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Discovery of an Eyeless Trechine Beetle (Coleoptera, Trechinae) in Taiwan[1)]

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Abstract An eyeless trechine beetle is recorded for the first time from the Island of Taiwan. It is an endogean species occurring in the subalpine zone of Mt. Hsüeh Shan, the second highest mountain in the subtropical island. It belongs to the *Trechoblemus* series hitherto unknown from Taiwan, and seems to have a relationship to the genus *Oroblemus* S. UÉNO et A. YOSHIDA of Northeast Japan. The new name given is *Masuzonoblemus tristis* S. UÉNO, gen. et sp. nov.

Thirteen species of trechine beetles in a strict sense have hitherto been described from the Island of Taiwan. They are classified into four genera of three different phylogenetic groups, that is *Epaphiopsis*, *Trechiama* and *Agonotrechus* series. All but two of them are wingless, and are confined to the alpine and subalpine zones of the Chung-yang and the Hsüeh-shan Mountain Ranges (cf. UÉNO, 1979, 1980, 1987 a, 1989). However, no eyeless species are included in them, and their existence in Taiwan has been doubted up to now, because we have been unable to find any in Taiwanese caves.

In 1989, the National Science Museum, Tokyo, made a faunal survey of the high mountains of Taiwan in collaboration with National Taiwan University. I was leading the first party which was sent to five mountain areas in June and July. Many trechine beetles were collected during the survey, mostly above 2,500 m in altitude, and though it has not been carefully studied yet, this collection contains thirteen specimens of an eyeless species unexpectedly found in the subalpine zone of Mt. Hsüeh Shan, the second highest mountain in the island.

After a close examination of these specimens, it has become apparent that the trechine beetle in question belongs to the *Trechoblemus* series hitherto unknown from Taiwan. This is more unexpected than the occurrence of an eyeless species itself, because the genus-group is obviously northerly in distribution and does not extend its range even to the Pacific side of Southwest Japan (cf. UÉNO, 1982, p. 73, 1988, pp. 44–47, fig. 5). Still more surprising is that the species seems to bear a relationship to the genus *Oroblemus* S. UÉNO et A. YOSHIDA (1966, p. 77), whose members are localized in a narrow area along the Japan Sea side of Northeast Japan, from the Island of Sado in the southwest to the Oshima Peninsula of Hokkaido in

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the northeast (cf. UÉNO, 1983, 1987 b, pp. 126–131), and not directly related to the genera occurring in Southwest Japan and the Korean Peninsula, though it shows some superficial resemblance to *Daiconotrechus iwatai* (S. UÉNO) (1970, p. 610, figs. 4–6, 1971, p. 183, fig. 1) from the Island of Daikon-jima in Southwest Japan.

Before dealing with the whole collection of the Trechinae made by the first party of the expedition, I am going to introduce this surprising discovery into science and to dedicate the most interesting trechine beetle to my father, the late Professor Masuzo UÉNO, who had always shown deep interest in my study of subterranean animals but unexpectedly passed away on June 17, 1989, at the age of 89, when I was searching for high altitude inhabitants including trechine beetles in the heart of Taiwanese mountains, many of which are difficult of access.

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

Before going into further details, I wish to express my hearty thanks to Professor Yau-I CHU and Mr. Chiun-chen KER of the Department of Plant Pathology and Entomology, National Taiwan University, for their kind collaboration, and to Professor Masataka SATÔ and Dr. Mamoru OWADA for their support in the field.

Genus ***Masuzonoblemus*** S. UÉNO, nov.

Type species: *Masuzonoblemus tristis* S. UÉNO, sp. nov.

Belonging to the *Trechoblemus* group and related to *Oroblemus* S. UÉNO et A. YOSHIDA of Northeast Japan, but different from the latter mainly in much more reduced eyes and in the possession of semicircular external lamella at the apical part of each copulatory piece.

Body elongate, with small fore-body and fairly large elytra; apterous and depigmented; surface largely covered with short suberect pubescence, though almost glabrous on frons, vertex and lateral parts of venter; appendages not long but fairly slender; colour yellowish brown.

Head fairly large, wider than long, with deep entire frontal furrows not angulate at middle and rather widely divergent in front and behind; two supraorbital pores present on each side, lying on lines subparallel to each other; eyes degenerated and devoid of distinct facets, though their trace usually bears a few vestigial pubescence; genae convex and pubescent. Labrum transverse, widely emarginate at apex, though the central portion of apical margin is either straight or very slightly produced. Mandibles stout, briefly hooked at the acute apices; right mandible very sharply tridentate, left mandible sharply bidentate. Mentum imperfectly fused with submentum, labial suture between them being almost complete; mentum tooth porrect and fairly broad, distinctly emarginate at the tip; submentum with a transverse row of eight setae; ligula subtrapezoidal, subtruncate at the apex which is octosetose; paraglossae long, thin and arcuate; labial palpus fairly thick, with penultimate segment lightly dilated towards apex and quadrisetose, apical segment about as long as the

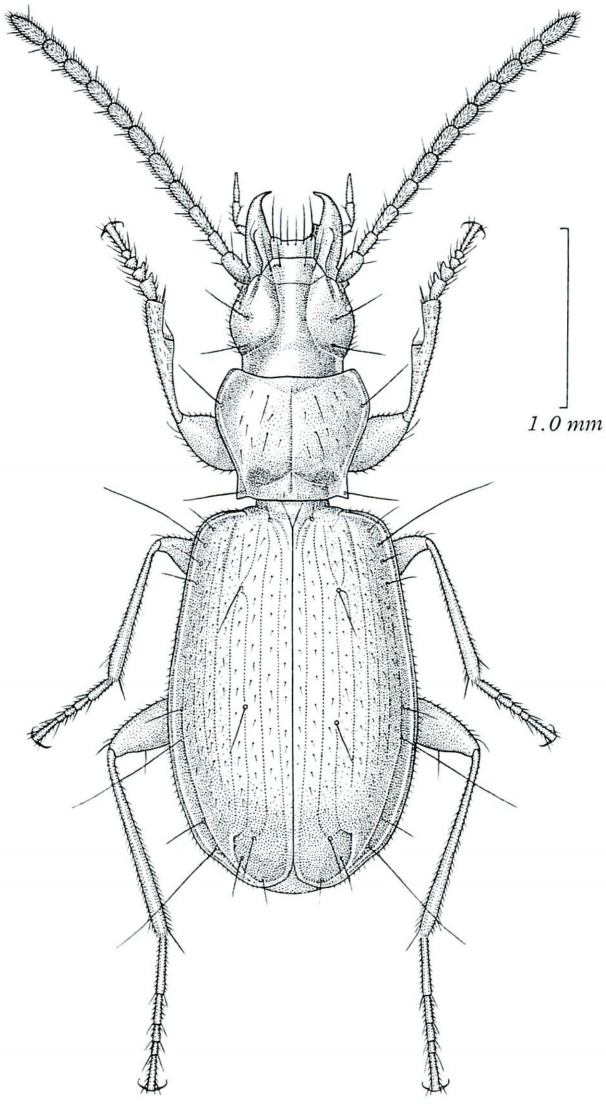


Fig. 1. *Masuzonoblemus tristis* S. UÉNO, gen. et sp. nov., ♂, from San-liu-chiu on Mt. Hsüeh Shan.

penultimate, nearly parallel-sided in proximal half and asetose. Maxillae stout; lacinia with recurved spines and hairs on the inner margin; maxillary palpus fairly stout, penultimate segment widely dilated towards apex and plurisetose, apical segment slightly longer than the penultimate, subconical and asetose. Antennae stout, subfiliform, and hardly dilated towards apices; terminal segment the longest, followed in length by scape, segment 2 about as long as each of segments 8–10 and slightly

shorter than the remainings, which are subequal in length to one another.

Pronotum small, subcordate, sparsely covered with short erect pubescence, which becomes vestigial in some individuals, and with two discal setae ranged one behind the other on each side of median line usually before the middle; sides entirely bordered and moderately reflexed, not ciliated except near front angles, where there are a few vestigial hairs, distinctly sinuate before hind angles, which are usually sharp, and with two pair of marginal setae, of which the anterior pair is before the widest part and the posterior is just before hind angles; median line deeply impressed on the disc but neither widening in basal area nor reaching base; apical transverse impression superficial, basal one deep and continuous, laterally merging into deep basal foveae; postangular carinae absent. Scutellum small though distinct.

Elytra oblong-ovate, much wider than pronotum, and without transverse impression on basal peduncle; each interval mostly with one, partially (external ones in particular) with two, irregular row(s) of short suberect pubescence; shoulders square; sides bordered throughout and minutely ciliated, moderately arcuate only behind middle; apices separately rounded; striae entire, distinctly punctate, scutellar striole deep and fairly long, apical striole deep, arcuate, curved inwards at the anterior end and joining stria 3; stria 3 with two setiferous dorsal pores; preapical pore situated at the apical anastomosis of striae 2 and 3, a little more distant from apex than from suture, and obviously closer to apical striole than to suture; marginal umbilicate pores aggregated and almost regular, though the first pore of the humeral set is sometimes a little isolated from the other three.

Ventral surface finely pubescent except for the lateral parts of respective segments; sternites 3–5 each with a pair of setae only; anal sternite with a pair of marginal setae in ♂, with two pair of them in ♀. Legs fairly slender; protibiae very slightly arcuate in apical halves, rather widely dilated towards apices, entirely pubescent, and not externally grooved; tarsi fairly stout, protarsal segments 1 and 2 in ♂ widely dilated, stoutly produced inwards at apices, and furnished beneath with sexual adhesive appendages.

Male genitalia small; aedeagus widely membraneous on dorsum and apically open just behind middle; basal part strongly curved ventrad, with small basal orifice and well developed sagittal aileron; apical lobe simple, long and flattened; inner sac devoid of sclerotized teeth, but armed with two copulatory pieces horizontally lying side by side and half exposed from apical orifice, each piece bearing a minutely tuberculate external lamella at the apical part; styles fairly stout and unequal in length and configuration, each usually bearing four apical setae.

Range. Known so far only from the subalpine zone of the Island of Taiwan.

Notes. In general appearance, the type species of this new genus evidently differs from the members of *Oroblemus*, which have more parallel-sided and depressed bodies. However, it must be related to the latter, especially in view of the similarity of peculiarly formed copulatory pieces. Even the symmetrically developed apico-

external lamellae characteristic of the Taiwanese species can be formed from apical dilatation of copulatory pieces, as seen in the right copulatory piece of *Oroblemus subsulcipes* S. UÉNO (1983, p. 162, figs. 2–3).

Oroblemites tianshanicus S. UÉNO et PAWŁOWSKI (1981) from the Tian Shan Mountains has hitherto been regarded as the closest relative of *Oroblemus*, but the aedeagal inner armature of the former is utterly different from that of the latter. *Masuzonoblemus* is much closer to *Oroblemus* in this respect, and a common ancestry between them cannot be denied. As was already pointed out, however, there is a very wide geographical gap between their ranges, and the intervening areas are occupied at least by six genera of the same phyletic group. No anophthalmic species belonging to this genus-group have been recorded from Mainland China, in which the Taiwanese species must have originated, but two oculate species of *Trechoblemus* are known from the Yang-zi Jiang basin (cf. SUENSON, 1957, pp. 93–94, pl. 2 above; JEANNEL, 1962, p. 198), a sure indication that the common ancestor of *Masuzonoblemus* and *Oroblemus* once occurred in the same area. It is probable that the ancestral trechines dispersed towards the southeast into Taiwan and towards the northeast into Japan, and that their descendants survive now as relicts, *Masuzonoblemus* and *Oroblemus*, only in two remote areas.

Masuzonoblemus tristis S. UÉNO, sp. nov.

(Figs. 1–3)

Length: 3.25–3.60 mm (from apical margin of clypeus to apices of elytra).

Apterous and anophthalmic; integument thin and translucent; concolorously yellowish brown except for darker mandibles, shiny.

Head fairly large, wider than long, and moderately depressed above, with frons and supraorbital areas moderately convex; microsculpture distinct though not very coarse, consisting of polygonal meshes which are mostly isodiametric but partially wide; anterior supraorbital pore somewhat foveolate, posterior one not adjoining frontal furrow; genae evenly and rather strongly convex, wholly covered with short hairs; neck wide, with the anterior constriction distinctly marked; mandibles stout, broad at the bases and sharply hooked at the apices; antennae reaching basal third of elytra or extending a little beyond that level, segments 8–10 each ovoid and slightly less than twice as long as wide, terminal segment obviously longer but narrower than scape.

Pronotum rather variable in shape according to individuals, small, subcordate, wider than head, wider than long, widest at about five-sevenths from base, and more gradually narrowed towards base than towards apex; PW/HW 1.15–1.29 (M 1.25), PW/PL 1.18–1.35 (M 1.27), PW/PA 1.34–1.44 (M 1.40), PW/PB 1.30–1.44 (M 1.37); sides either very obtusely subangulate or moderately rounded at the widest part, almost straight or feebly arcuate both in front and behind, distinctly but usually not deeply sinuate at a level between basal eighth and sixth, and then more or less

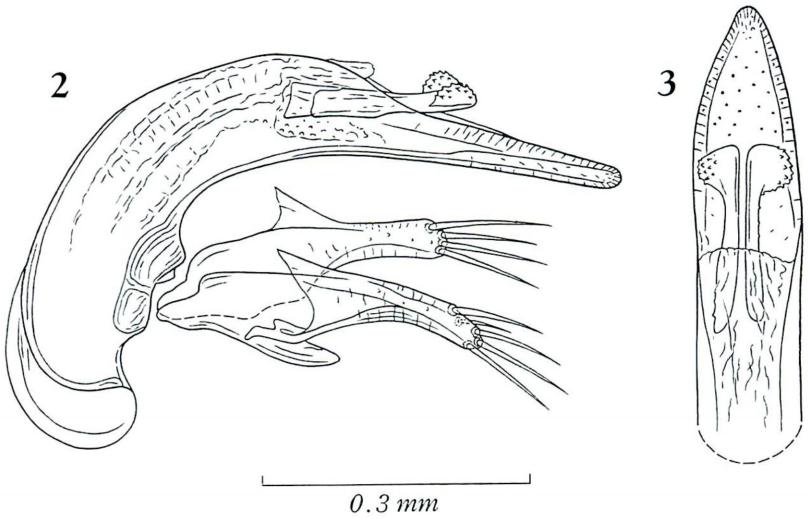
divergent, though not widely, towards hind angles, which are usually sharp and slightly produced postero-laterad but sometimes rectangular; apex about as wide as base, PB/PA 0.99–1.08 (M 1.02), either slightly emarginate, slightly bisinuate or almost straight at middle according to individuals, with front angles more or less produced forwards and narrowly rounded at the tips; base either slightly bisinuate or straight at middle, usually emarginate on each side inside hind angle; surface moderately convex, sparsely covered with short erect pubescence, which remains only partially in some individuals, and more or less rugulose longitudinally in apical area; microsculpture mostly distinct, consisting of fine transverse lines partially forming irregular meshes; basal transverse impression narrow and sulciform though uneven, laterally merging into large semicircular basal foveae, which are deep and vaguely strigose at the bottom; basal area longitudinally strigose.

Elytra oblong-ovate, much wider than pronotum, longer than wide in a similar proportion, widest at about middle, and more gradually narrowed towards bases than towards apices; EW/PW 1.50–1.62 (M 1.56), EL/EW 1.49–1.60 (M 1.54); shoulders square, with prehumeral borders almost perpendicular to the mid-line though slightly curved backwards at the innermost portions; sides either straight or very feebly arcuate behind shoulders, moderately arcuate behind middle, and slightly emarginate before apices, which are separately rounded and form a large re-entrant angle at suture; surface moderately convex at the sides but much less so on the disc, with steep apical declivity; microsculpture mostly distinct, consisting of fine transverse lines; striae deeply impressed, especially on the disc, 1–5 more or less deepened in basal area; apical striole short but deep, rather strongly arcuate, externally bordered by obtuse apical carina; intervals gently convex on the disc, slightly so even at the side; stria 3 with two setiferous dorsal pores at 1/6–1/5 and 1/2–5/9 from base respectively.

Ventral surface and legs as described under the genus; mesotarsal segment 1 obviously shorter than segments 2–4 together but a little longer than segments 2–3 together; metatarsal segment 1 only slightly shorter than segments 2–4 together.

Male genital organ small though moderately sclerotized. Aedeagus nearly one-third as long as elytra, tubular and strongly arcuate in basal half; basal part elongate, with small basal orifice whose sides are deeply emarginate; sagittal aileron large though hyaline; apical lobe long and nearly symmetrical, narrowly rounded at the extremity, narrow, straight and very gradually tapered towards apex in lateral view, broad and with subtriangular apical part in dorsal view; ventral margin distinctly emarginate before middle in profile. Copulatory pieces rod-like, each with a dorso-externally spread, semicircular lamella at the apical part, whose surface is minutely tuberculate in the external portion; right piece about three-tenths as long as aedeagus, and slightly longer than the left. Styles fairly stout, left style longer than the right, each usually bearing four stout setae at the apex though an extra seta rarely occurs on one of the styles.

Type series. Holotype: ♂, 1–VII–1989, S. UÉNO leg. Allotype: ♀, 1–VII–



Figs. 2–3. Male genitalia of *Masuzonoblemus tristis* S. UÉNO, gen. et sp. nov., from San-liu-chiu on Mt. Hsüeh Shan; left lateral view (2), and apical part of aedeagus, dorsal view (3).

1989, M. SATÔ leg. Paratypes: 6 ♂♂, 5 ♀♀, 1–VII–1989, S. UÉNO & M. SATÔ leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. San-liu-chiu on Mt. Hsüeh Shan, 3,580 m in altitude, in T'ai-chung Hsien, Taiwan.

Notes. This interesting new trechine beetle is an endogean species occurring in the subalpine zone of Mt. Hsüeh Shan. On the eastern slope of the main peak, there is a gently slanting area below the largest cirque. It is called San-liu-chiu, and is covered with tall coniferous trees, which keep the moisture of the ground throughout the year. Certain carabid beetles including *Epaphiopsis elegans* S. UÉNO are commonly found in this subalpine forest.

Looking for the *Epaphiopsis*, I came across a pale-coloured trechine beetle running about at the bottom of a hole, which was left after a large embedded stone was taken out. Having realized that it is eyeless, Professor SATÔ and I dug out all large stones deeply embedded in the nearby ground to search for other individuals of the beetle. Our painstaking efforts were repaid with a good success, though the trechine was met only in the immediate vicinity of a small depression. Most specimens were found on the soil beneath large stones, but two or three individuals were running on the surfaces of upturned stones. As a rule, they did not coexist with *Epaphiopsis elegans*, which usually occurred in shallower habitats.

要　約

上野俊一：台湾の高山におけるメクラチビゴミムシの発見．—— 台湾の高山からは，これまでに4属 13 種の狭義のチビゴミムシ類が報告されている．これらは3系統群に区分されるが，いずれも有眼の種類で，複眼の退化したものは含まれていない．ところが 1989 年の夏に，雪山の亜高山帯の針葉樹林中 (3,580 m 地点) で，土中に深く埋まった大きい石の下から，無眼淡色の小さいチビゴミムシの1種が発見された．この種は，台湾から未記録のアトスジチビゴミムシ群に属し，しかも，日本北東部の日本海側に分布するキタメクラチビゴミムシ属 *Oroblemus* に類縁の近いものである．したがって，この新種が発見されたことは，単に分類学的な興味にとどまらず，生物地理学的にもきわめて重要な意義をもつので，ほかの採集品の検討に先だって記載し，*Masuzonoblemus tristis* S. UÉNO と命名して，調査旅行中に急逝した父，益三に捧げた．

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