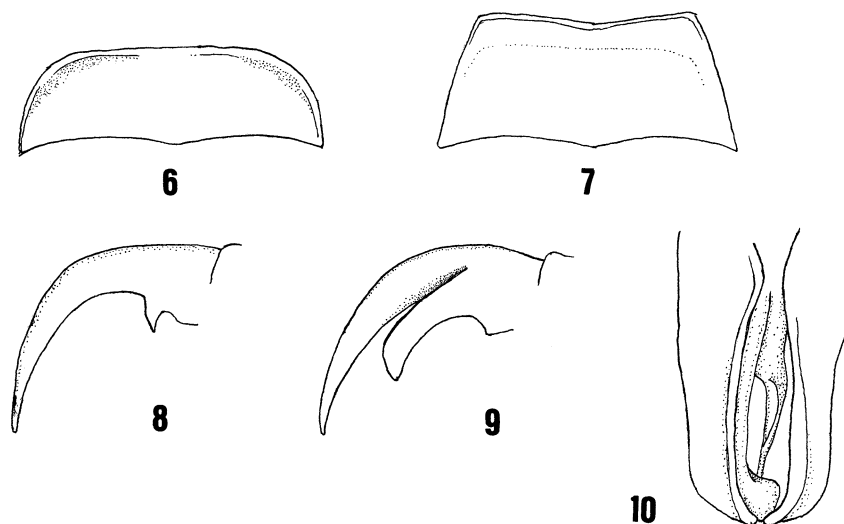
*Etymology.* This species was named after its very large body.

*Notes.* This new Bornean species of large body closely resembles the type species, *Psilopholis grandis* in its external morphology, so that it is rather difficult to point out the differences between the two. The new Bornean species can be differentiated from the hitherto known specimens of *Psilopholis grandis* as follows: 1) lateral margin of pronotum gently curved in male; 2) ventral side of paramere of male genitalia strongly reduced in sclerotization, becoming a shape like an obtriangular frame.

*Psilopholis grandis* is widespread from the Malay Peninsula, Sumatra to Borneo via Java. The body length is not different from one another at least among the populations of Sumatra, Borneo and the Malay Peninsula.

The specimens of *P. grandis* and those of the new species of very large body can be collected at the same time in the same locality at least at Kimanis Road of Keningau District of North Borneo. Accordingly, it cannot be regarded as a subspecies of *P. grandis* although this new species closely resembles *P. grandis*. These two species have a clear difference in the body length. The ranges of the body length of these two species do not overlap each other.

This indicates that these two species do not belong to the same species showing a very large variation in the body length, but that they are clearly independent species. For these reasons, I regard this species of very large body as a new species and give a new name, *P. gigantea*.



Figs. 6-10. — 6-7. Clypeus — 6, *Psilopholis grandis*; 7, *Stephanopholis melolonthoides*. — 8-9. Protarsal claw — 8, *Melolontha japonica*; 9, *Anoxia villosa*. — 10. Male genitalia of *Dasylepida ishigakiensis*.

Table 1. A list of species belonging to the subtribe Melolonthina examined for comparative study of the genera.

species	collection locality
<i>Melolontha melolontha</i> LINNÉ, 1758	France: 73, Macon
<i>M. japonica</i> BURMEISTER, 1855	Japan: Wakayama, Susami-chô, Samoto
<i>Anisopholis affinis</i> MOSER, 1914	W. Sumatra: near Bukit Tinggi, Harau Valley
<i>Exolontha pennata</i> (SHARP, 1876)	N. Thailand: near Chiang Mai
<i>Schoenherria sulcipennis</i> (CASTELNAU, 1840)	Philippines: C. Luzon, near Lucena, Kinabuhayan
<i>Polyphylla laticollis</i> LEWIS, 1887	Japan: Osaka, Toyosato
<i>P. schoenfeldti</i> BRENSKE, 1890	Japan: Amami-Oshima Is.
<i>Anoxia villosa</i> FABRICIUS, 1781	France: 33, Le grencaf; Italy: Mariwa Ravewwa
<i>A. australis</i> SHOENHERR, 1817	Spain: Murcia, Mar Menor, La Manga
<i>Engertia lii</i> KEITH, 2006	Philippines: Mindanao Is., Mt. Apo & Mt. Parker, Leyte Is., Mt. Balocawihay
<i>Exopholis hypoleuca</i> (WIEDEMANN, 1819)	W. Sumatra: near Bukit Tinggi, Harau Valley & Lembah Anai
<i>Asactopholis gracilipes</i> (SHARP, 1876)	N. Borneo: near Keningau
<i>Chaetocosmetes</i> sp. 1	Malaysia: Cameron H.L., Tanah Rata
<i>C.</i> sp. 2	Malaysia: Kedah
<i>Stephanopholis melolonthoides</i> (BRENSKE, 1892)	Philippines: N. Luzon, Asin Hot-spring
<i>Wadaia kaorui</i> ITOH, 1994	N. Borneo: Mt. Trus Madi & Mt. Kinabalu
<i>Psilopholis grandis</i> (CASTELNAU, 1840)	W. Sumatra: near Bukit Tinggi, Lembah Anai
<i>Lepidiota bimaculata</i> SAUNDERS, 1839	Thailand: Bangkok & near Chiang Mai
<i>Leucopholis tristis</i> BRENSKE, 1892	W. Sumatra: near Bukit Tinggi, Harau Valley
<i>Cyphochilus cretaceus</i> (NIJIMA et KINOSHITA, 1923)	Taiwan: Nantou, Nanshanchi & Sun Moon Lake
<i>C. feae</i> BRENSKE, 1903	N. Thailand: Chiang Mai
<i>Dedalopterus malyszi</i> BUNALSKI, 2002	N. Vietnam: Sapa
<i>Malaisius siamensis</i> LI et YANG, 1999	N. Thailand: Fang
<i>Dasylepida ishigakiensis</i> (NIJIMA et KINOSHITA, 1927)	Japan: Okinawa, Ishigakijima & Miyakojima Isls.
<i>D. fissa</i> MOSER, 1913	Taiwan: Nantou, Lienhwachi & Shizutou

### Character Analysis of the Subtribe Melolonthina

The subtribe Melolonthina has been divided into the *Melolontha* lineage and the *Leucopholis* one only by the difference of the antennal club composed of three segments or more segments. For example, LÖBL & SMETANA (2006) listed the former as Melolonthini and the latter as Leucopholini.

I tried to investigate whether or not this division into two lineages can be supported by other characters when used the representative genera of the Palearctic and Oriental Regions for the subtribe Melolonthina. I listed up twenty-five representative species examined for this investigation in Table 1.

The characters for comparison need to be shared by as much genera as possible. I carefully selected them as follows:

Table 2. Comparison of the characters among representative species of the principal genera of the subtribe Melolonthina in the Palearctic and Oriental Regions. See the text about the content of the numbered characters in the matrix. The genus with a symbol (\*) shows that it is recognized as either of two lineages in LOBL & SMETANA (2006).

lineage	species	character							
		1	2	3	4	5	6	7	8
<i>Melolontha</i> lineage	* <i>Melolontha melolontha</i>	0	0	1	0	1	0	0	0
	* <i>M. japonica</i>	0	0	1	1	1	0	0	0
	<i>Anisopholis affinis</i>	2	1	1	1	1	0	0	0
	* <i>Exolontha pennata</i>	0	0	1	0	0	0	0	0
	<i>Schoenherria sulcipennis</i>	0	0	1	1	1	0	0	0
	* <i>Polyphylla laticollis</i>	2	1	1	0	0	0	1	0
	* <i>P. shoefeldti</i>	2	1	1	0	1	1	1	0
	* <i>Anoxia villosa</i>	0	1	1	0	1	1	1	0
	* <i>A. australis</i>	0,1	1	1	0	1	1	1	0
	<i>Engertia lii</i>	2	0	1	1	1	1	1	0
<i>Leucopholis</i> lineage	<i>Exopholis hypoleuca</i>	3	0	0	0	0	0	0	1
	* <i>Asactopholis gracilipes</i>	2	0	0	0	0,1	0	0	1
	<i>Chaetocosmetes sp.1</i>	1	0	0	0	0	0	0	0
	<i>C. sp.2</i>	0,1	0	0	0	0	0	0	0
	<i>Stephanopholis melolonthoides</i>	2	1	0	1	0	0	0	0
	<i>Wadaia kaorui</i>	2	1	0	0	1	0	1	0
	<i>Psilopholis grandis</i>	0	0	0	0	0	0	0	0
	* <i>Lepidiota bimaculata</i>	2	0	0	0	0,1	0	0	0
	* <i>Leucopholis tristis</i>	2	0	0	1	1	0	0	0
	* <i>Cyphochilus cretaceus</i>	2	0	0	0	0	0	0	1
	* <i>C. feae</i>	2	0	0	1	0	0	0	1
	* <i>Dedalopterus malyszi</i>	2	0	0	0	0	0	0	0
	* <i>Malaisius siamensis</i>	0	0	0	0	0	0	?	1
	* <i>Dasylepida ishigakiensis</i>	1	0	0	0	0	0	1	1
	* <i>D. fissa</i>	1	0	0	0	0	0	1	1

### Characters

1. integument of dorsal side (0) fine hairs only; (1) thick hairs; (2) rounded or rice-shaped scale; (3) glabrous
2. clypeus in male (0) rounded (e.g., Fig. 6); (1) strongly angulate (e.g., Fig. 7)
3. number of segments of antennal club (0) more than three segments at least in male; (1) three segments in both sexes
4. mesosternal process (0) absent; (1) more or less developed
5. maculations at sides of abdomen (0) not developed; (1) present as a patch
6. position of the denticle of protarsal claw in male (0) situated below the claw (e.g., Fig. 8); (1) occurring from inner side of the claw (e.g., Fig. 9)
7. difference in shape of claw between sexes (0) absent; (1) present
8. internal branching of each paramere of male genitalia (0) absent; (1) present (e.g., Fig. 10)

The eight characters enumerated above were examined for twenty-five species in the list. The resultant matrix is in Table 2. In this investigation, the only materials from Palearctic and Oriental Regions were examined.

This result seems to indicate that the division into two lineages cannot be supported what characteristics might be selected except for the number of the segments of antennal club. However, some genera may be able to form small groups by sharing above enumerated characters.

For example, *Polyphylla*, *Anoxia* and *Engertia* may form a genus-group by sharing the denticle of male protarsal claw occurring from its inner side, although *Polyphylla laticollis* does not share the characteristics. These three genera have their claws clearly differentiated between male and female.

In the same way, *Exopholis*, *Asactopholis*, *Dasylepida*, *Malaisius* and *Cyphochilus* share the branching parameres, so that their relationship must be carefully examined. *Cyphochilus*, *Dedalopterus* and *Malaisius* may be allied to one another by the mildly and roundly trapezoidal clypeus, although this is not shown in the result in Table 2.

In the subtribe Melolonthina, some genera may be related to each other and form genus-groups, but others cannot be combined with any other genera. So far as I have examined this result, it is impossible to assign all the genera in the subtribe Melolonthina either to the *Leucopholis* lineage or to the *Melolontha* one by any definite morphological characteristics. Thus, I would like to propose not to use the names of these two lineages and to state merely that the genus *Psilopholis* belongs to the subtribe Melolonthina here.

## 要 約

松本 武：ボルネオ島産の *Psilopholis* 属の 1 新種ならびにコフキコガネ亜族の慣例的な区分の正当性について。——コフキコガネ亜族の *Psilopholis* 属の特大種をボルネオ島から見出し、*P. gigantea* と命名した。本種は、基準種 *P. grandis* にきわめてよく似ているが、少なくともボルネオ島北部では同所的に生息していること、両者の体長差は歴然としており、変異の幅の重なり合うことがなく中間的な大きさの個体もないこと、♂交尾器側片の裏側には顕著な差があることなどから新種と考えられたのでここに記載した。*Psilopholis* 属の形質状態についての記述が少なかったため改めてここで記載した。スマトラ島から記載された *Tricholepis vestita* SHARP の記載を丹念に調べたところ、*P. grandis* の♀についての記述であることが判明したので、これを新参下位異名とした。

従来、コフキコガネ亜族は、触角葉片節の数の違いのみによって *Melolontha* 属または *Leucopholis* 属に近い 2 系列の属群に分けられてきたが、この区分が他の形質でも支持されるかどうか主要な属の代表種を使って検討した。多様な形態をもつこの亜族の属は触角以外の形質では 2 系列にはっきりと割り振ることができなかった。このため、コフキコガネ亜族を *Melolontha* 属系列、*Leucopholis* 属系列の 2 系列に分けることは合理的ではないと考えられるので、この呼称を使わないように提唱したい。今回、取り扱った *Psilopholis* 属は、単にコフキコガネ亜族に属するものであると述べるにとどめておきたい。



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*Elytra, Tokyo*, **38**(2): 247–248, November 13, 2010

## An Old Record of *Hydaticus thermonectoides* (Coleoptera, Dytiscidae) from Kyushu Island, Japan

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*Hydaticus thermonectoides* SHARP, 1884 was originally described from Nagano Prefecture, central Honshu, Japan and has been known from Japan (central Honshu), South Korea, and China (Jiangsu, Zhejiang and Yunnan) (MORI & KITAYAMA, 2002; NILSSON, 2003). Recently, we have found a specimen of this species collected from the northern part of Kyushu Island about half a century ago. This is the first record of *H. thermonectoides* from Kyushu Island.

*Specimen examined.* 1♀, Mt. Hikosan, Soeda-machi, Fukuoka Pref., Kyushu, Japan, 15–VII–1954, H. KAMIYA leg. In the collections of the National Museum of Nature and Science, Tokyo.

*Notes.* This specimen was collected by the late Dr. Hiroyuki SASAJI (= KAMIYA). As aquatic

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