

A New Species of the Genus *Hydrovatus* (Coleoptera, Dytiscidae) from Iriomote Island, Southwestern Japan, with a Key to the Japanese Species

Olof BISTRÖM^{1)*} and Kohei WATANABE²⁾

¹⁾Finnish Museum of Natural History, Entomology Unit, POBox 17,
FI-00014 University of Helsinki, Finland
E-mail: olof.bistrom@helsinki.fi

²⁾Ishikawa Insect Museum, 3, Inu, Yawata-machi,
Hakusan-shi, Ishikawa, 920–2113 Japan
E-mail: kontyu11@furekon.jp

* Contribution to the study of Dytiscidae 88.

Abstract The genus *Hydrovatus* MOTSCHULSKY, 1853 known from Japan is briefly discussed. *Hydrovatus remotus* n. sp. is described from Island of Iriomote, Okinawa Prefecture, southernmost Japan, on the basis of seven specimens. Characters for separation from the closely related species and detail illustrations of male genitalia are given. The habitat of the collecting site is briefly described and photographed. A key to the species for Japan is presented.

Key words: Coleoptera, Dytiscidae, genus *Hydrovatus*, new species, taxonomy, key to species, Japan.

Introduction

The diving beetle genus *Hydrovatus* MOTSCHULSKY, 1853, is one of the most species rich among all dytiscid genera with at present 210 recognized species (cf. NILSSON, 2016). Its distribution ranges all continents except Antarctic but the main occurrence is concentrated to tropical and subtropical regions. The genus was revised quite recently by BISTRÖM (1997) and after this there has been a few additions, the latest being BISTRÖM and BERGSTEN (2016).

In this paper we describe a new species from the Island of Iriomote, southernmost Japan, which is the second largest island of the Ryukyu archipelago. Besides islands of Okinawa the closest larger piece of land is Taiwan, located some 200 km apart (Fig. 6). At present in all eight *Hydrovatus* species are known from Japan. A key to the species of Japan is given below.

A number of species groups were introduced in the revision (BISTRÖM, 1997) and the *H. remotus* undoubtedly belongs to the species group *H. confertus*. With *H. remotus* included the number of species in the species group is now 19.

Abbreviations as follows:

FMNH — Finnish Museum of Natural History, University of Helsinki, Finland;

IIM — Ishikawa Insect Museum, Ishikawa Pref., Japan

Taxonomy

Hydrovatus remotus n. sp.

[Japanese name: Chûgata-maru-keshi-gengorô]

(Figs. 1–5, 7)

Type locality. Iriomote, Taketomi-chô, Iriomote Island, Okinawa Pref., Japan.

Type material. 7 exs. Holotype: 1 ♂ (National Museum of Nature and Science, Japan), around paddy, Iriomote, Taketomi-chô, Iriomote Island, Okinawa Pref., Japan, 26.X.2016, Kohei WATANABE leg. Paratypes: 1 ♂ (IIM), 1 ♀ (FMNH), same data as for the holotype; 1 ♀ (Coll. INAHATA, Japan), fallow field, Iriomote, Taketomi-chô, Iriomote Island, Okinawa Pref., Japan, 4–5.IV.2015, Light Trap, Noriaki INAHATA leg; 1 ♀ (FMNH), 2 ♀♀ (IIM), pond, Haiminaka, Taketomi-chô, Iriomote Island, Okinawa Pref., Japan, 27.X.2016, Kohei WATANABE leg.

Diagnosis. In the species group *H. confertus* only two species were known lacking stridulatory apparatus in male, viz. *H. jaechi* BISTRÖM and *H. agathodaemon* BISTRÖM, both described from Indonesia. *H. remotus* n. sp., described from Japan is the third one. All other species placed in this species group have either a stridulatory apparatus with ridges or a glabrous area on the same location as the stridulatory apparatus. From *H. agathodaemon*, *H. remotus* is distinguished by the male antenna which is slender and unmodified, while finely modified and enlarged in *H. agathodaemon*. From *H. jaechi*, *H. remotus* is separated by the slightly larger body (the length of *H. jaechi* 2.4–2.5 mm) and by the clearly finer punctures on elytra in *H. jaechi*.

Description. Body: Length, males 2.7–2.8 mm, females 2.6 mm; width, males 1.6–1.8 mm, females 1.6–1.7 mm. Head and pronotum pale ferruginous to ferruginous; elytra slightly darker, one colored ferruginous. Pronotal base at each side of middle with a rather narrow, vague, darker marking (Fig. 1 & 7).

Head: Frontal outline slightly uneven; not distinctly margined but at each side of middle with a few fine, punctures forming, minor transverse impressions. Slightly matte; with distinct reticulation. Punctures fine and sparse; extensively almost absent. Punctures densest at eyes, in two shallow, frontal depressions and posteriorly in middle of head. Antenna slightly modified. Slightly enlarged up to fourth segment and from there slightly and evenly narrowing to apical joint (Fig. 2).

Pronotum: Lateral outline slightly and evenly curved. Slightly matte, with distinct reticulation. With fairly distinct and evenly distributed punctures; discally punctures slightly weaker and sparser.

Elytra: Slightly matte to rather shiny (a little more shiny than pronotum); with distinct reticulation. With rather fine to fairly coarse punctures; punctures quite dense and almost evenly distributed. Rows of punctures absent (mixed with ordinary punctures). Epipleura pale ferruginous; with distinct but irregular punctures; finely reticulated.

Ventral aspect: Pale ferruginous to ferruginous; no distinct color pattern. Submat, with distinct reticulation. Metathorax, metacoxal plates and basal ventrite with fairly coarse, quite dense punctures. Punctures on rest of abdomen finer, sparser and in part rather indistinct. No stridulatory apparatus frontally on metacoxal plates.

Legs: Pale ferruginous to ferruginous. Pro- and mesotarsus slightly enlarged, claws simple, unmodified.

Male genitalia (Figs. 3–5): Lateral sides of penis evenly convergent anteriorly and posteriorly in dorsal view; near apex of penis with a slight constriction, then the lateral sides slightly divergent and

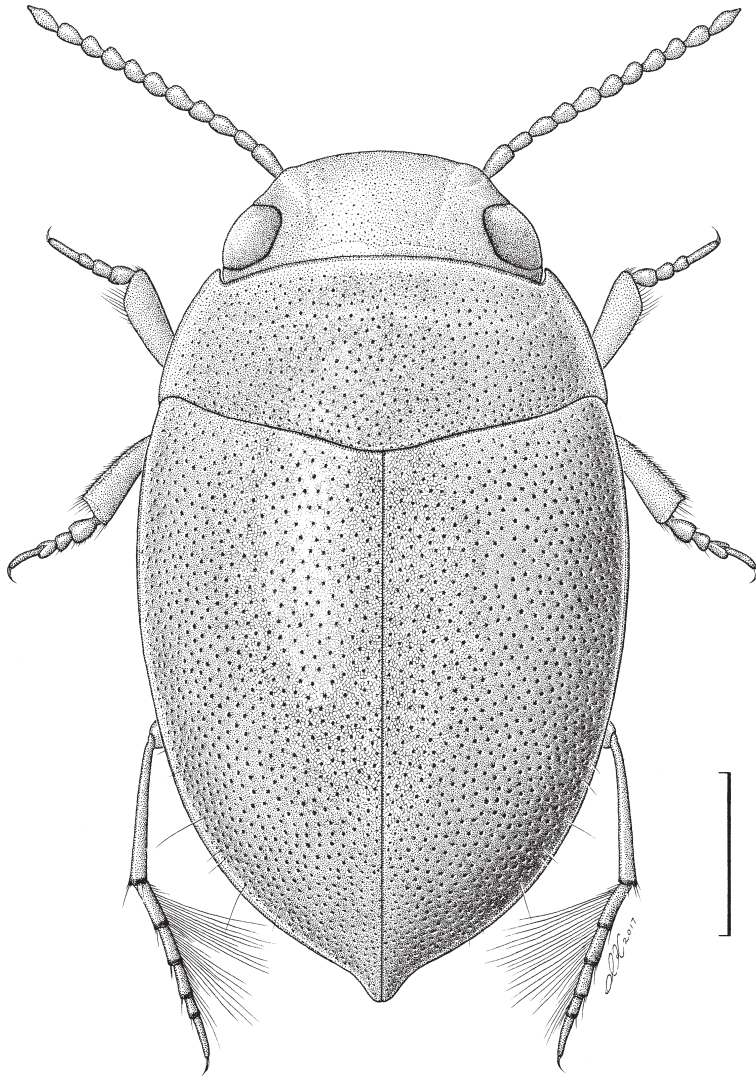


Fig. 1. Dorsal view of *Hydrovatus remotus* n. sp., paratype, male, sketched by I. KAWASHIMA. Scale: 0.5 mm.

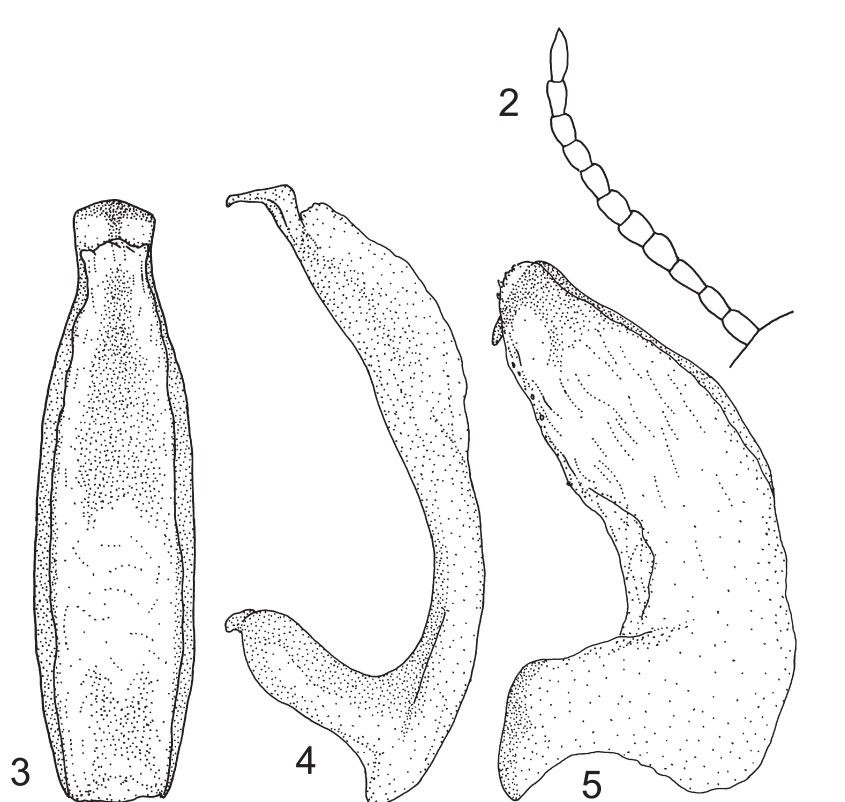
the apex truncated. In laterel view, apex of penis form a fine hook downward, the dorsal margin of hook straight. Apical part of parameres covered with soft and semitransparent tissue. Apical hook of parameres sclerotized and discernible through soft tissue, the dorsal margin almost straight.

F e m a l e: Externally as male but antenna not modified, slender.

Etymology. The species name *remotus* is Latin and means distant. It refers to the site of the new species being on the remote Island of Iriomote in southernmost Japan.

Distribution. Japan: Iriomote Island (Fig. 6).

Habitat. Collecting information of *H. remotus* is as follows. In all seven specimens were preserved from three sites (Table 1). At the type locality (around paddy in Iriomote), three individuals



Figs. 2–5. *Hydrovatus remotus* n. sp. — 2, Male antenna; 3, penis, dorsal aspect; 4, penis, lateral aspect; 5, paramere. Scales: Up 1.0 mm, for antenna; down 0.5 mm, for male genitalia.

were collected from open channel where shallow plants were densely planted. Besides *H. remotus* the following species were sampled from the same site: *Neohydrocoptus subvittulus* (MOTSCHULSKY), *Hydrovatus pumilus* SHARP, *H. yagii* KITAYAMA, MORI & MATSUI, *H. stridulus* BISTRÖM, *H. acuminatus* MOTSCHULSKY, *H. bonvouloiri* SHARP, *Hydroglyphus amamiensis* (M. SATŌ), *Leiodytes nicobaricus* (REDTENBACHER), *Laccophilus chinensis* BOHEMAN, *L. sharpi* REGIMBART, *Copelatus tenebrosus* REGIMBART and *Cybister sugillatus* ERICHSON. The second site (Fig. 8) is a pond in Haiminaka. Three individuals were collected from the place where shallow plants were densely planted. Besides *H. remotus* the following species were sampled from the same site: *N. subvittulus*, *Canthydrus nitidulus* (SHARP), *H. stridulus*, *H. acuminatus*, *H. bonvouloiri*, *Herophydrus rufus* (CLARK), *L. sharpi*, *Copelatus tenebrosus*, *Hydaticus vittatus* (FABRICIUS), *Cybister sugillatus* and *C. tripunctatus* (FABRICIUS). The third site is fallow field in Iriomote near the type locality. In this place, one individual was collected from the right trap. Besides *H. remotus* the following species were sampled from the same site: *H. pumilus*, *H. yagii*, *H. stridulus*, *H. acuminatus*, *H. seminarius* MOTSCHULSKY and *H. bonvouloiri* (INAHATA, 2016: *H. remotus* n. sp. was recorded as *H. subtilis* by misidentification.).

Key to *Hydrovatus* Species from Japan

The key is only applicable for male specimens (For caplets 1–3, it is common to all specimens). For construction of the key we have used specimens collected from Japan solely. For the time being, the status of some species is regarded uncertain and in need of further study. Below these species are briefly commented:

The taxonomy of *H. bonvouloiri* is slightly uncertain and future studies (e.g. DNA analyses) may prove that it is synonymous with another described species from Oriental Region.

Possible synonymy between *H. pumilus* and *H. pudicus* (CLARK, 1863) is still an open question and in need of further study.

The taxonomic status of *H. subtilis* in Japan is uncertain. Japanese specimens differ slightly in shape of male antenna from *H. subtilis* specimens from e.g. Thailand.

For habitus and genitalia illustrations, c.f. also BISTRÖM (1997).

Distribution is based on MATSUI (1988, 1990), MORI and KITAYAMA (2002), SATÔ (2003), HOSOYA *et al.* (2009), KITANO *et al.* (2011), AOYAGI (2011 a, b, 2012, 2013, 2015), YOSHITOMI (2014), HAYASHI and KADOWAKI (2016), INAHATA (2016) and WATANABE *et al.* (2016). According to Mr. AOYAGI, *H. yagii* of AOYAGI (2015) is in fact *H. pumilus*. In addition, caution is necessary because earlier records of *H. subtilis* may be errors and they are possibly to be associated to *H. stridulus* or *H. remotus* n. sp.

1. Body large; length 3.5–3.7 mm. Distribution: Honshu, Shikoku, Kyushu, Tokara Isls. (Nakano Is.), Iheya Is., Izena Is., Okinawa Is., Kume Is., Yagaji Is., Ishigaki Is., Kohama Is., Iriomote Is., Yonaguni Is. *H. bonvouloiri* SHARP, 1882
- Body smaller; maximum length 2.8 mm 2
2. Body small; length 1.9–2.1 mm 3
- Body larger; length 2.4–2.8 mm 4
3. Body elongated, subparallel-sided; elytral punctures on disc fine, sparse and slightly irregularly distributed. Distribution: Kyushu, Amami-Ôshima Is., Aka Is., Ishigaki Is., Iriomote Is. *H. pumilus* SHARP, 1882
- Body slightly globular, with sides somewhat rounded; elytral punctures on disc slightly coarser, denser and less irregularly distributed. Distribution: Honshu, Amami-Ôshima Is., Ikema Is., Ishigaki Is., Iriomote Is. *H. yagii* KITAYAMA, MORI & MATSUI, 1993
4. Male lacks stridulation apparatus on metacoxal plates along suture close to metathorax 5
- Male with stridulation apparatus on metacoxal plates along suture close to metathorax 6
5. Penis distinctly angled at apex, curvature abrupt (lateral aspect) (Fig. 4). Distribution: Iriomote Is. *H. remotus* n. sp.
- Penis not angled at apex, almost straight or smoothly curved (lateral aspect). Distribution: Honshu, Dogo Is., Shikoku, Kyushu, Amami-Ôshima Is., Tokunoshima Is., Iheya Is., Izena Is., Okinoerabu Is., Yoron Is., Okinawa Is., Yagaji Is., Sesoko Is., Tonaki Is., Tokashiki Is., Aka Is., Miyako Is., Ishigaki Is., Kohama Is., Iriomote Is., Yonaguni Is., Daitô Isls. (Minamidaitô Is.) ... *H. acuminatus* MOTSCHULSKY, 1859
6. Head between eyes narrowly margined; apical part of penis evenly curved (ventrally). Distribution: Amami-Ôshima Is., Ishigaki Is., Iriomote Is. *H. seminarius* MOTSCHULSKY, 1859
- Head between eyes not margined; at most with fine, elongated impressions at frontal edge on each side of middle; apical part of penis abruptly curved /angled (lateral aspect) 7
7. Male antenna from fourth joint to apex clearly and evenly enlarged (equally broad). Distribution: Honshu, Hegura Is., Amami-Ôshima Is., Okinawa Is., Ishigaki Is., Iriomote Is., Yonaguni Is. ...

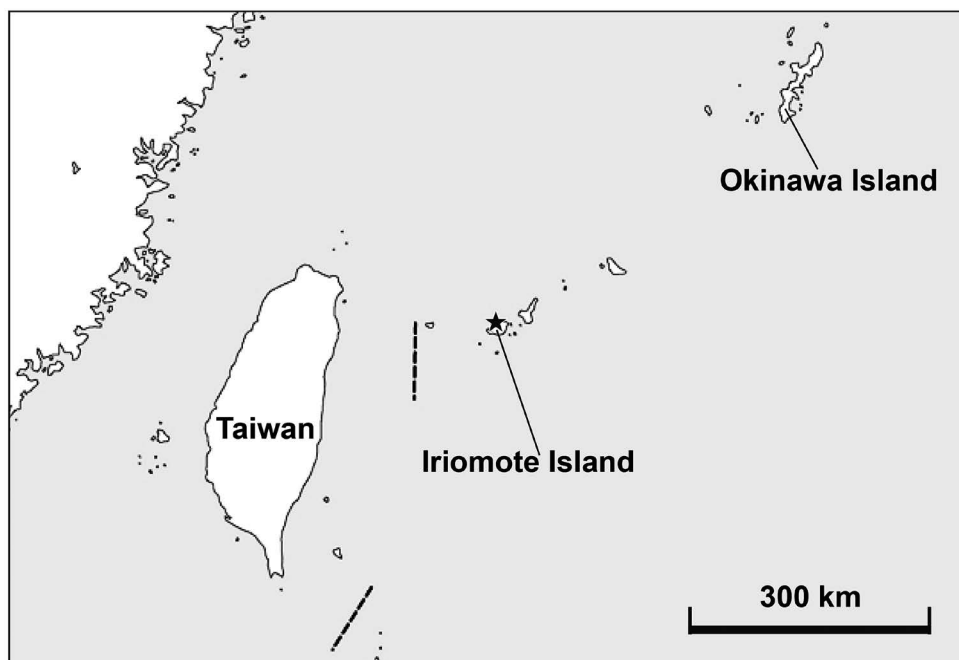


Fig. 6. Map of the Iriomote Island with type locality, marked ★.

- *H. stridulus* BISTRÖM, 1997
- Male antenna with joints 7–8 broader than adjacent joints (this character is not evident in specimens from Japan, which have less modified male antenna). Distribution: Honshu, Hachijō Is., Shikoku, Kyushu, Tokara Isls. (Nakano Is., Akuseki Is.), Amami-Ōshima Is., Tokunoshima Is., Iheya Is., Okinawa Is., Aka Is., Ikema Is., Ishigaki Is., Kohama Is., Iriomote Is., Yonaguni Is.
- *H. subtilis* SHARP, 1882

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Fig. 7 . Dorsal view of *Hydrovatus remotus* n. sp., holotype, male, photographed by P. MALINEN.



Fig. 8. Picture of one of the collecting sites, a pond in Haiminaka. Photo: K. WATANABE.

Table 1. Dytiscoidea collected in the habitats of *Hydrovatus remotus* n. sp.

Species name	The type locality: around paddy in Iriomote	The second site: pond in Haiminaka	The third site ¹ : fallow field in Iriomote
<i>Neohydrocoptus subvittulus</i> (MOTSCHULSKY)	●	●	
<i>Canthydrus nitidulus</i> (SHARP)		●	
<i>Hydrovatus pumilus</i> SHARP	●		●
<i>Hydrovatus yagii</i> KITAYAMA, MORI & MATSUI	●		●
<i>Hydrovatus stridulus</i> BISTRÖM	●	●	●
<i>Hydrovatus remotus</i> n. sp.	●	●	●
<i>Hydrovatus acuminatus</i> MOTSCHULSKY	●	●	●
<i>Hydrovatus seminarius</i> MOTSCHULSKY			●
<i>Hydrovatus bonvouloiri</i> SHARP	●	●	●
<i>Hydroglyphus amamiensis</i> (M. SATŌ)	●		
<i>Leiodytes nicobaricus</i> (REDTENBACHER)	●		
<i>Herophydrus rufus</i> (CLARK)		●	
<i>Laccophilus chinensis</i> BOHEMAN	●		
<i>Laccophilus sharpi</i> REGIMBART	●	●	
<i>Copelatus tenebrosus</i> REGIMBART	●	●	
<i>Hydaticus vittatus</i> (FABRICIUS)		●	
<i>Cybister sugillatus</i> ERICHSON	●	●	
<i>Cybister tripunctatus</i> (FABRICIUS)		●	

¹: The third site was based on INAHATA (2016).

要 約

Olof BISTRÖM・渡部晃平：西表島から発見された新種 *Hydrovatus remotus* n. sp. と日本産マルケシゲンゴロウ属 *Hydrovatus* (コウチュウ目ゲンゴロウ科) について、——— 沖縄県西表島から本属の新種チュウガタマルケシゲンゴロウ *H. remotus* n. sp. を7個体の標本に基づいて記載した(タイプ産地：沖縄県西表島竹富町西表)。本新種はオス後基節の隆起線列 stridulatory apparatus を欠くこと、オス交尾器の形態などにより他種と区別できる。さらに、本新種を含めた日本産マルケシゲンゴロウ属8種の検索表を作成した。

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