

Additions to the Trechine Fauna of Northeast Japan (Coleoptera, Trechinae)

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Abstract

Three species of trechine beetles of the genus *Trechus* are newly recorded from Hokkaido and the Island of Rishiri-tô, Northeast Japan. Two of them are new species belonging to the subgenera *Epaphiolus* and *Epaphius*, named *T. sugai* and *T. matsumotoi* respectively. The other is *T.* (s. str.) *apicalis* MOTSCHULSKY, widely distributed over the cold-temperate areas in northeastern Asia and northern North America.

Through the courtesy of Mr. Toshinobu MATSUMOTO, I was able to examine three specimens of trechine beetles collected on the Island of Rishiri-tô off northern Hokkaido, Northeast Japan. From this volcanic island, an endemic species of trechine beetle has already been recorded. It is *Trechus* (*Epaphius*) *ikutanii* S. UÉNO (1961, p. 343; FISCHHUBER, 1977, p. 7), known so far only from a female obtained near Lake Himé-numa at the northern foot of Mt. Rishiri-zan. The present material came from a higher elevation of the same volcano, and is evidently different from *T. ikutanii*.

Of the three specimens, a pair of smaller ones were determined to be a new member of the subgenus *Epaphius* closely related to a subalpine species occurring in the mainland of Hokkaido, while the remaining larger one was identified with *T.* (s. str.) *apicalis* MOTSCHULSKY, which had theretofore been known, in Asia, from the Maritime Territory, the northern Kuriles and Kamchatka. In the present paper, I am going to describe the new species under the name of *T.* (*E.*) *matsumotoi* and to record *T. apicalis* for the first time from Japan.

At this opportunity, I am also going to describe a remarkable new species of the same genus from southern Hokkaido. The single known specimen of this trechine was received from Mr. Kuniaki SUGA nearly twenty years ago, and its importance, both taxonomic and zoogeographic, has been noted since then. However, I have refrained from describing it, as SUGA's specimen is unfortunately a female. It may be a member of *Epaphiolus*, but has several peculiarities that deny its close relationship with *T. rivularis* (GYLLENHAL), the only known species of the subgenus. Since no additional specimens have been obtained for a very long time, I have decided to introduce it into science under the name of *T. sugai*, with the hope that this will encourage carabid collectors to look for new materials of the trechine more attentively.

The abbreviations used in this article are the same as those explained in other papers of mine.

Before going further, I wish to express my hearty thanks to Messrs. Toshinobu MATSUMOTO and Kuniaki SUGA for their kindness in submitting the interesting specimens at my disposal for study.

Trechus (Epaphiolus) sugai S. UÉNO, sp. nov.

[Japanese name: Suga-chibigomimushi]

(Fig. 1)

Length: 4.25 mm (from apical margin of clypeus to apices of elytra).

Readily recognized not only on the peculiar conformation of its prothorax but also on the unique disposition of setiferous dorsal pores and apical striole on its elytra.

Relatively large species of peculiar facies, with small fore body, ample elytra and fairly slender appendages; apterous and depigmented. Colour reddish brown, shiny, faintly iridescent on elytra; mandibles except for the dorso-internal face, and margins of prothorax and each elytron infuscated; maxillae, labium, scape and apical half of antennae, propleura, ventral surface of hind body and legs more or less lighter than the other parts of body, mostly yellowish brown.

Head small, obviously wider than long, and depressed above; frontal furrows shallow though entire, obtusely subangulate at middle, and rather widely divergent in front and behind; frons only very slightly convex or rather flattened, supraorbital areas gently convex; microsculpture sharply impressed, mostly formed by isodiametric meshes; supraorbital pores fairly close to each other on either side, lying on lines divergent posteriorly; eyes rather large and well convex, much longer than genae, which are about one-sixth as long as eyes, perfectly glabrous, very slightly convex, and strongly contracted behind; neck rather narrow, with the anterior constriction deep and sharply marked at the sides; labrum transverse and only shallowly emarginate at apex; mandibles stout, briefly hooked at apices, with a premolar tooth on the right; mentum tooth porrect and distinctly bifid; palpi short and rather thin, with penultimate segments gently dilated towards apices; antennae filiform and thin, reaching basal third of elytra, with segment 2 about seven-eighths as long as segment 3 which is very slightly longer than segment 4, segments 7–9 subequal in length to one another, each about as long as segment 3 and fully three times as long as wide, terminal segment the longest, obviously longer, though much narrower, than scape.

Pronotum transverse subquadrate, much wider than head, much wider than long, widest at two-thirds from base, and more strongly narrowed towards apex than towards base; PW/HW 1.34, PW/PL 1.36, PW/PA 1.45, PW/PB 1.27; surface moderately convex, microsculpture formed by fine transverse lines; sides entirely bordered and reflexed, gently arcuate in front, very feebly so behind the widest part, and gently again just in front of hind angles, without trace of ante-basal sinuation; side borders narrow in front but becoming wider behind the widest part and forming very widely

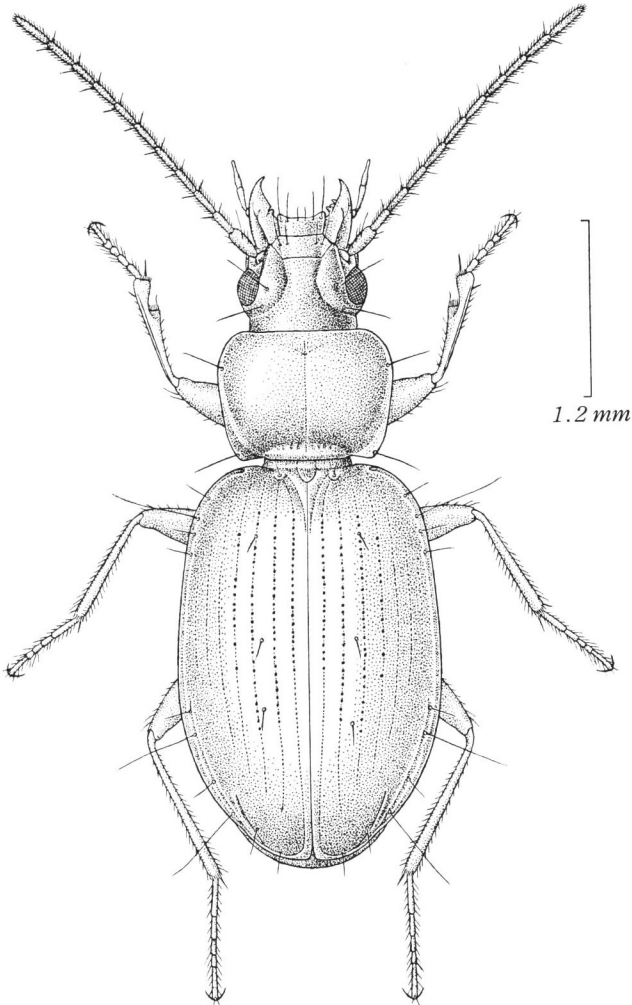


Fig. 1. *Trechus (Epaphiolus) sugai* S. UÉNO, sp. nov., ♀, from Ohnuma in southwestern Hokkaido.

reflexed areas behind middle, especially near hind angles; both lateral and postangular setae present, the latter being slightly removed forwards; apex slightly emarginate, narrower than base, PB/PA 1.14, with front angles widely rounded off; base slightly arcuate at the median part and distinctly emarginate on each side inside hind angle, making the latter seemingly produced posteriad; hind angles distinct though obtuse and blunt at the tips; median line clearly impressed on the disc, but not widening basad nor reaching basal margin; apical transverse impression shallow, apical area with vague longitudinal wrinkles; basal transverse impression distinct though narrow and shallow, longitudinally wrinkled; basal foveae fairly large though rather mal-defined,

smooth at the bottom; basal area narrow and smooth; postangular carinae absent.

Elytra ovate, much wider than prothorax, widest at about middle, and much more gradually narrowed towards bases than towards apices; EW/PW 1.52, EL/EW 1.47; surface well convex, especially behind middle; microsculpture formed by fine transverse lines though partially obliterated; shoulders distinct, with prehumeral borders gently arcuate and perpendicular to the mid-line at the innermost portions; sides narrowly bordered throughout, almost straight behind shoulders, gently arcuate behind middle, and almost conjointly rounded at apices through slight preapical emargination, forming a very small re-entrant angle at suture; striae distinct and rather coarsely punctate on the disc, but becoming shallower and nearly obsolete both at the side and before apex, only stria 1 entire, 6–7 very slight, 8 deeply impressed behind the middle set of marginal umbilicate pores; scutellar striole long and deeply impressed; apical striole distinct, straight in anterior part, and free at the anterior end though directed to stria 7; intervals slightly convex only near suture, apical carina obtuse; setiferous dorsal pores three in number including preapical pore, being situated at about 1/6, 3/7 and 3/5 from base respectively, the proximal pore lying on stria 3 as usual but the other two are located on interval 3 nearer to stria 3 than to stria 2; marginal umbilicate and apical pores regular, though the second and third ones of the former series are nearer to each other than to the first or to the fourth.

Ventral surface smooth; anal sternite with two pair of setae in ♀. Legs fairly slender; protibiae straight, gently dilated towards apices, and longitudinally grooved on the external face; tarsi thin.

Male unknown.

Type specimen. Holotype: ♀, 5–VIII–1965, K. SUGA leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Ohnuma, 130 m in altitude, in Nanaé-chô of the Oshima Peninsula, southwestern Hokkaido, Northeast Japan.

Notes. I have placed this strange species in the subgenus *Epaphiolus* JEANNEL (1962, p. 175) with some hesitation. With the exception of the structure of mentum tooth, it does not bear much resemblance to the only known species of the subgenus, *Trechus rivularis* (GYLLENHAL, 1810, p. 33; JEANNEL, 1927, pp. 132, 138, figs. 516–519; SHILENKOV, 1982, pp. 85, 86, fig. 2; etc.) from northern Europe and Siberia. I have at my hand two specimens of the Euro-Siberian species, one from Finland and the other from Germany, and have carefully compared them with the type of *T. sugai*. It is true that, besides the bifid tooth of mentum, the two species share the same features of mandibular dentition, superficial frontal furrows and the unusually anterior position of preapical pore (or the third dorsal pore), but the close resemblance stops there. The Japanese species differs from the Euro-Siberian in the conformation of prothorax, especially of its postangular parts, the coarsely punctate striae on elytra, the disposition of apical striole, the position of the second dorsal pore, and the arrangement of the humeral set of marginal umbilicate pores. It is most probable that the new species

belongs to a lineage different from that of *T. rivularis*. On the other hand, however, *T. sugai* shows a closer similarity to *T. rivularis* than to any species of *Epaphius*. I am confident of this, as I have seen all the described forms of *Epaphius* with the only exception of *T. (E.) densicornis* (FISCHHUBER, 1977, pp. 3, 6, fig. 1) from Vladivostok. For this reason, *T. sugai* is tentatively placed at the side of *T. rivularis*, though I am not certain if *Epaphiolus* is really distinctive from *Epaphius*.

The single known specimen of this remarkable new species was found in vegetable debris accumulated among reeds on the southern shore of Lake Oh-numa. The biotope seems very similar to that described for *T. rivularis* (cf. LINDROTH, 1945, p. 663). Though I have been unable to obtain any additional specimen, this trechine may probably inhabit marshy places in the vicinities of the lake.

Trechus (Epaphius) matsumotoi S. UÉNO, sp. nov.

[Japanese name: Matsumoto-chibigomimushi]

(Figs. 2-4)

Length: 3.05 mm (from apical margin of clypeus to apices of elytra).

Closely allied to *T. hashimotoi* S. UÉNO (1961, p. 337, figs. 1-8) from Mt. Shokanbetsu-daké, but the head is more transverse, with larger eyes and shorter genae, the prothorax is less transverse and less contracted at the two ends, with the sides less strongly arcuate before middle and much more narrowly bordered, the pronotal disc is devoid of a pair of foveoles, the elytra are a little smaller, more strongly convex, especially at the apical parts, and more superficially striate, especially at the sides, and the aedeagus is not abruptly narrowed at the base of apical lobe, which is shorter and pointed at the tip in profile.

Colour as in *T. hashimotoi*. Head short and wide, widely depressed above, obviously more transverse than in *T. hashimotoi*, with frontal furrows more widely divergent posteriad; eyes larger and more strongly convex than in *T. hashimotoi*, with the genae shorter (about one-fifth as long as eyes) and less convex; other cephalic features as in *T. hashimotoi*. Pronotum longer than in *T. hashimotoi*, widest at about two-thirds from base, and less contracted both towards apex and towards base, with the sides less strongly arcuate in front and much more narrowly bordered even behind middle; PW/HW 1.23 in the holotype, 1.28 in the allotype, PW/PL 1.43 in both the holotype and allotype, PW/PA 1.42 in the holotype, 1.38 in the allotype, PW/PB 1.23 in the holotype, 1.24 in the allotype, PB/PA 1.16 in the holotype, 1.10 in the allotype; front angles more widely rounded off, hind angles marked on each side by a very obtuse corner; base distinctly and somewhat arcuately oblique on each side; dorsum without discal foveoles even in ♂; basal area wider than in *T. hashimotoi*; postangular carinae absent; other features as in *T. hashimotoi*. Elytra a little smaller than in *T. hashimotoi*, more strongly convex, especially behind middle, though the disc is depressed in basal half, widest at about middle, and more gradually narrowed towards bases than towards apices; EW/PW 1.52 in the holotype, 1.58 in the allotype,

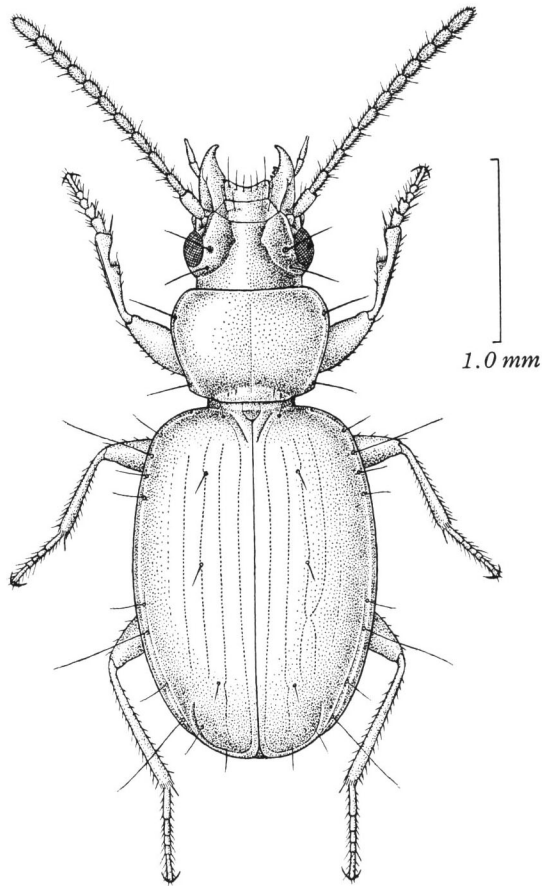
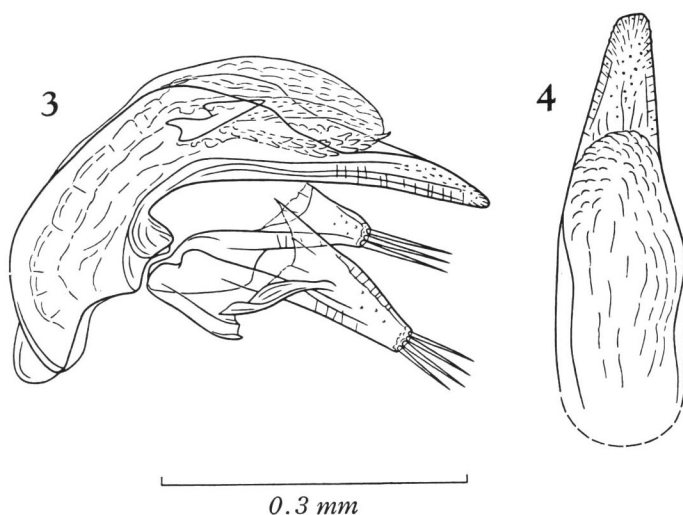


Fig. 2. *Trechus (Epaphius) matsumotoi* S. UÉNO, sp. nov., ♂, from Chôkan-yama on Mt. Rishiri-zan.

EL/EW 1.43 in the holotype, 1.34 in the allotype; striae shallower than in *T. hashimotoi* though more clearly punctate on the disc, becoming obsolete near base, before apex and at the side except for stria 1 which is entire, stria 5 very fine and fragmentary, 6–7 nearly effaced, 8 deeply impressed behind the middle set of marginal umbilicate pores; apical striole shorter and more strongly curved than in *T. hashimotoi*; other elytral features as in *T. hashimotoi*. Ventral surface and legs as in *T. hashimotoi*, though the legs are somewhat stouter than in the latter.

Male genital organ very small though moderately sclerotized, shorter and less flattened than in *T. hashimotoi*, with shorter and broader apical lobe. Aedeagus only one-fourth as long as elytra, hardly arcuate at middle, and widely membranous on the dorsal surface, with the lateral walls reduced from before middle; basal part large, less strongly bent than in *T. hashimotoi*, widely emarginate at the sides of basal orifice,



Figs. 3-4. Male genitalia of *Trechus (Epaphius) matsumotoi* S. UÉNO, sp. nov., from Chôkan-yama on Mt. Rishiri-zan; left lateral view (3), and apical part of aedeagus, dorso-apical view (4).

and provided with a hyaline sagittal aileron; apical lobe broad at the base and gradually narrowed towards apex, which is obliquely subtruncated in dorsal view; in profile, apical lobe very slightly curved ventrad and gradually narrowed towards the blunt tip; ventral margin almost straight at middle in profile. Inner sac covered with numerous scales and teeth, which are well sclerotized on the ventral and right sides; a small sagittate copulatory piece present at the right side of the proximal part of inner sac. Styles large and wide as in *T. hashimotoi*, bearing short stout apical setae, the number of which is four on the left style and three on the right style in the holotype.

Type series. Holotype: ♂, allotype: ♀, 26-VIII-1978, T. MATSUMOTO leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Chôkan-yama on the northern slope of Mt. Rishiri-zan, 1,150 m in altitude, on the Island of Rishiri-tô off northern Hokkaido, Northeast Japan.

Notes. This new trechine beetle is no doubt close to *T. hashimotoi* and does not seem directly related to the species occurring in the Soviet Far East (*T. arsenjevi* (JEANNEL, 1962), *T. dorsistriatus* A. MORAWITZ, 1862, etc.). Its habitat seems restricted to the subalpine zone of the isolated volcanic island, Rishiri-tô, while that of *T. hashimotoi* has been known only in the subalpine zone of Mt. Shokanbetsu-daké, an isolated volcano of the Mashiké Mountains lying on the western coast of central Hokkaido. Besides the water gap, the former is separated from the latter by a distance of about 165 km to the north by west. It is probable that the ancestor of these species immigrated into northwestern Hokkaido from somewhere in southeastern Siberia and later became differentiated into two localized forms through the isolation by the sea.

The type specimens of the present species were found from under stones in a subalpine meadow at the headspring of the Hôryôzawa-gawa on the northern slope of Mt. Rishiri-zan. It is, therefore, most probable that this trechine is a high altitude species like its close relative, *T. hashimotoi*. Contrary to this, *T. ikutanii*, another endemic species belonging to the same subgenus, may be an inhabitant of the forested area, having been known only from Lake Himé-numa near the foot of the same slope.

Trechus (s. str.) *apicalis* MOTSCHULSKY, 1845

[Japanese name: Saihaté-chibigomimushi]

Trechus apicalis MOTSCHULSKY, 1845, Bull. Soc. imp. Natur. Mosc., **18** (2), p. 347, pl. 5, fig. 6; type area: Kamtschatka.

Trechus (s. str.) *apicalis*: JEANNEL, 1927, Abeille, Paris, **33**, pp. 168, 172. — UÉNO, 1966, Bull. natn. Sci. Mus., Tokyo, **9**, p. 70, figs. 1–2.

For other references, see UÉNO (1966, *loc. cit.*).

Japanese specimen examined. 1 ♀, Chôkan-yama on Mt. Rishiri-zan, 1,150 m alt., Is. Rishiri-tô off N Hokkaido, NE Japan, 26–VIII–1978, T. MATSUMOTO leg. (NSMT).

Notes. This widespread species is recorded for the first time from the Japanese territory. The single specimen now known is unfortunately a female, but I am confident of this identification, as I have compared it with the specimens from the Maritime Territory,¹⁾ the northern Kuriles and Canada.

The carabid fauna of the Island of Rishiri-tô seems to some extent different from that of Hokkaido, though the volcanic island is only 19 km distant from the nearest point of the mainland. For instance, *Miscodera arctica* (PAYKULL) has so far been known, within the Japanese territory, only from this island (cf. HABU, 1972, p. 30). *Trechus apicalis* is another example of this. It is, of course, possible that these subarctic species will be found in future at the northernmost part of the mainland, but this may not be ascertained very easily, since most part of northernmost Hokkaido opposite to Rishiri-tô is barren low plains.

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