

## New Cave Trechids from the Eastern Foot of the Suzuka Mountain Range, Japan<sup>1)</sup>

By

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It is well known that there is a barrier of distribution to certain groups of animals and plants at the east of Lake Biwa-ko. A boundary line, which arises in the northwest from the Bay of Tsuruga, through the northern part of the Suzuka mountain range and extends eastward to the Izu Peninsula or the Bósô Peninsula, was usually recognized by old zoogeographers, who called it either STEJNEGER's line or LEWIS' line. Although the application of such divisional lines is rejected by modern zoogeographers, in view of that they are too much simplified to show the intricate faunal phenomena, a barrier is distinctly observed at least to the distribution of some ancient cavernicoles. An excellent example of this type of distribution is shown by trechids, of which the phyletic group of *Kurasawatrechus* spreads over the eastern regions from the Suzukas and the phyletic group of *Trechiamia* occupies the regions west of the mountain range.

The importance in animal distribution of the Suzuka mountain range has thus become magnified from the biospeological point of view. Up to the recent times, however, cave investigations were focused to the northwestern part of the mountains, where there is especially rich in limestone caves. On the other hand, they were seriously delayed at the eastern and the southern parts, where the cave faunas were known only from a preliminary survey made by Prof. YOSII in 1952. This situation was unfortunate in analysing the distribution of trechids, for it seemed to be of great importance to know the southern limit of the range of *Kurasawatrechus*-group. Cave pseudoscorpions of the genus *Spelaeochthonius*, which has a similar range of distribution to that of *Kurasawatrechus*-group, extends its range far south to the central part of the Kii Peninsula (MORIKAWA, 1956, pp. 271, 274-276). On the contrary, this area is occupied by cave trechids of the genus *Kusumia* belonging to the group of *Trechiamia*, which has a similar range of distribution to that of *Urochthonius*, another group of cave pseudoscorpions. Such a discrepancy in the distribution ranges of the two groups of ancient cave animals may have arisen from the difference in the histories of subterranean evolution between them.

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Having a wide gap on the distribution map, however, it was quite difficult to develop the presumption.

In the spring of 1959, new light was thrown on this problem with the discoveries of cave trechids at the eastern side of the Suzuka mountain range. On March 6th, an individual of a trechid was taken by Mr. KATÔ at the innermost of Shakudaijin-no-kaza-ana Cave, situated at the southeastern foot of the Suzukas, and was submitted to the writer for identification through the courtesy of Mr. ICHIHASHI. The writer himself investigated this cave on March 15th, searching in vain for a second specimen. On the same day, however, he was fortunate in obtaining an individual of a trechid in the depth of Shinodaté-no-kaza-ana Cave, situated at the north-eastern foot of the mountains. After a close examination of these two specimens, it becomes evident that they belong to the genus *Kurasawatrechus* and are related to *K. spelaeus* S. UÉNO (1958, p. 129), described from Kugô Cave in Gifu Prefecture. The group of *Kurasawatrechus* has hitherto been known at the northwestern part of the Suzukas to be represented by a peculiar, highly evolved genus, *Ishidatrechus* S. UÉNO (1956). The southward extension of true *Kurasawatrechus* along the eastern foot of the mountain range is, therefore, quite unexpected and may offer an interesting problem to the ancient dispersal of Japanese trechids.

Before going to describe the new species, the writer wishes to express his hearty thanks to Prof. Kenji NAKAMURA for his encouragement; to Mr. Tsuguo KATÔ for his kindness in placing the valuable specimen at the writer's disposal; and to Messrs. Hajimu ICHIHASHI, Hiroyuki MORIOKA and Kyôichi NISHIKAWA for their kindness in aiding the writer at the field works.

***Kurasawatrechus ichihashii* S. UÉNO, sp. nov.**

Length: 2.7 mm (from front margin of clypeus to anal end).

Allied to *K. spelaeus* but different from the latter in many features as given below.

Evidently smaller in size and somewhat paler in colour than *K. spelaeus*. Head much more transverse than that of *K. spelaeus*, with pubescent genae which are much more prominent; frontal furrows strongly curved and deepening in front, much more widely divergent in front than those in *K. spelaeus*; front well convex; mentum tooth distinctly bifid; antennae submoniliform and stout, slightly dilated towards apices and reaching basal three-sevenths of elytra; antennal segment 2 three-fourths as long as segment 3, which is only slightly longer than segment 4, each one of middle segments nearly twice as long as wide or a little less so; other features similar to those in *K. spelaeus*.

Pronotum subcordate and convex, but evidently shorter than that of *K. spelaeus*, 1.35 times wider than head, 1.16 times wider than long, widest at seven-tenths from base; the curvature of lateral sides similar to that in *K. spelaeus*, with basal sinuation at two-sevenths from base; each postangular seta inserted at a position slightly before hind angle; the ratio of the greatest width to the width of apex

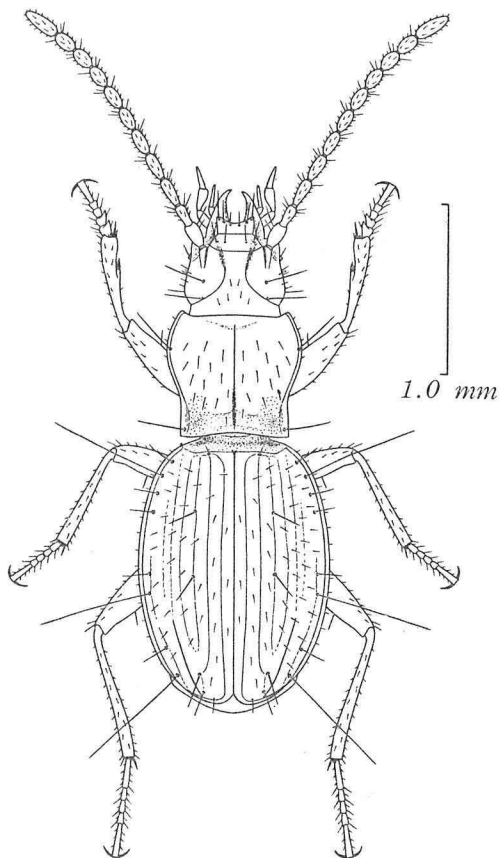


Fig. 1. *Kurawatrechus ichihashii* sp. nov., ♂, of Shinodaté-no-kaza-ana Cave.

1.27; base very slightly wider than apex and slightly reduced at middle; front angles a little more porrect than those in *K. spelaeus*; hind angles slightly larger than right angle; median line distinct, not reaching apex, somewhat widening basally and nearly reaching base; apical transverse impression nearly obliterated but minutely wrinkled; basal transverse impression continuous, basal foveae not very large and rather shallow; microsculpture formed by irregular reticulation and fine transverse lines.

Elytra oval and convex, smaller than those in *K. spelaeus*, 1.39 times wider than pronotum, 1.41 times longer than wide, widest at four-ninths from base; shoulders effaced; lateral sides less rounded than those in *K. spelaeus*; striae slightly deeper than those in *K. spelaeus*, recurrent striole remarkably long and straight; intervals slightly convex on the disk but flat on the sides, each with a

row of pubescence; stria 3 with two small dorsal pores at basal two-sevenths and the middle; microsculpture composed of irregular wide meshes and transverse lines.

Ventral surface pubescent on the median parts from prosternum to sternite 5; anal sternite with one seta on each side in ♂. Legs short and stout; protibiae slightly bowed and entirely pubescent; in ♂ protarsal segments 1 and 2 distinctly dilated and sharply produced inwards at apices.

Male genital organ small but moderately chitinized. Aedeagus slender and arcuate, gradually tapering towards apex behind middle; basal part not very large, with a small basal orifice, lateral sides of which are hardly emarginate; sagittal aileron well developed; apical part prolonged, with the tip blunt and slightly bent towards ventral side in profile; in dorsal aspect, apical lamella narrow and rounded at apex; ventral side widely but not deeply concave at middle, and nearly straight before apex. Inner sac armed with a large copulatory piece, which is elongate and rolled; apical part of the piece covered with minute teeth and divided into two lamellae. Styles relatively large and wide, each with three large apical setae.

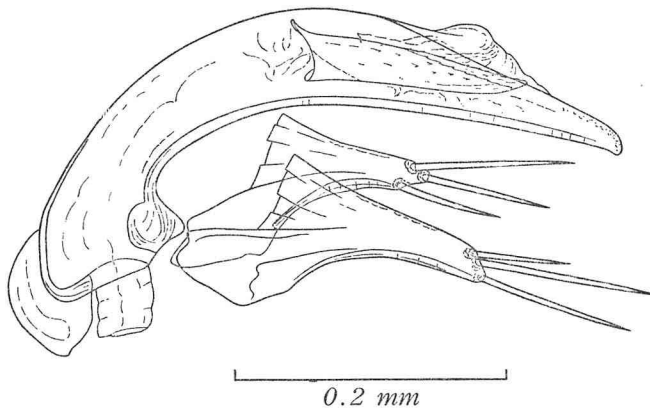


Fig. 2. Male genital organ of *Kurasawatrechus ichihashii* sp. nov., of Shinodaté-no-kaza-ana Cave; left lateral view.

Female unknown.

*Type-specimen*: Holotype: ♂ (15-III-1959, collected by S. UÉNO and deposited in his collection).

*Type-locality*: A limestone cave called "Shinodaté-no-kaza-ana", at Shinodaté of Fujiwara-mura, in Mié Prefecture, central Honshu.

The present new species has some features showing the resemblance to the eastern species, *K. eriophorus* A. YOSHIDA et S. NOMURA (1952, p. 6) and *K. ohshimai* S. UÉNO (1952, p. 15), though there appears to remain little doubt in regard to the affinity of *K. ichihashii* to *K. spelaeus*. Among those features, the presence of microsculpture clearly impressed on elytra and of the pubescence on sternites seems

to be of special importance. The same features are also found in the following new species, and may well be regarded as to be common within the genus *Kurasawatrechus*. It is obvious that the loss of such primitive characters is the result of specialization. *K. spelaeus* is therefore a peculiar species in this respect and may require a future examination of the male genitalia.

Shinodaté-no-kaza-ana Cave is situated at the northeastern foot of the Suzuka mountain range, about 9.5 km east of Samé-no-kōmori-ana Cave. Its large entrance is open just above the water on the left side of the Inabé-gawa River. This limestone cave seems to be a drain of the past times and is extremely scanty of nutriment in the main gallery, which is gradually ascending from the entrance to the innermost. There is, however, a branch in the depth, which develops on a higher level than that of the main gallery. The holotype of *K. ichihashii* was found at the innermost of this branch among pebbles on the wet muddy floor, coexisting with a chthoniid pseudoscorpion, a blaniulid diplopod and an anurid springtail.

***Kurasawatrechus katoi* S. UÉNO, sp. nov.**

Length: 3.0 mm (from front margin of clypeus to anal end).

Closely allied to *K. ichihashii* and well accord with the description of the latter, excepting the features noted below.

Somewhat larger in size and a little darker in colour than *K. ichihashii*. Head less transverse than that of *K. ichihashii*, nearly quadrate, with frontal furrows less divergent in front and with genae less convex; antennae reaching basal three-tenths of elytra, with segments 2-4 thinner and less ovate than those in *K. ichihashii*; antennal segment 2 three-fifths as long as segment 3, which is slightly longer than segment 4, each one of middle segments twice as long as wide.

Pronotum a little less transverse and less contracted posteriorly than that of *K. ichihashii*, with the basal part distinctly larger behind basal sinuation; 1.39 times wider than head, 1.11 times wider than long, widest at seven-tenths from base; lateral sides less rounded in front than those in *K. ichihashii*, with basal sinuation much shallower and at a position more in front (at one-third from base); lateral seta inserted at one-fifth from apex; apex nearly straight, the ratio of the greatest width to the width of apex 1.25; base a little wider than apex and slightly bisinuate, with the median part slightly produced backwards; hind angles rectangular; median line shallower than that in *K. ichihashii*; microsculpture similar to that in the latter species but less sharply impressed.

Elytra less ovate than those in *K. ichihashii*, with wider basal part, 1.45 times wider than pronotum, longer than wide in a same proportion, widest at about two-fifths from base; prehumeral borders less oblique than those in *K. ichihashii*; lateral sides less rounded especially behind the widest part and less oblique near apices; scutellar striae present though short; stria 3 with two dorsal pores at two-ninths to one-fourth from base and a little behind middle.

Anal sternite with two setae on each side in ♀.

Male unknown.

*Type-specimen*: Holotype: ♀ (6-III-1959, collected by T. KATÔ and preserved in UÉNO's collection).

*Type-locality*: A limestone cave called "Shakudaijin-no-kaza-ana", at Ogisu of Tsubaki, Reihô-mura, in Mié Prefecture, central Honshu.

At the southern part of the Suzukas, where the mountain range turns westward, there is a peak called "Nyûdô-ga-také" (906 m above the sea). Shakudaijin-no-kaza-ana Cave is situated near the southern foot of this peak, at an altitude of about 350 m. The place is about 28 km south of Shinodaté-no-kaza-ana Cave and about 12 km north of the town of Kameyama. Its entrance is open at the root of an outcrop of limestone on the right side of a branch of the Ogisu-dani. Small as it is, the cave keeps an interesting fauna, various kinds of cave animals having been brought from it to light. Many of these animals are, however, usually rare, owing possibly to the paucity of nutriment and to the low humidity in the depth. *K. katoi* is also extremely rare, only the holotype of this species having been known up to the present. It was found by Mr. KATÔ under a stone placed on a narrow wet platform near the innermost, where there could be reached only by crawling through a troublesome cat-hole. At the same place, the writer took a specimen of *Spelaeochthonius*.

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