

New halophilous Trechids of Japan
(Coleoptera, Harpalidae)

By

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In 1954, a remarkable species of trechid was reported and illustrated by Mr. MASIDA under the name of "*Trechus (Epaphius?)* sp." in a local insect-club's publication ("Rare Insects", Masuda, 9, p. 11, with fig.). It was unexpectedly obtained by him from the bottom of a large heap of stones appeared at ebb in the estuary of a river flowing into the Japan Sea near Hamada. The illustration inserted in his report was so excellent as to suggest a new species, any of whose relatives had not been found in the Japanese Islands up to that time. Mr. MASIDA kindly placed the examples used in his report for the writer's study, and also took trouble to secure additional specimens. The examination of these specimens made the writer readily possible in confirming his supposition stated above. The species could not be attributable to any of the trechid-genera known from the Far East nor those from the Holarctic Region, but seemed to be a close relative of *Duvaliomimus* JEANNEL (1928, L'Abeille, Paris, 35, pp. 23, 28, 82), which consisted of two *Duvalius*-like species known from New Zealand.

Almost all the important characters of *Duvaliomimus* are found in the Japanese species as well. The apical group of setiferous pores on the elytra is not evolved; the inner sac is not armed with differentiated copulatory pieces but covered with numerous teeth. The elytral dorsal pores are situated on the 3rd stria and not on the 5th; the apical striole is directed to the termination of the 5th stria; the humeral group of umbilicate pores is regular; the protibiae are pubescent on the apical portion of the anterior face; two proximal segments are dilated in the male protarsi.

There are found, however, a few but noticeable differences between the Japanese species and the New Zealand ones. In the Japanese species, the mentum is not fused with submentum, while they are fused together in *Duvaliomimus*; in the former, the submentum has a row of six setae instead of four. Besides these characteristics, the third elytral dorsal pore is situated on the 3rd stria and not on the 2nd in the species found by Mr. MASIDA. These features may be sufficient for establishing a special genus, to which the writer wishes to give a new name, *Thalassoduvalius*.

After the manuscript of this paper was prepared, the writer received from

Mr. KUROSA several undetermined carabids for identification, among which was found a trechid that closely resembled Hamada specimens. It will be also described in the present paper following the description of the new species from Hamada.

The writer's hearty thanks are due to Prof. Kenji NAKAMURA for his encouragement, as well as to Messrs. Kôzaku MASIDA of Masuda Industrial High School and Kazuyoshi KUROSA of Saéki City for their kind aid in supplying valuable specimens.

Genus *Thalassoduvallius* S. UÉNO, gen. nov.

Type-species: *Thalassoduvallius masidai* S. UÉNO, sp. nov.

Apterous. General appearance of *Duvallius*-type; body surface glabrous. Colour reddish brown, almost depigmented.

Head large and wide, flat on dorsal side; frontal furrows deep and entire; eyes very small and flat, normally faceted, obviously shorter than genae, which are not pubescent; two supraorbital pores present; microsculpture consisted of well impressed reticulation. Labrum deeply emarginate and with a central tubercle in this emargination, showing an appearance something like trident. Mandibles stout, bidentate, with apices sharp and slightly hooked. Mentum free, not fused with submentum; mentum tooth triangular, slightly bifid at the tip and with a median sulcus; submentum with three setae on each side; ligula rounded at apex and octosetose; paraglossae narrow, extending well beyond ligula. Palpi stout; apical segments subconical, tapering towards the blunt tips; penultimate segments nearly equal in length to the apical ones, asetose in maxillary palpus and quadrisetose in labial palpus. Antennae filiform and slender, pubescent as usual; segment 2 shortest and segment 3 longest, each one of segments 4-10 inclusive becoming shorter successively towards apex.

Pronotum cordate and convex; lateral sides narrowly bordered and sharply reflexed, widely rounded in front and shortly sinuate before hind angles, which are nearly rectangular; present both lateral and postangular setae, of which the former is inserted before the widest part and the latter is removed a little forwards; median line remarkably deep and wide; basal foveae deep; microsculpture consisted of transverse meshes.

Elytra oval and convex, not fused together though incapable of opening due to the fusion of basal articulation; shoulders effaced; lateral border reaching at base a point approximately opposite to stria 4; lateral sides regularly rounded from shoulder to the slight preapical emargination; apex rounded; striae distinct, outer striae more or less shallower than inner ones and disappearing both near base and before apex; scutellar striole distinct, fairly long; apical striole deep, interrupted at the end and directed to the termination of stria 5; intervals smooth, distinctly convex at least on the disk, apical carina salient; stria 3 with three setiferous dorsal pores, preapical pore absent, stria 5 with no dorsal pore;

humeral group of umbilicate pores regular, four pores ranged equidistantly and adjoining the marginal gutter; microsculpture formed by transverse lines.

Anal sternite with one seta in ♂, two in ♀ on each side.

Legs, especially tibiae and tarsi slender; protibiae with a narrow groove on the external face, almost glabrous on the anterior face but with several minute hairs on its apical portion; tarsal segment 4 with a long ventral apophysis; protarsi in ♂ with proximal two segments strongly dilated, inwardly produced at apices and furnished beneath with sexual adhesive appendages.

Aedeagus elongate and arcuate, hardly attenuated towards apex which is produced as a short snout; basal part large and fairly long, with a narrow sagittal aileron; basal orifice small; inner sac covered with numerous teeth and

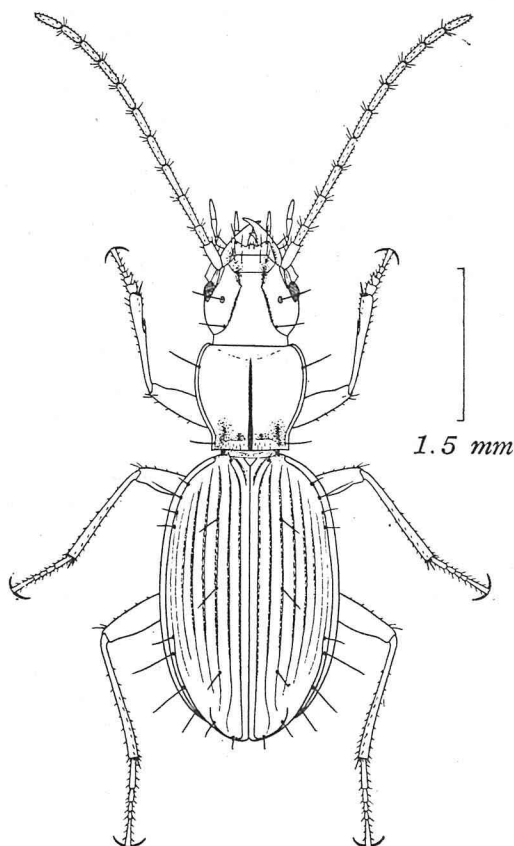


Fig. 1. *Thalassoduvallius masidai* S. UENO, gen. et sp. nov., ♂, of the Sufugawa River.

without developed copulatory piece. Styles moderately long and rather wide. The number of the apical setae on styles is variable; these setae seem to be four in characteristic number, but may increase as many as to six.

As mentioned already, the present new genus is closely allied to *Duvaliomimus* and is the second genus of the phyletic series of *Duvaliomimus* (*sensu* JEANNEL, 1928). It is not easy to explain that one genus which is endemic to Japan is so close to the other which is restricted to New Zealand. JEANNEL has noticed the fact that there are found in New Zealand some archaic animals of Palaearctic origin, and has presumed that those animals immigrated from Asia to New Zealand during Upper Jurassic and evolved there during Cretaceous (1928, *loc. cit.*, pp. 82-83; 1942, *La genèse des faunes terrestres*, Paris, pp. 226-228). Although the discovery of the Japanese representative of the phyletic series of *Duvaliomimus* may support JEANNEL's assumption, it is still difficult to understand the problem that so similar features have long been kept between two stocks which were separated during very old time. At present, it is difficult to the writer to discuss the problem in full detail how such a discontinuous distribution has arisen, except safely to say that both the genera may be relic.

In fact, *Thalassoduvalius* has maintained, as seen in the New Zealand genus as well, several interesting archaic characters, i. e., not evolved apical group of setiferous pores, not specialized copulatory piece and non-fixation in the number of the apical setae on styles. The last exemplified feature is also frequently observed in the archaic genus *Trechiana*.

A considerable development of the genera belonging to the phyletic series of *Trechiana* is one of the striking features of the trechid fauna of Japan. With the discovery of *Thalassoduvalius*, one more remarkable element is added to it. From the predominancy of such archaic genera in Japan, it may be supposed that the Japanese Islands, that were once the eastern coast of the Angara Continent, were a part of the native place of 'Trechini bidentati'.

On the other hand, *Thalassoduvalius* is remarkable in its habitats which are seen in intertidal zone. Of course, several species of trechids have been recorded as to be intertidal, and one of such species, belonging to the genus *Perileptus*, was described by the present writer in one of his previous papers (S. UÉNO, 1955, *Publ. Seto Mar. Biol. Lab.*, 4, p. 338, figs. 1-2). So far as the Japanese species of apterous trechids are concerned, they are usually confined either to endogean habitats or to caves. It is interesting that *Thalassoduvalius masidai*, the type-species of the genus, is restricted not only to intertidal zone but to a depth of a large heap of stones, where there is certainly dark as in caves.

In this place, the writer prefers to notice the strong resemblance between *Thalassoduvalius* and cavernicoles, i. e., depigmentation of the body, degeneration of eyes, development of genae, constriction of the fore-body and so on. This

resemblance is also found in all the species belonging to the marine subtribe Aepi. The phenomenon was considered by JEANNEL as follows (1926, L'Abeille, Paris, 32, p. 441): "These characters result probably from an orthogenetic evolution analogous to that which has sustained Trechini of caves". In the species of the latter subtribe, the antennae and legs are never so slender as in the present genus.

Thalassoduvallius masidai S. UÉNO, sp. nov.

Length: 4.6–4.9 mm (from front margin of clypeus to anal end).

Colour reddish brown to dark reddish brown, shiny; antennae (becoming paler towards apices), legs (except tarsi) and apical sternites pale reddish brown to reddish brown, always obviously paler than the rest of the body; palpi and tarsi pale.

Head large and wide; frontal furrows deep especially in front, obtusely subangulate between eyes and diverging both in front and behind; surface flat especially on vertex; eyes small and flat; genae well developed and convex, about 1.5 times longer than eyes; supracrural pores situated on the lines which are divergent anteriorly; antennae slender, longer in ♂ than in ♀, i. e., reaching basal four-ninths of elytra in ♂ and basal two-fifths of that in ♀; segment 2 shortest, segment 1 about 1.2 times longer than segment 2 and about as long as segment 9, segment 3 about 1.6 times longer than segment 2, segment 4 nearly as long as or slightly shorter than segment 3, segment 11 about as long as middle segments.

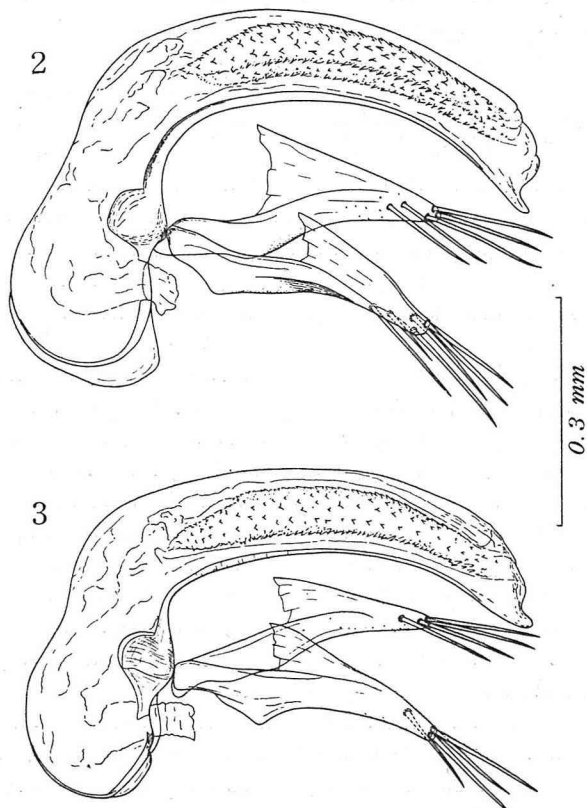
Pronotum cordate and convex, 1.16–1.18 times wider than head, about 1.1 times wider than long, widest at about two-thirds from base; lateral sides widely and gently rounded in front, moderately and rather suddenly sinuate at about one-sixth from base; lateral seta inserted at about four-fifths from base; apex slightly emarginate or nearly straight, about 1.1 times (or less) wider than base, which is nearly straight; front angles hardly advanced, hind angles almost rectangular or somewhat sharp; median line remarkably wide and deep, forming a groove and not reaching apex; front transverse impression indistinct, replaced by some vague wrinkles; basal transverse impression rather shallow though evident, rugose, interrupted at middle and merging on each side into basal fovea, which is large, deep and more or less uneven; a distinct and fairly long carina present between the apical part of basal fovea and the marginal gutter; surface impunctured, basal area longitudinally strigose.

Elytra oval, well convex; 1.62–1.64 times wider than pronotum in ♂, 1.68 times wider than that in ♀, nearly 1.6 times longer than wide, widest at about middle; shoulders effaced and rounded; striae deep and sulciform on the disk, becoming shallower both on the sides and near apex; inner striae evidently crenulate, striae 4–7 obsolete both near base and before apex, stria 8 becoming shallower before the middle group of umbilicate pores but traceable to shoulder;

scutellar striole long and deep; intervals smooth, well convex on the disk but less so on the sides, interval 4 frequently interrupted at the position of the second dorsal pore; apical carina conspicuous; stria 3 with three setiferous dorsal pores, placed at one-fifth to two-ninths from base, a little before the middle and three-fourths from base respectively.

Legs fairly long; tibiae and tarsi slender.

Male genital organ rather small and moderately chitinized. Aedeagus elongate and strongly arcuate, with dorsal side semicircular in profile; basal part large and with a small basal orifice which is open facing towards apex; sagittal aileron narrow, thin and hyaline; apex produced into a narrow snout which is blunt at the extremity; ventral side regularly concave; inner sac entirely covered with numerous teeth. Styles moderately long and rather wide, subequal in length to each other; each provided with four apical setae, three terminal



Figs. 2-3. Male genital organ, left lateral view.

2. *Thalassoduvallius masidai* S. UÉNO, nov., holotype, of the Sufugawa River.
3. *Thalassoduvallius kurosai* S. UÉNO, nov., holotype, of Uwajima.

and one subterminal, but in the holotype, there are six setae on left style and five setae on right one.

Holotype: ♂, allotype: ♀ (28-V-1953, collected by K. MASIDA). Paratypes: 2 ♂♂ (19-IX-1954, by K. MASIDA).

The type-specimens are deposited in the writer's collection.

Type-locality: The estuary of the Sufugawa River, south-western environs of Hamada, Shimané Prefecture, Honshu.

Regarding the habitat of this remarkable new species, the writer has already spent many words in the preceding pages. It dwells in a depth of a large heap of fist-sized stones, which are accumulated in the estuary of the Sufugawa River. The positions where the trechid was found are about thirty to sixty centimetres below the surface of the heap and are always wet. Those places are situated near high water mark and are immersed by sea water at maximum high tide or on stormy days. It is said that there were found some beach-fleas, earwigs and rove-beetles, coexisting with the trechid.

***Thalassodualius kurosai* S. UÉNO, sp. nov.**

Length: 4.2 mm (from front margin of clypeus to anal end).

Very closely allied to the type-species and coming perfectly under the description of the latter with the exception of the following characters.

Colour dark reddish brown, shiny; elytra, sternites (becoming paler towards apex) and antennae reddish brown; palpi and tarsi pale, the rest of legs pale reddish brown.

Head with frontal furrows not angulate between eyes and moderately distant from one another; eyes flatter and genae less convex than those in *T. masidai*. Antennae probably reaching basal two-fifths of elytra, though the accurate datum could not be seen; it is unfortunate that, in the holotype which is only a single known specimen, left antenna missing segments 9-11 inclusive and right antenna missing segments 4-11 inclusive; segment 1 about 1.5 times longer than segment 2, segment 3 about 1.8 times longer than segment 2 and about 1.1 times longer than segment 4.

Pronotum smaller in comparison with head than that in *T. masidai*, with both the widest part and the basal situation more in front, showing an appearance more contracted behind; 1.15 times wider than head, about 1.1 times wider than long, widest at about five-sevenths from base; lateral sides more strongly rounded in front, more widely sinuate at about one-fifth from base; lateral seta inserted at about three-fourths from base; apex slightly and widely emarginate, nearly 1.1 times wider than base, which is slightly reduced at middle; front angles rounded, hind angles somewhat sharp; basal transverse impression shallower than that in *T. masidai* and hardly rugose; postangular carina rather obtuse.

Elytra fully 1.6 times wider than pronotum, longer than wide in a same proportion, widest at about middle; striae much shallower than those in *T. masidai*, though inner striae fairly deep, rather weakly crenulate, striae 4-6 obsolete both near base and before apex, stria 7 and the basal half of stria 8 almost obliterated; intervals less convex than those in *T. masidai*; stria 3 with three setiferous dorsal pores, located at one-fourth from base, about the middle and three-fourths from base respectively.

Male genital organ similar to that of *T. masidai*. Aedeagus somewhat wider and less arcuate, with the basal part more strongly bent; sagittal aileron very small, almost disappearing; apical snout thicker; ventral side less concave. Each style provided with four apical setae, three terminal and one subterminal.

Female unknown.

Holotype: ♂ (2-VI-1946, collected by K. KUROSA and preserved in UÉNO's collection).

Type-locality: Uwajima, Ehimé Prefecture, on the western coast of the Island of Shikoku.

The present new species is so closely allied to *T. masidai* that it may be regarded as a subspecies of the latter. The species is, however, known only by a single individual, which is moreover somewhat damaged. The writer prefers to treat it as an independent species, till the time when the range of variation of this species would be examined.

The type-specimen was found under vegetable debris which were accumulated in a channel of sewage discharging into the port of Uwajima. This habitat seems to be unusual. The species may normally inhabit under a depth of stones which are heaped on the rocky shore in the neighbourhood of the present habitat.