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Two New *Stygiotrechus* (Coleoptera, Trechinae) on the Verge of Extinction

Shun-Ichi UÉNO

Department of Zoology, National Science Museum (Nat. Hist.),
3–23–1 Hyakunin-chô, Shinjuku, Tokyo, 169–0073 Japan

Abstract Two new species of the trechine genus *Stygiotrechus* are described from the western end of the Izumi Hills in the Kii Peninsula, Central Japan. One of them, named *S. kadanus*, belongs to the *ohtanii* group and is upper hypogean, while the other, named *S. kitayamai,* belongs to the *morimotoi* group and spreads from the endogean to the upper hypogean zones. In addition, the male genitalia of *S. ohtanii*, the type of the *ohtanii* group, are described for the first time in order to make possible a genitalic comparison between *S. kadanus* and *S. ohtanii*. The two new species are threatened by the large quarries supplying the enormous quantity of stone blocks for the construction of Kansai International Airport, which is being built on a reclaimed land from the sea.

In the autumn of 1998, a female specimen of an anophthalmic species of *Trechiama* was discovered by Masato MORI in a gully on the southwestern slope of Takamori-yama lying at the western end of the Izumi Hills that stretch from west to east in the central part of the Kii Peninsula, Central Japan. It was later proved to be a new species belonging to the *satoui* complex of the genus *Trechiama* theretofore known only from northeastern Shikoku and the Island of Awaji-shima, and was described by ASHIDA (1999, p. 606, figs. 1–5) under the name of *T. morii*. This discovery was very important from the zoogeographical viewpoint, since it was the first positive proof of a close faunal relationship of the Izumi Hills in the Kii Peninsula to the Sanuki Hills in northeastern Shikoku concerning the trechine beetles of the genus *Trechiama*, though a similar relationship had already been suggested by the members of *Stygiotrechus*.

In the course of searching for additional specimens of *Trechiama morii*, a second species of anophthalmic trechine beetle was discovered in the same gully, and was determined as a species of the genus *Stygiotrechus*. To our surprise, this species belongs to the *morimotoi* group, whose members theretofore known are distributed to the eastern part of the Chûgoku Hills on the northern side of the eastern part of the Inland Sea of Seto-naikai, hence identical in the distributional pattern with *Trechiama dissitus* S. UÉNO (1984, p. 10, figs. 5–6; 1985, pp. 167, 188) which belongs to the *kosugei* complex but is isolated in the central part of the Izumi Hills. Still further investigation made in the same gully brought forth a third species of anophthalmic trechine beetle,

also belonging to the genus *Stygiotrechus* but to a different species-group, i.e., that of *S. ohtanii*. This species-group was then known from three species, *S. ohtanii* S. UÉNO (1969, pp. 490, 491, fig. 5), *S. nishikawai* S. UÉNO (1980, pp. 3, 10, figs. 2–4) and S. *satoui* S. UÉNO (1976, p. 278, figs. 1–4), and has been regarded as a proof of faunal relationship between the Izumi Hills and the Sanuki Hills. The discovery of a fourth species of the same group near the western end of the Izumi Hills affords a sounder basis for the above inference.

The successive discoveries of the two new species of *Stygiotrechus* were already noticed by ASHIDA (1999, p. 609; 2000, pp. 24, 25) and KITAYAMA and ASHIDA (1999, p. 12, fig. 8), who were expected to describe them. Unfortunately, it became urgent to give them proper scientific names, because of rapid destruction of the hill on which lies the habitat of the trechine beetles. For this reason, ASHIDA who is now staying in the United States as a visiting scientist shifted the burden to me. In view of the urgency, I will limit the present paper to the descriptions of the new species, though several other *Stygiotrechus* have been discovered in recent years from other places of Kinki District including the Island of Awaji-shima. It is, however, necessary to describe male genitalic features of *S. ohtanii* for comparison, an account of which will be given after the descriptions of the new species.

The abbreviations used herein are the same as those explained in previous papers of mine.

Before going into further details, I wish to express my hearty thanks to the following friends of mine for their kind support of the present study: Dr. Hisashi ASHIDA, Dr. Yoshiaki NISHIKAWA, Messrs. Kenji KITAYAMA, Masato MORI, Takumi SAITÔ and Shôtarô TANAKA.

This paper is dedicated to the memory of the late Mr. Akira KITAYAMA, who unexpectedly passed away from multiple organ failure on January 21, 2001, at the age of 41, only 50 days after taking me along to the gully on Takamori-yama, in which coexist the three species of anophthalmic trechine beetles. He was the coauthor of "Dytiscoidea of Japan" (1993), anonymous compiler of "Osaka Red Data Book 2000. 3" (2000) and "Osaka Wildlife List 2000. 3" (2000), and a leading member of the Kansai Trechine Research Group.

Stygiotrechus kadanus S. UÉNO, sp. nov.

(Figs. 1–3)

Stygiotrechus sp.: ASHIDA, 2000, Checklist of Trechinae from Japan, Kyoto, vers. VIII, p. 24.

Length: 2.55–2.90 mm (from apical margin of clypeus to apices of elytra).

Closely allied to *S. ohtanii* S. UÉNO from Mt. Kongô-zan, but discriminated by smaller head, a little longer pronotum covered with longer hairs and with the sides slightly but appreciably sinuate at about basal two-sevenths, and more parallel-sided elytra with ampler basal part and square shoulders. Decisively different from *S.*

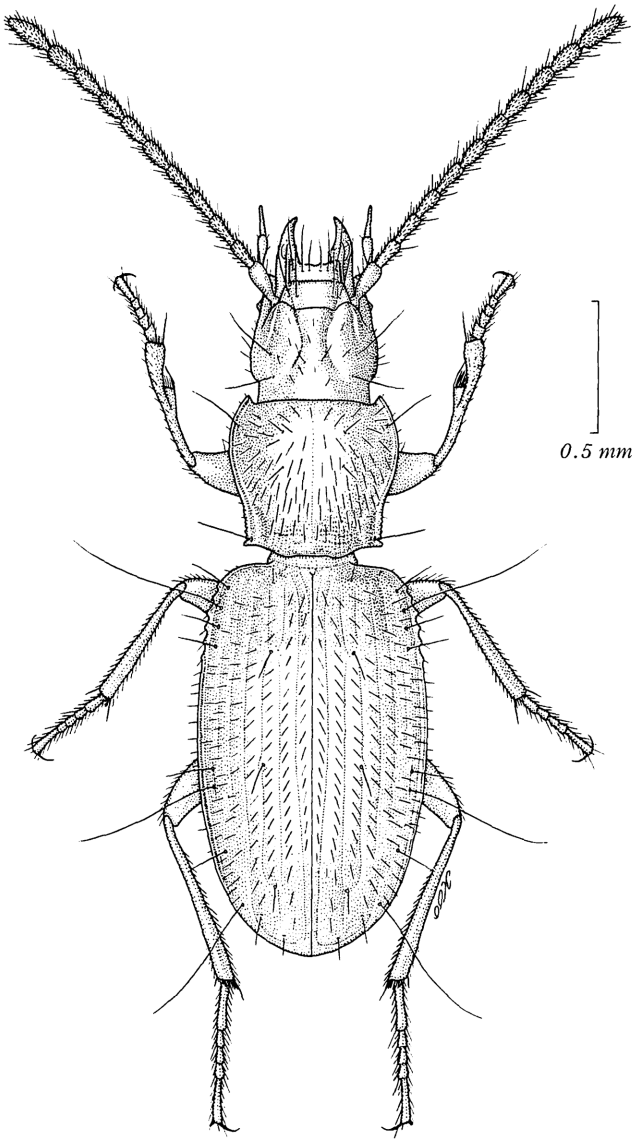


Fig. 1. *Stygiotrechus kadanus* S. UÉNO, sp. nov., ♂, from the Momiji-dani on Takamori-yama in Wakayama-shi.

ohtanii also in the configuration of male genitalia, above all in that of aedeagal apical lobe.

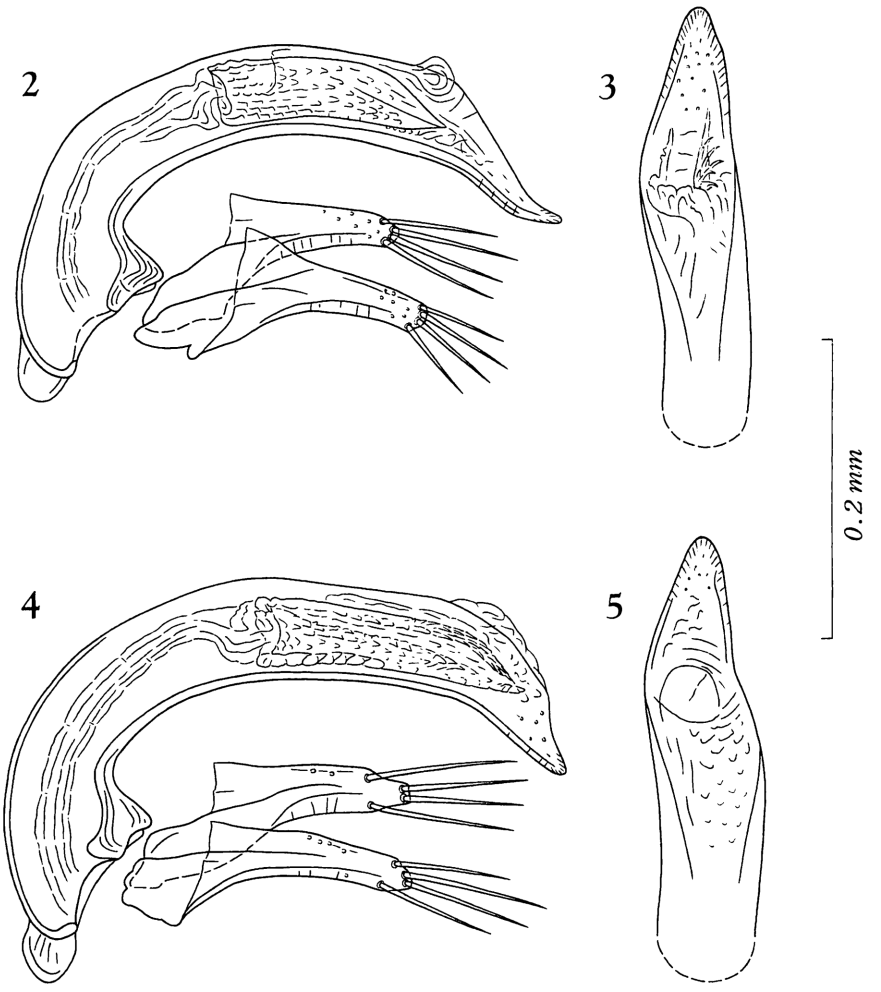
Body a little more robust and usually somewhat darker in coloration than in *S. ohtanii*. Head as in *S. ohtanii* though smaller; antennae a little longer, usually reaching basal third of elytra, with segments 6–10 a little more elongate. Pronotum a little

longer on an average than in *S. ohtanii*, usually widest at about five-sevenths from base though the position varies from two-thirds to three-fourths according to individuals, with the sides less evenly arcuate behind; PW/HW 1.26–1.33 (M 1.30), PW/PL 1.08–1.12 (M 1.10), PW/PA 1.23–1.27 (M 1.25), PW/PB 1.18–1.26 (M 1.22); sides gently arcuate in front, slightly but appreciably sinuate at about two-sevenths from base, either nearly parallel or slightly convergent posteriad in basal part, and distinctly indented behind ante-basal sinuation; apex about as wide as or slightly narrower than base, PA/PB 0.94–1.02 (M 0.98); base briefly lobed as in *S. ohtanii* and sometimes bi-sinuate; front angles sharply produced forwards, hind angles usually subrectangular and minutely denticulate laterad at the corners; disc sparsely covered with fairly long hairs, with two pair of discal setae which are not conspicuous being mingled in long discal hairs; basal foveae shallow, not delimited externally by distinct carinae. Elytra more parallel-sided than in *S. ohtanii*, widest at about four-ninths from base, broader and ampler at the basal part, and only lightly contracted basad; EW/PW 1.37–1.45 (M 1.41), EL/EW 1.51–1.57 (M 1.54); shoulders square, obviously more salient than in *S. ohtanii*; humeral borders distinctly serrate, each bearing five to eight teeth, of which median three or four are obviously larger than the others; dorsum moderately convex, though distinctly depressed in basal area externally delimited by obtusely carinate basal portion of interval 5; striation and chaetotaxy as in *S. ohtanii*, though the apical striole is often directed to stria 6 or 7; each interval provided with an irregular row (partially rows) of fairly long pubescence, which is evidently longer than in *S. ohtanii*. Legs as in *S. ohtanii*, but the tarsi are a little longer and slenderer than in the latter.

Male genital organ small and lightly sclerotized, generally similar to that of *S. ohtanii*, but evidently different in the curvature of aedeagal tube and the configuration of apical lobe. Aedeagus about one-fourth as long as elytra, tubular, less regularly arcuate in basal half in lateral view than in *S. ohtanii*, less sigmoidally curved in dorsal view than in the latter, with the basal part more abruptly bent ventrad; basal orifice small, with the sides only shallowly emarginate; sagittal aileron small though distinct; viewed laterally, apical lobe narrower than in *S. ohtanii*, lightly curved ventrad and slightly reflexed at the terminal portion whose tip is nearly pointed; in one of the paratypes, the terminal portion is shorter and less reflexed than in the illustrated specimen; viewed dorsally, apical lobe somewhat asymmetrical; ventral margin widely and regularly emarginate in profile. Copulatory piece a little shorter than in *S. ohtanii*, four-ninths as long as aedeagus, though similarly shaped and similarly covered with scales. Styles fairly slender at the apical parts, left style longer than the right, each bearing four apical setae.

Type series. Holotype: ♂, allotype: ♀, 30–I–1999, T. SAITÔ leg. Paratypes: 1♂, 29–XI–1998, H. ASHIDA leg.; 1♀, 30–I–1999, T. SAITÔ leg.; 1♂,1♀ (somewhat teneral), 13–II–1999, T. SAITÔ leg.; 1♀, 4–VII–1999, K. KITAYAMA leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Momiji-dani on Takamori-yama, 70 m in altitude, at Kada of



Figs. 2–5. Male genitalia of *Stygiotrechus* spp.; left lateral view (2, 4), and apical part of aedeagus, dorso-apical view (3, 5). — 2–3, *S. kadanus* S. UÉNO, sp. nov., from the Momiji-dani on Takamori-yama; 4–5, *S. ohtanii* S. UÉNO, 1969, from Mt. Kongô-zan.

Wakayama-shi in Wakayama Prefecture, Central Japan.

Notes. Though apparently related to *S. ohtanii*, this new species shows a closer resemblance to *S. nishikawai* in the configuration of the elytra. Besides, it exhibits an intermediate state of the aedeagal apical lobe between the two species. Further comparative study is needed for drawing the final conclusion as regards true relationships of the members of the *ohtanii* group of *Stygiotrechus*, since several other populations of their relatives were discovered in recent years from the intervening areas between the localities of the hitherto described species.

Bionomical account of *S. kadanus* and *S. kitayamai* to be described below will be given on later pages under the heading of General Remarks.

Stygiotrechus kitayamai S. UÉNO, sp. nov.

(Figs. 6–8)

Stygiotrechus sp. 1: K. KITAYAMA & ASHIDA, 1999, Nejirebane, Osaka, (85): p. 12, fig. 8. — ASHIDA, 2000, Checklist of Trechinae from Japan, Kyoto, vers. VIII, p. 25.

Length: 2.45–3.05 mm (from apical margin of clypeus to apices of elytra).

Closely similar in external morphology to *S. morimotoi* S. UÉNO (1973 b, pp. 24, 29, figs. 1–3), above all to subsp. *notarum* S. UÉNO (1980, pp. 8, 11, figs. 7–8), but markedly different from it by the elongate and less arcuate aedeagus with broad apical lobe widely subtruncate at the tip and obviously larger styles.

Similar in facies to *S. morimotoi* but rather variable in the proportions of body parts, usually with more elongate hind body. Colour reddish brown, shiny, usually darker than in *S. morimotoi*; clypeus and labrum more or less lighter than the other parts of head; palpi, apical halves of antennae, ventral side of hind body, and legs yellowish brown.

Head less transverse than in *S. morimotoi*, usually with less tumid genal parts which are a little more gradually convergent anteriad; frontal furrows less strongly arcuate, often very shallow behind a level between supraorbital pores except near neck constriction; labrum rather shallowly emarginate at the apex; antennae similar to those of *S. morimotoi notarum*, reaching or nearly reaching basal three-tenths of elytra; other cephalic features as in *S. morimotoi*.

Pronotum seemingly a little broader in basal half than in *S. morimotoi*, though almost identical with the latter in standard ratios, widest at about or a little behind two-thirds from base; PW/HW 1.23–1.37 (M 1.31), PW/PL 1.08–1.17 (M 1.12), PW/PA 1.21–1.31 (M 1.27), PW/PB 1.24–1.31 (M 1.26), PA/PB 0.96–1.04 (M 1.00); sides feebly arcuate in front, less so behind middle but still slightly arcuate to postangular denticles, neither straight nor invisibly sinuate as in *S. morimotoi*, obtusely though appreciably indented in basal fourth; front angles acutely produced forwards, hind angles distinctly denticulate laterad; base more or less emarginate at middle, sometimes deeply so, forming a round protuberance on each side and oblique emargination inside each hind angle; basal area depressed on each side and indented on the margin of each round protuberance; other prothoracic features as in *S. morimotoi*.

Elytra usually more elongate than in *S. morimotoi*, widest at about four-ninths from bases, and a little more parallel-sided; EW/PW 1.24–1.31 (M 1.28), EL/EW 1.51–1.61 (M 1.56); sides briefly but deeply emarginate behind each humeral tooth, and then very feebly arcuate to the level of the apicalmost pore of the marginal umbilicate series; apices widely and conjointly rounded, preapical emargination very slight but appreciable; striae superficial, evanescent at the side, stria 1 entire, 2–5 more or less traceable throughout, 6 either vestigial or obliterated, 7 obsolete, 8 fragmentarily

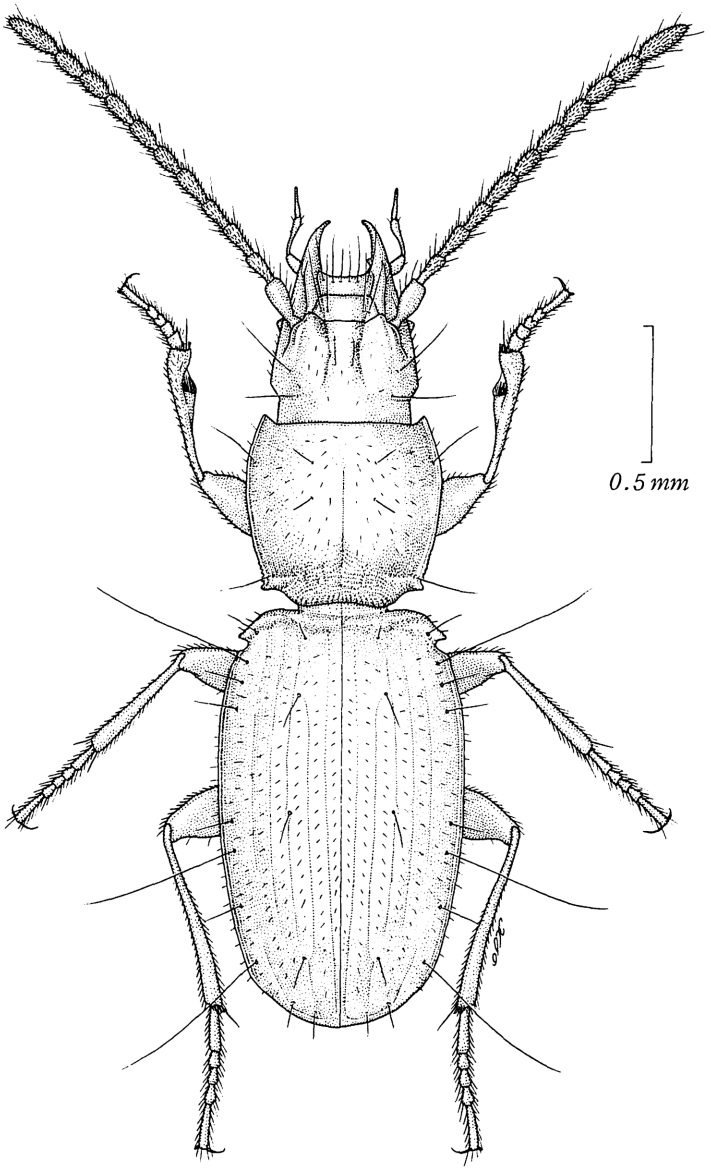


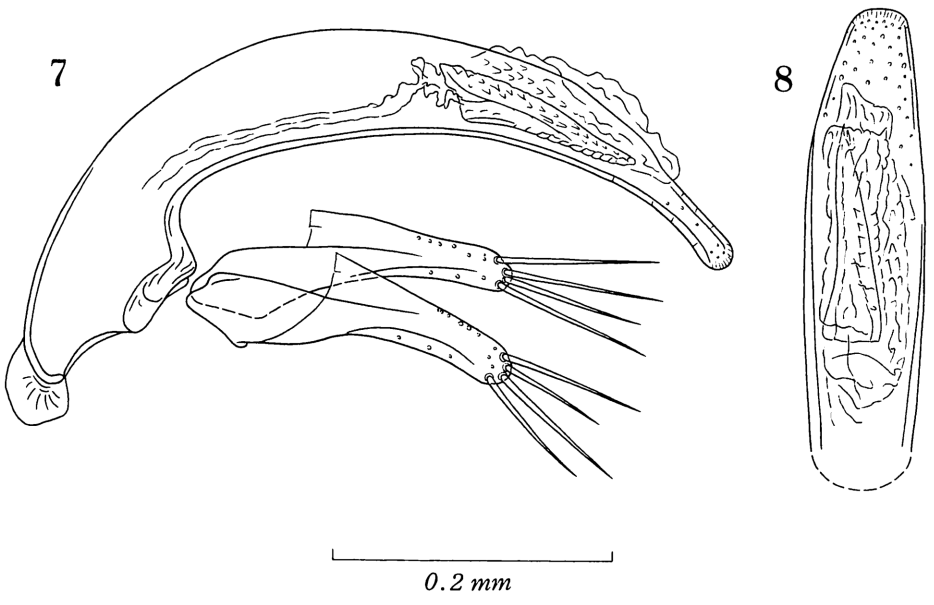
Fig. 6. *Stygiotrechus kitayamai* S. UÉNO, sp. nov., ♂, from the Momiji-dani on Takamori-yama in Wakayama-shi.

perceptible in apical part; no scutellar striole; apical striole distinct though not sharply carved, hardly arcuate in front, and directed to the site of stria 5 or 7; stria 3 with two setiferous dorsal pores at 2/11–2/9 and 1/5–1/2 from base, respectively; other elytral features as in *S. morimotoi*.

Ventral surface and legs as in *S. morimotoi*, though the legs are a little slenderer.

Male genital organ fairly large and moderately sclerotized, markedly different in configuration from that of *S. morimotoi* though basically similar to the latter. Aedeagus about three-tenths as long as elytra, elongate, lightly depressed, straight in dorsal view, gently arcuate at middle, and widely membraneous on dorsum, with the dorsal margin semicircularly rounded before middle in profile but less so behind; basal part elongate, moderately curved ventrad, and shallowly emarginate at the sides of basal orifice; sagittal aileron not large but well protrudent ventro-proximally; viewed dorsally, apical lobe broad, gradually narrowed towards apex which is widely subtruncate; viewed laterally, apical lobe long and narrow, protruding ventro-apically, slightly dilated in apical portion, and narrowly rounded at the extremity; ventral margin widely emarginate in profile, more strongly so in apical third. Inner sac partially covered with poorly sclerotized scales and armed with a longitudinally rolled copulatory piece, which is elongate, about two-sevenths as long as aedeagus, gradually tapered towards pointed apex, and mostly covered with scales on the surface. Styles fairly large, elongate, left style a little longer than the right, each bearing four long setae at the apex.

Type series. Holotype: ♂, allotype: ♀, 2–XII–2000, S. UÉNO leg. Paratypes: 5♂♂, 5♀♀, 7–XI–1998, A. KITAYAMA & M. MORI leg.; 1♂, 29–XI–1998, H. ASHIDA leg.; 1♀, 1–XII–1998, T. SAITÔ leg.; 1♂, 5–XII–1998, T. SAITÔ leg.; 10♂♂, 7♀♀, 2–XII–2000, S. UÉNO, A. KITAYAMA, K. KITAYAMA, Y. NISHIKAWA & S. TANAKA leg.



Figs. 7–8. Male genitalia of *Stygiotrechus kitayamai* S. UÉNO, sp. nov., from the Momiji-dani on Takamori-yama in Wakayama-shi; left lateral view (7), and apical part of aedeagus, dorso-apical view (8).

All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Momiji-dani on Takamori-yama, 70 m in altitude, at Kada of Wakayama-shi in Wakayama Prefecture, Central Japan.

Further specimens examined. 3♂♂, 3♀♀, Okineto-yama, 120 m alt. on W slope, Tanagawa, Misaki-chô, Osaka Pref., Central Japan, 4–VI–1999, H. ASHIDA & K. KITAYAMA leg. (NSMT).

Notes. Though closely resembling *S. morimotoi* in general appearance, this new species can be recognized at first sight on its elongate, parallel-sided hind body, even though the feature is subject to individual variation. Taxonomic validity of this character state is verified by the characteristic male genitalia of *S. kitayamai*, which resemble to some extent those of *S. morimotoi notarum* in lateral aspect but are evidently different from the latter in dorsal aspect.

This interesting and important species is dedicated to the memory of the late Mr. Akira KITAYAMA in honour of his devotion to clarification of the trechine fauna of western Central Japan.

Stygiotrechus ohtanii S. UÉNO, 1969

(Figs. 4–5)

Stygiotrechus ohtanii S. UÉNO, 1969, Bull. natn. Sci. Mus., Tokyo, **12**, pp. 490, 491, fig. 5; type locality: Mt. Kongô-zan; 1973, Bull. natn. Sci. Mus., Tokyo, **16**, p. 29; 1980, J. speleol. Soc. Japan, **5**, p. 10. —— K. KITAYAMA & ASHIDA, 1999, Nejirebane, Osaka, (85), p. 13, fig. 9. —— ASHIDA, 2000, Checklist of Trechinae from Japan, Kyoto, vers. VIII, p. 24.

Through the courtesy of Hisashi ASHIDA, I was able to examine a male specimen of this species (2.70 mm in the length of body). It agrees in every respect with the type series and has the following standard ratios: PW/HW 1.26, PW/PL 1.12, PW/PA 1.24, PW/PB 1.27, PA/PB 1.02, EW/PW 1.40, EL/EW 1.56.

Male genital organ small and lightly sclerotized. Aedeagus slightly more than one-fourth as long as elytra, tubular, strongly arcuate before middle but nearly straight behind in lateral view, sigmoidally twisted in dorsal view, with the apical part moderately curved ventrad and fairly broad to near the base of apical lobe in profile; dorsal margin semicircularly rounded before middle in profile; basal part relatively large, shallowly emarginate at the sides of basal orifice; sagittal aileron small though protrudent; viewed laterally, apical lobe subtriangular, fairly broad at the base, straightly narrowed towards blunt apex, and not reflexed at the terminal portion; viewed dorsally, apical part nearly symmetrical though somewhat inclined to the left, narrowly rounded at the tip of apical lobe; ventral margin moderately emarginate before middle but hardly so in apical half to the base of ventrally curved apical part. Inner sac armed with a large elongate copulatory piece about a half as long as aedeagus, wholly covered with scales of various shape on the surface, partially large and broad but partially spinose, and with the apex pointed. Styles relatively broad, subequal in length, each

bearing four setae at the apex, one or two of which are removed proximally.

Male specimen examined. 1♂, Mt. Kongô-zan, 1,000 m alt., Chihaya-akasaka-mura, Osaka Pref., Central Japan, 10–X–1998, H. ASHIDA leg. (NSMT).

Notes. It seems worth noting that the male genitalia of *S. ohtanii* are more closely similar to those of *S. satoui* than to those of *S. nishikawai* in the configuration of the aedeagus, which is arcuate from the base to the apex in lateral view and sigmoidally twisted in dorsal view, with the apical lobe simply produced ventro-apicad, although the Kongô-zan species is doubtless closer to *S. nishikawai* in external morphology and geographical relationship. It is possible that configuration of the aedeagal apical lobe is merely species-specific among the members of the group of *Stygiotrechus ohtanii*, not indicative of their phylogenetic affinities.

General Remarks

Takamori-yama (285 m in height), on which lies the type locality of the three species of anophthalmic trechine beetles including the two new species of *Stygiotrechus*, is located at the western end of the Izumi Hills stretching from west to east on the borders of Wakayama and Osaka Prefectures in the western central part of the Kii Peninsula, central Honshu, Central Japan. The exact type locality is a steeply slanting side gully of the Momiji-dani on the southwestern slope of the hill. The gully is only about 2 m wide at the mouth and 30 m or so long, and is filled with sandstone debris mingled with soil (Fig. 10), forming a typical upper hypogean environment, particularly near the mouth just above the water of the Momiji-dani. There is no flowing water in the gully except on rainy days, but the lower layers of the scree are always moist, being shaded by broadleaved trees and fed by seepages (cf. Fig. 9).

Of the three species of anophthalmic trechines, *Stygiotrechus kadanus* is the rarest one and occurs only in the deepest layer, 100–150 cm below the surface. *Trechiama morii* is also frequent in the deepest layer, but is sometimes met with at the shallower parts at the depth of about 30 cm, so far as the micro-habitat is wet. Both the species are doubtless upper hypogean in nature, even though *S. kadanus* is short-legged and is considerably different in this respect from *T. morii*. In contrast to these, *Stygiotrechus kitayamai* seems primarily endogean. It is rather widespread in the gully, and is usually found crawling on the undersurfaces of stones embedded in the ground or lying in the shallower layers of the scree. However, this species often creeps down into deeper layers and is sometimes found even at the bottom in coexistence with *T. morii*. In this particular gully, therefore, the endogean zone seems continuous to the upper hypogean zone, at least for *S. kitayamai*.

Coexistence of three different species of anophthalmic trechines is quite exceptional in Japan, and has hitherto been known only at few stations. Even in those exceptional places, micro-habitat segregation is usually observed between inhabitants, which, as a rule, belong to different genera. Coexistence of two congeneric species have been known sporadically, but in such cases, the two species usually belong to dif-

ferent species-groups and one of the two is much rarer than the other. For instance, *Kurasawatrechus kawaguchii* S. UÉNO coexists exactly in the same habitat, sometimes on the undersurface of the same stone, with *K. longulus* S. UÉNO on Mt. Nyûgasa-yama of the Southern Japanese Alps (cf. UÉNO, 1973 a) and with *K. brevicornis* S. UÉNO on the Kitazawa-tôgé of the same mountain range (cf. UÉNO, 1979); *K. kawaguchii* is rather widespread and belongs to a different lineage from the latter two, which are directly related to each other and predominated by the former species. A similar situation is observed on the two species of *Stygiotrechus* occurring on Takamori-yama. Though congeneric, they belong to different species-groups, and *S. kitayamai* of the *morimotoi* group is evidently predominant over *S. kadanus* of the *ohtanii* group. In all probability, this must reflect difference in the history of their immigration into the Izumi Hills.

It is most probable that *S. kadanus* is the older immigrant of the two. The members of the *ohtanii* group, to which belongs *S. kadanus*, are distributed in northeastern Shikoku (*S. satoui* S. UÉNO) and the western central areas of the Kii Peninsula, mainly along the Sanuki Hills in the former and the Izumi Hills in the latter, though spreading over the adjacent hills, particularly in the Kii Peninsula. The species-group extends its distribution to the western side of Ikoma-yama of the Ikoma Hills to the north of Mt. Kongô-zan (undescribed; ASHIDA, 2000, p. 24), but does not seem to have crossed the Yodo-gawa alluvion and to have spread over the eastern part of the Chûgoku Hills. The same pattern of distribution is shown by the *satoui* group of the genus *Trechiama*, to which belongs *T. morii*, though speciation of this group of long-legged trechines seems to have occurred mainly in northeastern Shikoku, probably on or near the Sanuki Hills (cf. UÉNO, 1985, p. 191). Some ancestral trechines of this group dispersed eastwards onto the Island of Awaji-shima and then colonized the western corner of the Izumi Hills in the Kii Peninsula. The dispersal may have been effected on land, since the existing species at the easternmost part of the distributional range are so closely related to one another that their differentiation may have occurred in rather a recent period and since dispersal across the Naruto Straits and the Kitan Straits, both of which have strong currents, may have been extremely difficult, even if aided by flood waters of such a large river as the Yoshino-gawa. Derivation of the *ohtanii* group of *Stygiotrechus* may be the same as that of the *satoui* group of *Trechiama*, though the former has become speciated more intensively at the Kii side of the water gap. At any rate, *Stygiotrechus kadanus* and *Trechiama morii* can be regarded as evidences of close faunal relationship between the Sanuki Hills and the Izumi Hills.

On the contrary, the ancestor of *Stygiotrechus kitayamai* may have reached Takamori-yama directly from the north. It belongs to the *morimotoi* group, whose component species previously known are distributed in the eastern part of the Chûgoku Hills along the northern side of the Inland Sea of Seto-naikai (cf. UÉNO, 1980, p. 2, fig. 1). None of its members have been found in other parts of the Izumi–Kongô–Ikoma Range and northeastern Shikoku, though an undescribed species of the same species-group was discovered quite recently at the southern part of the Island of Awaji-shima

(cf. ASHIDA, 2000, p. 25). Isolated occurrence of *S. kitayamai* at the western end of the Izumi Hills is very similar to that of *Trechiama dissitus* at the central part of the same hill range, a species belonging to the *kosugei* complex whose component species are otherwise distributed over the easternmost part of the Chûgoku Hills (cf. UÉNO, 1985, p. 193, fig. 20). It seems improbable that the ancestors of these trechines reached the Izumis through hill ranges, since neither of the two ways, one through the Ikoma–Kongô Hills and the other through the Island of Awaji-shima, retains evidences of their existence in the past.

At present, we have fairly good knowledge about the anophthalmic trechines occurring in the areas around the Bay of Osaka. It is therefore implausible that certain new species of the group of *Stygiotrechus morimotoi* and that of *Trechiama kosugei* will be found in the intervening area between the Yodo-gawa alluvion and the Izumi Hills. In all probability, the ancestors of *S. kitayamai* and *Trechiama dissitus* must have immigrated to the Izumis by rafting on flood waters of large rivers emptying into the northern part of the Bay of Osaka. I have already pointed out that the isolated Iwaseoyama populations of *Stygiotrechus satoui satoui* and *Trechiama satoui* must have been derived from ancestral individuals that had been carried down by the water of inundation from the Sanuki Hills in northeastern Shikoku (cf. UÉNO, 1983, p. 76). A similar explanation can be offered as to the origin of the two anophthalmic trechines now surviving on Takamori-yama and Inunaki-san of the Izumi Hills. Their ancestors may have been carried southwards by flood waters of, for instance, the ancient Yodo-gawa River, which emptied into the Pacific through the narrow gap between the Kii Peninsula and the Island of Awaji-shima, now recognized as the Kitan Straits. The flood waters may have been partially dammed up at this narrow point, leaving certain drifters on either bank, some of which, including the ancestors of the two trechine species, became successfully established in the western part of the Izumi Hills then forming the left bank of the ancient river. The same process of colonization seems to have occurred also on the right bank, or the southern part of the Island of Awaji-shima, where an undescribed *Stygiotrechus* of the *morimotoi* group became differentiated.

Thus, the Kada area at the western end of the Izumi Hills is very important from the entomological, biospeological and zoogeographical viewpoints. Only this area in the Kii Peninsula furnishes substantial evidences to show that the past dispersal of ancestral anophthalmic trechines was effected not only on land but also by rafting on flood waters, the former from the west and the latter from the north, resulting in rare coexistence of the three species belonging to phylogenetically different groups. Unfortunately, Takamori-yama at the centre of the Kada area is being extensively quarried from different sides for supplying the enormous quantity of stone blocks for the con-

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Figs. 9–10. Side gully of the Momiji-dani on Takamori-yama, in which coexist the three species of anophthalmic trechine beetles, *Trechiama* (s. str.) *morii* ASHIDA, *Stygiotrechus kadanus* S. UÉNO, sp. nov., and *S. kitayamai* S. UÉNO, sp. nov. Figure 10 is a close-up of the lower part of the gully, showing a slanting heap of sandstone gravel. Photo S.-I. UÉNO.


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struction of Kansai International Airport, which is being built on a reclaimed land from the sea, in spite of the fact that its Wakayama side is largely designated as a prefectural forest park, and the excavation is now approaching to the type locality of the three species of anophthalmic trechine beetles. Two of the three species (excluding *Stygiotrechus kadanus*) are also known from a gully on the other side of the ridge, or about 1.4 km east-northeast of the type locality, but this habitat is also threatened by quarrying. It is strongly hoped that at least Takamori-yama and its close proximities will be urgently designated as a nature reserve of the Japanese Government for protecting the unique habitat of these important species against complete destruction.

要　　約

上野俊一：絶滅の危機に瀕するノコメメクラチビゴミムシ属の 2 新種．—— 和泉山地の西端に位置する高森山からノコメメクラチビゴミムシ属の 2 新種を記載し，これらにそれぞれタカモリメクラチビゴミムシ *Stygiotrechus kadanus* S. UÉNO およびキタヤマメクラチビゴミムシ *Stygiotrechus kitayamai* S. UÉNO の新名を与えた．前者はコンゴウメクラチビゴミムシ群，後者はモリモトメクラチビゴミムシ群に属し，それぞれの種群のなかでは，4 番目と 2 番目に命名される種になる．

これらの 2 種とカダメクラチビゴミムシ *Trechiama morii* ASHIDA とは，高森山を南西方向に流下する紅葉谷の小さい脇沢にすみ，地中性ないし地下浅層性で，生息域が極端に限られている．3 種のメクラチビゴミムシ類が同所的にすむこと自体，きわめて例外的で，わが国でこれまでに知られている同様の事例は片手で数えられるほどしかない．そのうえ，カダメクラチビゴミムシとタカモリメクラチビゴミムシとは，和泉山地がかつては淡路島の南部を経て四国の讃岐山地と陸続きだったことを裏づける重要な証拠になり，キタヤマメクラチビゴミムシのほうは本来，中国山地の東端部に分布する種群に属するので，生物地理学上きわめて興味深い問題を提起する．しかし，高森山の一帯は，関西国際空港建設のための土取場として南北の両面から大規模に掘り崩され，掘削の先端部が基準産地のすぐ近くに迫っている．3 種のメクラチビゴミムシ類のうち，タカモリメクラチビゴミムシ以外の 2 種は，東北東方向に約 1.4 km 離れた尾根の裏側からも見つかっているが，採石はこの方面でも実施されているので，将来の状況は予断を許さない．高森山を中心にして，多奈川西川と阿振川とに囲まれる区画だけでも特別保護区として保全し，これらの甲虫類の生息地を保護することが強く望まれる．

この論文は，今年の 1 月 21 日に全臓器不全のため急逝された北山 昭氏に捧げた．北山氏は，関西チビゴミ研究グループの有力メンバーで，高森山における盲目性チビゴミムシの発見にも深く関係された．この度の新種記載にともなう現地調査では，亡くなるわずか 50 日前にわたしをご案内いただき，生息状況をつぶさに観察させてくださった．ご存命であれば，日本のメクラチビゴミムシ相の解明に大きく貢献され，ご自身の論文も数多く公表されたであろう同氏を偲び，貴重な新種のひとつに和名，学名とも献名して，ご功績を永く後世に留めるよすがとする．

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