Elytra, *Tokyo*, **29** (2): 369–384, November 15, 2001

The *Trechiama* (Coleoptera, Trechinae) of the Asahi Mountains and the Adjacent Volcanoes in Northeast Japan

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Abstract Alpine and subalpine species of the trechine genus *Trechiama* are recorded from the non-volcanic Asahi Mountains and the two volcanoes adjacent to them, Mt. Gassan and Mt. Ha-yama, in northeastern Honshu, Northeast Japan. All the five species known are oculate and relatively dark-coloured, belonging to the *nivalis* subgroup of the group of *T. oreas*, three to the *nivalis* lineage (s. str.) and two to the *kurosawai* lineage. Both the Asahi Mountains and Mt. Gassan harbour two species of different lineages, though they appear to be ecologically segregated on the respective mountains, whereas Mt. Ha-yama seems to be inhabited by only a species of the *nivalis* lineage. Only one of the five species was previously described, that is, *T. babai* S. UÉNO, 1994 of the northwestern part of the Asahi Mountains. The new names given are *T. solorientis*, *T. montislunae* and *T. montisfolii* of the *nivalis* lineage, and *T. yoshihikoi* of the *kurosawai* lineage.

I am going to dedicate a paper to Yoshihiko KUROSAWA once again, to his memory this time. The subject to be taken up is the trechine beetles belonging to the genus *Trechiama* found on the Asahi Mountains and the two volcanoes adjacent to their northern end. KUROSAWA loved these mountains from his student days at Yamagata High School, and willingly helped me to clarify the trechine fauna of that part of Northeast Japan.

I first met KUROSAWA at Osaka near the end of the 1940's just after the World War II. He was very kind to me and taught me many things about Japanese beetles. After that, he always helped my study on the Japanese Carabidae, for several years at Aizu where he resided then and at Tokyo after 1951. About two dozen years later, when I became his only colleague in entomology at the National Science Museum, Tokyo, he received me as a good friend and adviser. We together worked hard for the enlargement and improvement of the entomology section of our museum for about twenty-five years, and even after his retirement in the spring of 1986, he gave me many useful advice for the development of the museum and the Japanese Society of Coleopterology.

It is therefore most regrettable that I have to write the present paper only after his death. It was KUROSAWA who urged me to investigate the trechine fauna of the high mountains of Yamagata Prefecture, and though I told him about the progress of my researches from time to time, I was unable to finish my studies in his lifetime. Even now, there still remain several matters that have to be clarified, but it can safely be said that

my present knowledge is satisfactory to show an outline of the *Trechiama* fauna of these mountains.

The Asahi Mountains are a range of non-volcanic, mainly granitic mountains at the northern part of the Echigo Range and stretch on the borders of Yamagata and Niigata Prefectures. The highest point is Oh-asahi-daké lying at the southern part, which attains to a height of 1,870 m, but there are many other peaks that reach or exceed 1,500 m in height. Though not so conspicuous in elevation, the Asahis lie in a heavy snowfall area of northeastern Japan and have many branch ridges sharply carved by snow couloirs. Alpine meadows are well developed on the watershed above the timberline and contain snow-patches here and there, some of which remain throughout the year and furnish favourable habitats for trechine beetles.

Adjacent to the northern end of the Asahis, there are two volcanoes erupted between the granite body of the Asahis and the Tertiary formation of the Dewa Hills. The higher of the two is called Gassan and is 1,984 m in height. Because of the relatively gentle topography at higher elevations, alpine meadows are more widely developed on Gassan than on the Asahis, embracing large snow-patches, particularly on the eastern slope, and yielding a favourable environment for harbouring various alpine insects inclusive of a *Trechiama*. On the other hand, the lower one of the two volcanoes, called Ha-yama and lying to the east of Gassan, is much lower than the latter, merely attaining to a height of 1,462 m and therefore not exceeding the timber-limit. Accordingly, only a few subalpine species are included in the carabid fauna of Ha-yama, though a *Trechiama* was found from colluvia deposited along a narrow stream flowing through a forest of mainly deciduous broadleaved trees.

In the present paper, these species of *Trechiama*, all oculate and relatively dark-coloured, will be dealt with. They are extremely similar to one another in external morphology, and cannot be discriminated with confidence on females alone. They are, however, apparently classified into two lineages by marked difference in the conformation of the aedeagal inner armature. One of them is the *nivalis* lineage whose component species are rather widely distributed on the high mountains at the southwestern and southern parts of Tôhoku District (cf. UÉNO, 1986, pp. 132–140, 1992, pp. 146–149, 1994 b, pp. 24–28; UÉNO & OHKAWA, 1993). The other lineage, that of *T. kurosawai*, has so far been known from four described species, of which three are endemic to the high mountains at the southern part of the Ôu Range stretching along the axis of Tôhoku District (UÉNO, 1986, pp. 140–142, 1989, pp. 124–128) and the fourth was described from the northwestern part of the Asahi Mountains under the name *T. babai* (UÉNO, 1994 a). We can now add a fifth species to this lineage, a relative of *T. babai* whose occurrence on Mt. Gassan was already noticed in the *Notes* following the original description of the latter species (UÉNO, 1994 a, p. 121).

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 Dr. Yasuaki WATANABE, Dr. Yoshiaki NISHIKAWA, Mr. Shigeru KIMATA and Mr. Satoru

MIZUSHIMA for their collaboration and help in making investigations on the remote mountains and for supplying me with additional specimens of one of the Gassan species.

Trechiama (s. str.) ***solorientis*** S. UÉNO, sp. nov.

(Figs. 1–2)

Length: 5.10–6.00 mm (from apical margin of clypeus to apices of elytra).

Closely similar to *T. nivalis* S. UÉNO (1986, p. 132, figs. 1–4) and practically indistinguishable from the latter in external morphology, but constantly and decisively different from it in the configuration of male genitalia, above all in that of the inner armature. Considerably variable in size, coloration, standard ratios and other details including the number of parameral setae. Colour usually darker than in *T. nivalis*, dark brown with brown appendages, sometimes with blackish fore body and pitchy black elytra.

Head as in *T. nivalis* though the genae are usually a little more convex; eyes variable in size and convexity, usually flat but sometimes convex even though small; genae two-thirds to five-sixths as long as eyes in most specimens, but as long as or even slightly longer than eyes in rare exceptions; antennae also variable in length, reaching basal three-tenths to three-sevenths of elytra. Pronotum as in *T. nivalis*, though the hind angles are more variable in the degree of sharpness and protrusion. Elytra also similar to those of *T. nivalis*, though usually less parallel-sided at middle and more clearly crenulate in striae; chaetotaxy identical with that of *T. nivalis* in basic pattern. Legs somewhat shorter than in *T. nivalis*. Standard ratios of body parts as follows: PW/HW 1.36–1.48 (M 1.43), PW/PL 1.15–1.30 (M 1.21), PW/PA 1.47–1.62 (M 1.56), PW/PB 1.24–1.52 (M 1.40), PB/PA 0.99–1.21 (M 1.12), EW/PW 1.43–1.60 (M 1.54), EL/EW 1.50–1.60 (M 1.55).

Male genital organ similar in basic conformation to that of *T. nivalis*, but markedly different in the configuration of aedeagus and its inner armature; the former is higher at the apical part, with the dorsal margin more strongly rounded in profile and the apex distinctly tuberculate in both lateral and dorsal views; the latter consists of two teeth-patches and a smaller, simply spatulate copulatory piece whose apex is rather widely rounded. Aedeagus about one-third as long as elytra, short and robust, somewhat expanded ventrad behind middle, and abruptly narrowed apicad from behind apical orifice, with the dorsal margin regularly rounded for the most part in lateral view, more strongly so at the apical part; basal part large, curved ventrad but not abruptly bent, and not regularly emarginate at the sides of basal orifice; sagittal aileron fairly large; apical lobe very short, curved ventrad, and abruptly narrowed towards the extremity, which is distinctly tuberculate and briefly reflexed; ventral margin bisinuate in lateral view. Copulatory piece lamellar, about three-tenths as long as aedeagus, and simply spatulate, with the apex rather widely rounded; dorsal teeth-patch lying dorsoapical to copulatory piece and somewhat longer than the latter; left dorsal teeth-patch

located left dorsal to the proximal half of copulatory piece, and obviously smaller than the dorsal one. Styles nearly straight, left style longer than the right, each usually bearing four or five apical setae, though the number of the setae often increases to six on one style, sometimes even to seven.

Variation in elytral chaetotaxy. Of the 101 specimens in total of the type series, 20 (8♂♂, 12♀♀), or 19.8%, are more or less aberrant in the number of setiferous dorsal pores on the elytra. Fourteen of them (7♂♂, 7♀♀) are lacking in one of the dorsal pores on the 3rd stria on one or both of the elytra, and three females possess an extra (fourth) dorsal pore on the 3rd stria of the left elytron. Even in normal specimens with three setiferous dorsal pores of the internal series on both the elytra, the middle and posterior dorsal pores are considerably variable in their position on the 3rd elytral stria, and sometimes closely approach to each other.

As compared with the internal series, the pore of the external series is usually stable, but four specimens, or 3.96%, of the type series are aberrant in this respect. Two females from Gingyokusui are lacking in this pore on the right elytron, so that the 5th stria of the right elytron is completely devoid of setiferous dorsal pores in these individuals. On the other hand, one male from the same locality possesses a second dorsal pore on the 5th stria of the right elytron, and one female from Kingyokusui has two dorsal pores on the 5th stria of both the elytra, a very interesting example suggesting a reversion of the elytral chaetotaxy.

Type series. Holotype: ♂, allotype: ♀, Gingyokusui, 24–VIII–1994, S. UÉNO leg. Paratypes: 1♂, Gingyokusui, 7–VIII–1983, Y. WATANABE leg.; 6♂♂, 14♀♀, Gingyokusui, 24–VIII–1994, S. UÉNO, Y. NISHIKAWA & Y. WATANABE leg.; 6♂♂, 4♀♀, Kingyokusui, 25–VIII–1994, S. UÉNO & Y. NISHIKAWA leg.; 1♂, 5♀♀, Ryûmon-zan, 25–VIII–1994, S. UÉNO & Y. NISHIKAWA leg.; 34♂♂, 28♀♀, Minamikankô-zan, 26–VIII–1994, S. UÉNO & Y. NISHIKAWA leg. All deposited at present in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Localities of the type series. Gingyokusui on Mt. Oh-asahi-daké (type locality!), 1,630 m in altitude, Kingyokusui on Mt. Oh-asahi-daké, 1,670 m in altitude, Ryûmon-zan, 1,570 m in altitude, and Minamikankô-zan, 1,530 m in altitude, all in Nishikawa-machi and on the Asahi Mountains, in Yamagata Prefecture, northeastern Honshu, Northeast Japan.

Additional specimens examined. 1♀, Asahi Mts.: Koasahi-daké, 1,530 m alt., Nishikawa-machi, Yamagata Pref., 24–VIII–1994, S. UÉNO leg.; 1♀, Asahi Mts.: Torihara-yama, 1,410 m alt., Asahi-machi, Yamagata Pref., 24–VIII–1994, S. UÉNO leg. (NSMT).

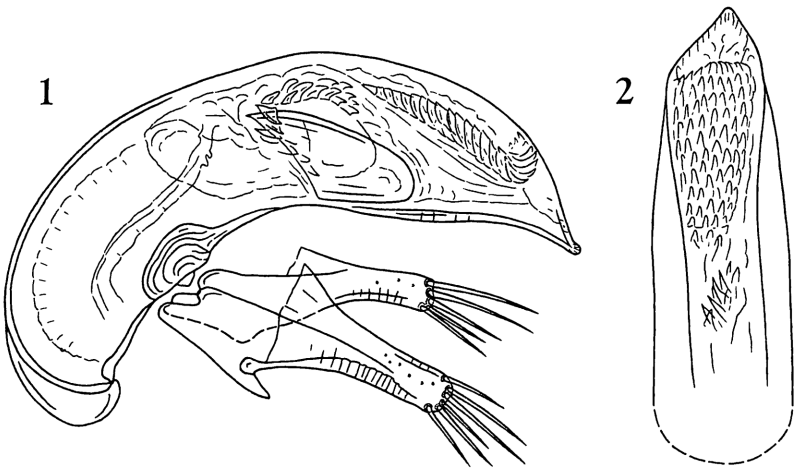
Notes. This new species seems primarily restricted to the alpine zone at the southeastern part of the Asahi Mountains. It has so far been known with certainty from four stations on the eastern side of the watershed ridge between Oh-asahi-daké and Minamikankô-zan, all of which lie at the lower edges of snow-patches developed at the heads of gullies. It should occur also in other places with similar environment, though it may not be easy to locate favourable habitats of the beetle.

The two stations, Gingyokusui and Kingyokusui, are located to the northeast and northwest of the summit of Mt. Oh-asahi-daké, respectively, and the former habitat is larger and a little lower than the latter. A beeline distance between the two is about 700 m. Near the end of August, snow-patches melt from the lower parts to an appreciable extent and feed the streams below. Gingyokusui is one of such melted snows and furnishes a typical habitat of the alpine *Trechiama*, which is found from beneath stones embedded at the edges of the cold water.

The other two stations are close to each other, but are moderately distant from the two stations on Oh-asahi-daké. Of these, the Ryûmon-zan site lies about 500 m northwest of Ryûmon-zan, a blunt head on the watershed branching off a side ridge, and is 3.8 km distant to the north-northwest in a beeline from Kingyokusui. The snow-patch on this gently sloping place completely melted away when we visited it on August 25, 1994, but several specimens of the *Trechiama* were found from beneath stones lying at the bottom of narrow grooves exposed after the retreat of the snow. On the contrary, the Minamikankô-zan site is a very steeply slanting snow-patch developed at the northeastern side of a markedly narrowed part of the watershed ridge about 600 m northwest of the Ryûmon-zan site. The depression embracing the snow-patch looks like a miniature of a cirque, with a semicircular, gently sloping section along the lower edge. The trechine beetle was abundant in this narrow humid place, being found from under heaps of stones probably accumulated by the downward movement of the snow couloir.

As was recorded above, the two specimens, both females, collected on the Koasahi Ridge are excluded from the type series, one from the western slope of Koasahi-daké about 1.4 km east-northeast of Gingyokusui and the other from the western side of Torihara-yama about 2 km east by south of Koasahi-daké. Their habitats are located in the forests of beech and birch well below the timber-limit, hence considerably different from those of the type series and similar to those of *T. babai* at the northwestern part of the Asahi Mountains to be described later. However, the Koasahi Ridge branches off from near the summit of Oh-asahi-daké and extends towards the east. The two localities on the ridge are therefore widely isolated from the known range of *T. babai*. Since the latter species is practically indistinguishable from *T. solorientis* in external morphology, it is impossible to determine the true systematic status of the Koasahi-daké and Torihara-yama specimens on females alone. However, I prefer to regard them tentatively as belonging to isolated populations of *T. solorientis* in view of the geographical situation of their collecting sites, leaving the final conclusion for future investigations. Incidentally, the Torihara-yama specimen is lacking in the third dorsal pore on the 3rd stria of the left elytron.

This new species is named after the Asahi Mountains, meaning the mountains of the rising sun in Japanese, on which are distributed its habitats.



Figs. 1–2. Male genitalia of *Trechiama* (s. str.) *solorientis* S. UÉNO, sp. nov., from Gingyokusui on Mt. Oh-asahi-daké of the Asahi Mountains; left lateral view (1), and apical part of aedeagus, dorso-apical view (2).

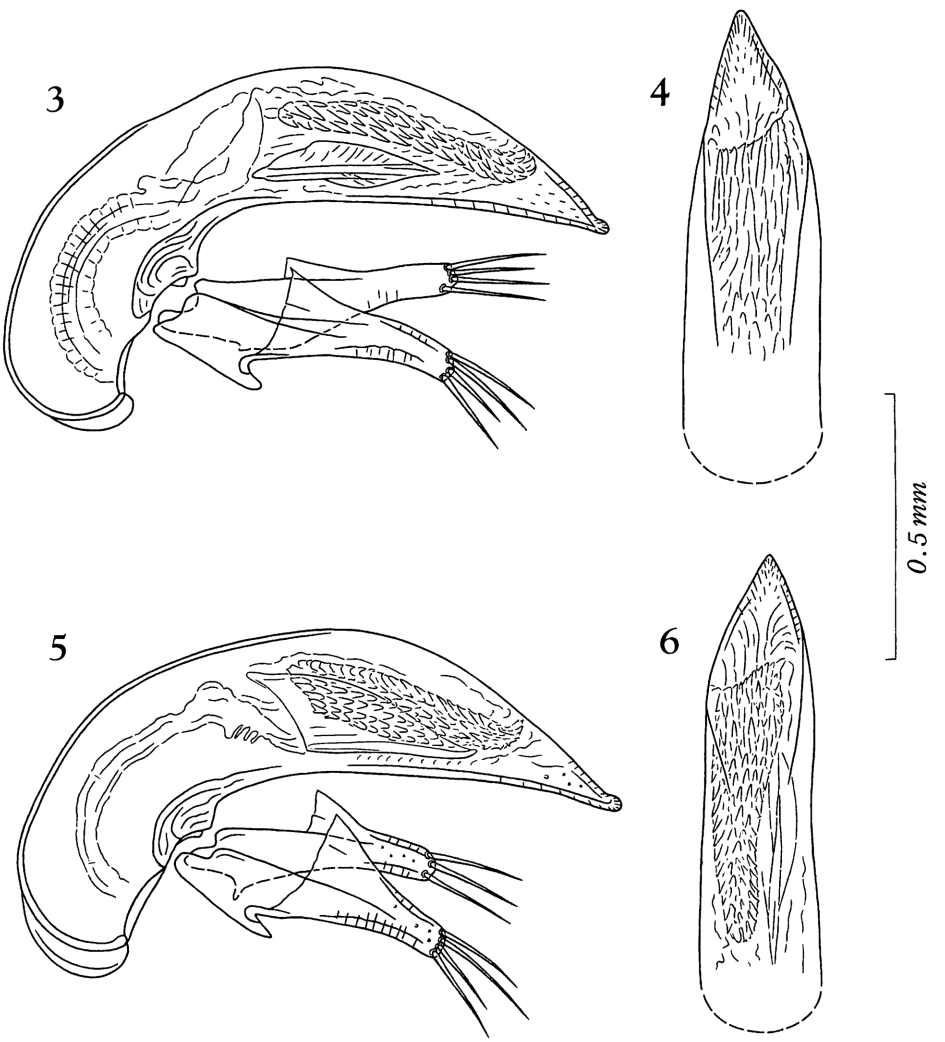
Trechiama (s. str.) ***montislunae*** S. UÉNO, sp. nov.

(Figs. 3–4, 7)

Length: 5.20–5.65 mm (from apical margin of clypeus to apices of elytra).

Very closely similar in external morphology to *T. solorientis*, with almost identical standard ratios, and practically indistinguishable from it except by the constant peculiarities of male genitalia. Colour usually a little lighter than in *T. solorientis*. Head as in *T. solorientis*, eyes and antennae similarly variable. Pronotum and elytra also similar to those of *T. solorientis*; elytral striae usually more faintly crenulate. Legs as in *T. solorientis*. Standard ratios of body parts as follows: PW/HW 1.37–1.50 (M 1.44), PW/PL 1.16–1.28 (M 1.21), PW/PA 1.51–1.65 (M 1.57), PW/PB 1.28–1.46 (M 1.41), PB/PA 1.04–1.19 (M 1.12), EW/PW 1.43–1.55 (M 1.50), EL/EW 1.52–1.60 (M 1.55).

Male genital organ markedly different in configuration from that of *T. nivalis* but similar to the latter in basic conformation. Aedeagus nearly three-eighths as long as elytra, hardly arcuate but almost semicircularly rounded at the dorsal margin in lateral view, with elongate basal part strongly bent ventrad and relatively long apical lobe; basal orifice small, with the sides only shallowly emarginate; sagittal aileron present though small and hyaline; viewed laterally, apical lobe gradually tapered towards the extremity, which is tuberculate and somewhat reflexed; viewed dorsally, apical lobe somewhat asymmetrical, inclined to the right, gradually narrowed apicad, and nearly pointed at the tip; ventral margin hardly emarginate in profile. Inner sac armed with a



Figs. 3–6. Male genitalia of *Trechiama* (s. str.) spp.; left lateral view (3, 5), and apical part of aedeagus, dorso-apical view (4, 6). —— 3–4. *T. montislunae* S. UÉNO, sp. nov., from Mt. Gassan. —— 5–6. *T. montisfolii* S. UÉNO, sp. nov. from Mt. Ha-yama.

copulatory piece and an elongate dorsal teeth-patch; copulatory piece three-tenths as long as aedeagus, lamellar, lanceolate, acicular at the apical part, and with a sclerotized rib along the ventral margin; dorsal teeth-patch horizontal, consisting of heavily sclerotized teeth which are compact and partially fused together, and obviously more elongate than copulatory piece as a whole. Styles fairly slender, left style only slightly longer than the right, each usually bearing four or five apical setae, rarely supplemented by a short sixth seta on one style.

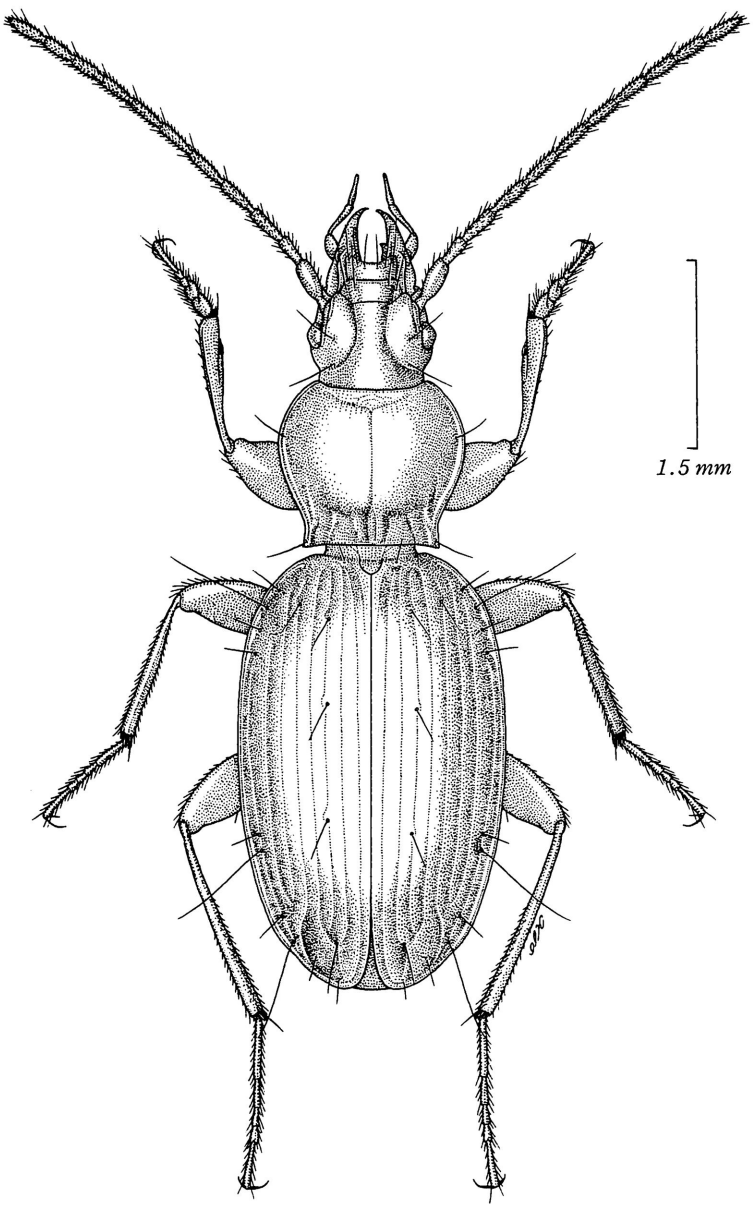


Fig. 7. *Trechiama* (s. str.) *montislunae* S. UÉNO, sp. nov., ♂, from Mt. Gassan.

Variation in elytral chaetotaxy. Of the total 20 specimens examined, five (3♂♂, 2♀♀), or 25%, are aberrant in the number of setiferous dorsal pores on the elytra. Two male paratypes are lacking in the middle pore of the internal series on the right elytron, while one female possesses a fourth dorsal pore on the 3rd stria of the right elytron.

One male paratype also possesses a fourth pore on the right elytron, and in this specimen, a second pore exists on the 5th stria of the left elytron. A second pore of the external series is also found on the right elytron of a female paratype. Thus, two paratypes (♂♀), or 10% of the specimens examined, show a partial reversion of the elytral chaetotaxy.

Type series. Holotype: ♂, N (=northern slope) 1,630 m, 1–VIII–1983, S. UÉNO leg. Allotype: ♀, N 1,800 m, 6–VIII–1964, S. UÉNO & S. MIZUSHIMA leg. Paratypes: 1♂, N 1,250 m, 5–VIII–1964, S. UÉNO leg.; 4♂♂, 3♀♀ (incl. teneral 1♂, 1♀), N 1,500–1,700 m, 29–VIII–1963, Y. WATANABE & K. MIZUSAWA leg.; 2♂♂, N 1,650 m (=Ichi-no-také), 5–VIII–1964, S. UÉNO & S. MIZUSHIMA leg.; 1♀, N 1,700 m, 22–VII–1955, K. MIYAMORI leg.; 1♂, 1♀, N 1,900 m, 6–VIII–1964, S. UÉNO & S. MIZUSHIMA leg.; 2♀♀, E (=eastern slope) 1,800 m, 7–VIII–1964, S. UÉNO & S. MIZUSHIMA leg.; 2♂♂, 1♀, WSW (=west-southwestern slope) 1,800 m, 31–VII–1983, S. UÉNO & Y. NISHIKAWA leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Localities of the type series. Mt. Gassan, 1,250–1,900 m in altitude on the northern slope and 1,800 m in altitude on the eastern slope, in Tachikawa-machi, and 1,800 m in altitude on the west-southwestern slope in Nishikawa-machi, all in Yamagata Prefecture of northeastern Honshu, Northeast Japan.

Notes. It seems worth noting that the aedeagal inner armature of this new species more closely resembles that of *T. nivalis* of the Iidé Mountains than that of *T. solorientis* of the Asahi Mountains, though Mt. Gassan and the Iidés are widely separated by the intervening Asahis, which are occupied by *T. solorientis*. On the other hand, the aedeagus itself is considerably different in configuration from those of *T. nivalis* and *T. solorientis*, which suggests a relatively isolated status of *T. montislunae*.

This new species is widely distributed, though by no means abundant, on the northern slope of Mt. Gassan, which is rather gentle as compared with the southern and particularly the western slopes. Mainly for climatic reasons, wide alpine meadows extend downwards to near a height of 1,400 m on this slope and harbour various alpine species of insects. *Trechiama montislunae* is mainly found above 1,600 m in altitude, though one of the paratypes was taken in a birch forest at an elevation of 1,250 m below the timber-limit. On the eastern and southwestern slopes, this species seems restricted to near the summit, at an altitude of about 1,800 m. At all the collecting sites, the trechine was found from beneath stones lying in humid places, usually not far from snow-patches.

The new specific name of this trechine beetle is derived from the name of the type locality, Gassan, which means a moon mountain in Japanese.

Trechiama (s. str.) ***montisfolii*** S. UÉNO, sp. nov.

(Figs. 5–6)

Length: 5.05–5.50 mm (from apical margin of clypeus to apices of elytra).

Very closely similar to *T. montislunae* of Mt. Gassan and agreeing with it in every external character state, but markedly different in male genitalic features, above all in the large size and different configuration of copulatory piece.

Colour reddish brown, shiny, as in the light-coloured individuals of *T. montislunae*, with lighter palpi and legs. Head as in *T. montislunae*, but the eyes are always flat; genae gently convex, three-fifths to three-fourths as long as eyes; antennae reaching basal three-eighths of elytra in ♂, basal third of elytra in ♀. Pronotum and elytra as in *T. montislunae*, the latter a little shorter and more widely depressed in ♀ than in ♂. Legs a little slenderer than in *T. montislunae*. Standard ratios of body parts as follows: PW/HW 1.38–1.44 (M 1.41), PW/PL 1.20–1.23 (M 1.22), PW/PA 1.55–1.61 (M 1.58), PW/PB 1.43–1.45 (M 1.44), PB/PA 1.08–1.12 (M 1.10), EW/PW 1.47–1.53 (M 1.49), EL/EW 1.59–1.67 in ♂♂, 1.53 in ♀.

Male genital organ similar in many respects to that of *T. montislunae*, but the aedeagus is a little shorter, thicker and gently compressed, about two-fifths as long as elytra, and bears a very large copulatory piece and laterally extended dorsal teeth-patch; copulatory piece triangularly spatulate, about two-fifths as long as aedeagus, about as long as dorsal teeth-patch and partially covered with its left lateral part; dorsal teeth-patch formed by smaller teeth and extending to the left lateral side. Styles relatively short, each bearing three or four apical setae.

Type series. Holotype: ♂, allotype: ♀, paratype: 1♂, 29–VIII–1994, S. UÉNO leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Mt. Ha-yama: Yûno-sawa, 1,110 m in altitude, in Sagaé-shi of Yamagata Prefecture, northeastern Honshu, Northeast Japan.

Notes. This trechine beetle is so similar to *T. montislunae* in both the external and genitalic character states that it could be regarded as a low altitude subspecies of the latter. It is particularly similar to light-coloured individuals of the Gassan species occurring in the alpine meadow, but the small flat eyes and depigmentation of the body of the Ha-yama trechine are indicative of its existence in the subterranean domain. In fact, two of the three specimens known were dug out from the upper hypogean zone, and the remaining one was found from an endogean habitat. On the other hand, remarkable modification of the aedeagal inner armature, above all the remarkably developed copulatory piece, seems to suggest that the differentiation of the Ha-yama trechine attains to the species level. Taking all these evidences into consideration, I have decided to regard the Ha-yama population of *Trechiama* as belonging to an independent species, not as a subspecies of *T. montislunae*, even though the speciation of them may be at a sibling stage.

Mt. Ha-yama, the type locality of this new species, lies about 16 km to the east by south of Mt. Gassan. As was already mentioned in the introduction of this paper, it is much lower than the latter volcano and devoid of true alpine zone. The three specimens of the type series of *T. montisfolii* were found near the source of the Yûno-gawa on the western slope of the mountain, one from beneath a large stone embedded in the

soil and the other two by digging colluvia deposited on the right side of the stream shaded by deciduous broadleaved trees. The trechine beetle is therefore sylvicolous and similar in this respect to the members of the *kurosawai* lineage, though the conformation of its male genitalia clearly shows that it belongs to the *nivalis* lineage.

This new species is named after its type locality, Ha-yama, which means a leaf mountain in Japanese.

Trechiama (s. str.) ***babai*** S. UÉNO, 1994

Trechiama (s. str.) *babai* S. UÉNO, 1994, Spec. Bull. Essa ent. Soc., Niigata, (2), p. 119, figs. 1–3; type locality: Sagami-iké on the Asahi Mountains.

Additional specimens examined. 4♂♂, 5♀♀, Asahi Mts.: Zenroku-iké, 1,490 m alt., Asahi-mura, Niigata Pref., 26–VIII–1994, S. UÉNO & Y. NISHIKAWA leg.; 1♀, Asahi Mts.: Ohtori-iké, 960 m alt., Asahi-mura, Yamagata Pref., 27–VIII–1994, S. UÉNO leg., 2♂♂, same locality, 28–VIII–1994, Y. NISHIKAWA leg.; 1♀, Asahi Mts.: Nanatsudaki-zawa, 780 m alt., Asahi-mura, Yamagata Pref., 28–VIII–1994, S. UÉNO leg. (all NSMT).

Notes. This species is a member of the *kurosawai* lineage originally described from "Sagami-iké" at the northwestern part of the Asahi Mountains. At the time of its description, I was not personally aware of its type locality and only cited BABA's personal notes on the habitat of the species. Later, however, I had an opportunity to visit "Sagami-iké" and to make a close examination of the habitat condition by myself. As a result, several errors were found out in the original account. First of all, "Sagami-iké" consists of two small subalpine lakes lying on different levels, the upper one, called Genzô-no-iké, being at an elevation of 1,530 m and the lower one, called Zenroku-iké, being at an elevation of 1,490 m. The exact type locality of *T. babai* is the lower one, or Zenroku-iké, which is only 2.5 km distant to the west-northwest in a beeline from Minamikankô-zan, the northernmost known locality of *T. solorientis*. Secondly, the habitat stream described in the original account does not emerge from the snow-edged lake itself but from a gully about 150 m southwest of it. Both the lake and the gully lie just above the timber-line, but the stream forms a deeply carved groove in a forest of dwarf birch. It is this groove that harbours the trechine beetle, which is always found from beneath stones lying in dark corners shaded by the scrub.

Thus, the original designation of the type locality, "Sagami-iké, 1,580 m in altitude", should be emended to "Zenroku-iké, 1,490 m in altitude", and the exact habitat of *T. babai* is not in the alpine meadow but at the uppermost part of the forest zone.

The sylvicolous nature of *T. babai* was further verified by the discovery of two additional localities in a beech forest more than 500 m lower than Zenroku-iké. One of them is Ohtori-iké, a beautiful lake surrounded by beech forests 6.7 km north-northwest of Zenroku-iké, and the other is the Nanatsudaki-zawa in a continuation of the same beech forest. The three specimens from Ohtori-iké were found from beneath stones lying in a gully running into the eastern side of the lake, and were identified

with *T. babai* by a careful comparison of the male genitalia.

The single female specimen taken in the Nanatsudaki-zawa Valley is rather small (5.00 mm in the length of body) and has relatively narrow elytra, but is regarded as an exceptional individual of *T. babai*, since its collecting site is only 1.3 km northwest of that of the Ohtori-iké specimens and since the Nanatsudaki-zawa is the outlet of Lake Ohtori-iké. The standard ratios of the specimen in question are as follows: PW/HW 1.36, PW/PL 1.17, PW/PA 1.51, PW/PB 1.35, PB/PA 1.12, EW/PW 1.48, EL/EW 1.61.

Within the *nivalis* subgroup, *T. babai* shows an exceptional stability in the number and arrangement of setiferous dorsal pores on the elytra. All the specimens examined including the type series (12♂♂, 8♀♀) invariably bear three dorsal pores of the internal series and a single dorsal pore of the external one.

Trechiama (s. str.) ***yoshihikoi*** S. UÉNO, sp. nov.

(Figs. 8–10)

Length: 5.40–5.45 mm (from apical margin of clypeus to apices of elytra).

Probably nearest to *T. yoshikoae* S. UÉNO (1994 b, p. 24, figs. 1–4) from Mt. Chôkai-zan, but distinguished at first sight from it by the large transverse prothorax and much less slender aedeagus. Readily discriminated from *T. babai* of the northwestern Asahis also by the large transverse prothorax and by the differently shaped aedeagus with quite different inner armature.

Colour dark brown with lighter elytra, shiny; palpi, apical antennomeres, venter of hind body, and legs light brown, evidently lighter than dorsum.

Head as in *T. yoshikoae* though the neck is a little broader and the frontal furrows less strongly arcuate; eyes small and rather flat; genae feebly convex, three-fourths to six-sevenths as long as eyes; antennae fairly stout, reaching basal three-eighths of elytra in ♂, basal third of elytra in ♀.

Pronotum obviously larger and more transverse than in *T. yoshikoae*, widest at five-eighths from base, and a little more strongly contracted towards apex than towards base; PW/HW 1.44 in the holotype (H), 1.49 in the allotype (A), PW/PL 1.24 in H, 1.28 in A, PW/PA 1.58 in H, 1.62 in A, PW/PB 1.38 in H, 1.49 in A; sides sharply bordered throughout, strongly rounded in front, less so behind the widest part, briefly but deeply sinuate at about basal ninth, and then slightly divergent towards hind angles, which are sharp and postero-laterally produced; apex a little narrower than base, PB/PA 1.14 in H, 1.09 in A, with obtuse front angles; base slightly bisinuate; sculptures on dorsum as in *T. yoshikoae*.

Elytra oblong-subovate, less elongate than in *T. yoshikoae*, widest at basal four-ninths, and almost equally narrowed towards bases and apices; EW/PW 1.38 in both H and A, EL/EW 1.55 in H, 1.48 in A; sides widely bordered, feebly arcuate from behind shoulders to the level of preapical pore, and widely rounded at apices; prehumeral borders feebly arcuate; dorsum widely depressed even in ♂, entirely and rather deeply stri-

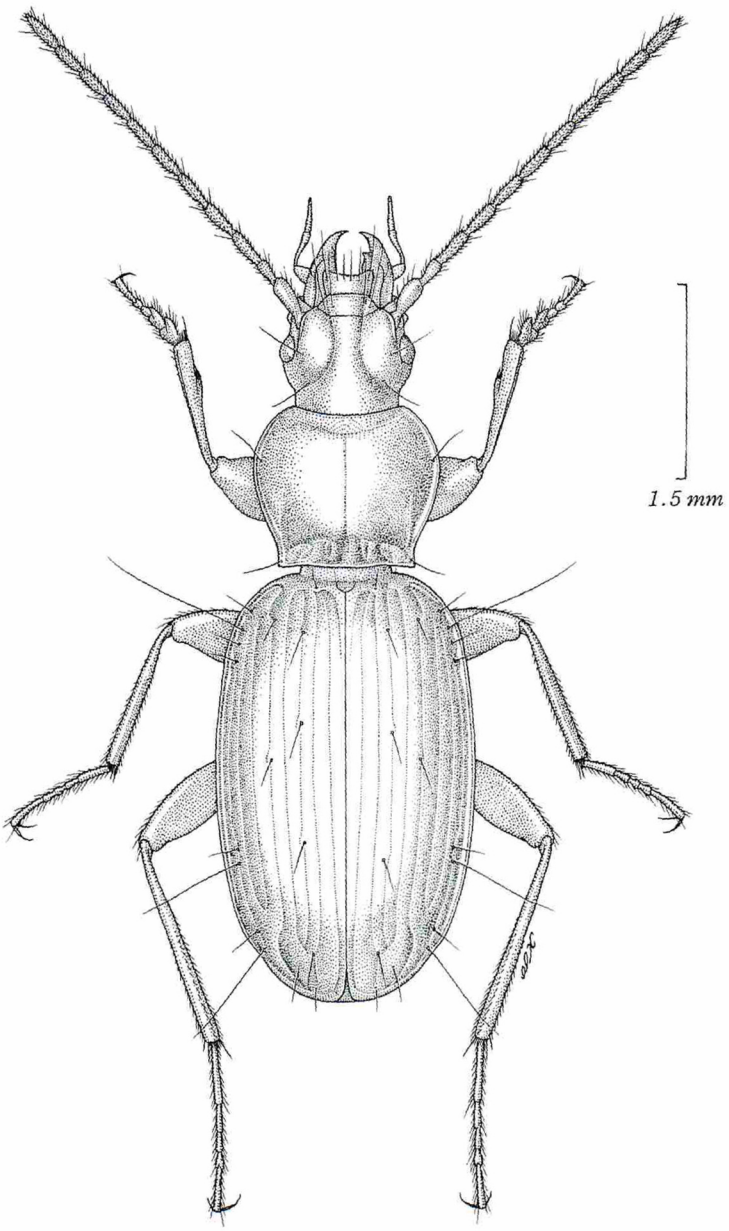


Fig. 8. *Trechiama* (s. str.) *yoshihikoi* S. UÉNO, sp. nov., ♂, from Uba-ga-také on Mt. Gassan.

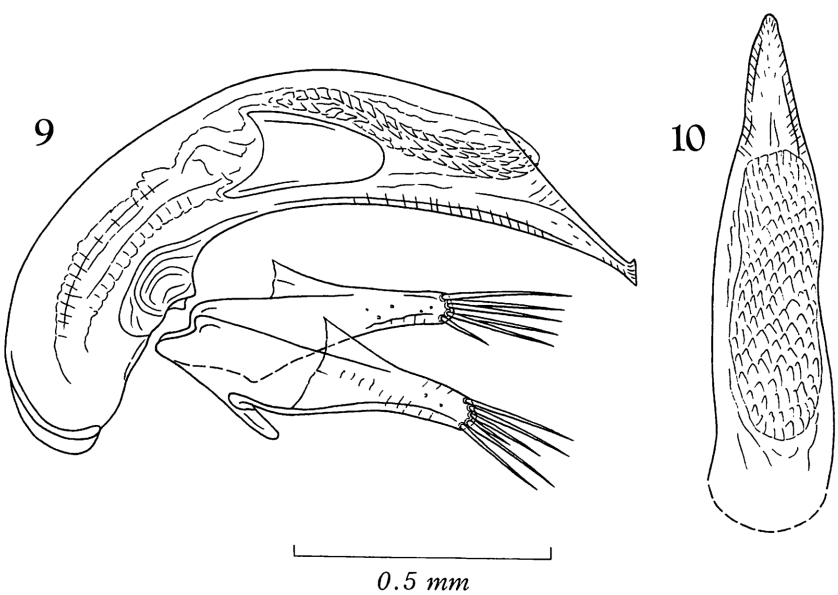
ate, all the striae clearly crenulate, both scutellar and apical strioles distinct, the latter deeply impressed and joining stria 5; stria 3 with three setiferous dorsal pores at about 1/8, 1/3–3/8 and 3/5–2/3 from base, respectively; stria 5 with a single setiferous dorsal

pore at about basal 1/9 in the allotype, but with two setiferous dorsal pores in the holotype, at 1/9 and 3/7 from base, respectively; preapical pore located at the apical anastomosis of striae 2 and 3 at about 1/10 from apex, behind the level of the terminus of apical striole.

Venter smooth; anal setae normal. Legs fairly stout as in *T. yoshikoae*.

Male genital organ basically similar to that of *T. yoshikoae*, though considerably different in configuration. Aedeagus three-eighths as long as elytra, lightly sinuate, moderately arcuate from basal bulb to apical orifice, and with the dorsal margin semicircularly rounded in profile; basal part fairly elongate, not ventrally bent, and not regularly emarginate at the sides of basal orifice; sagittal aileron narrow and hyaline; viewed dorsally, apical lobe elongate, gradually tapered towards the blunt extremity; viewed laterally, apical lobe straightly produced, gradually tapered, and ending in a sharp extremity tuberculate at the dorsal side; ventral margin widely emarginate in profile. Inner sac armed with a large hyaline copulatory piece and an elongate dorsal patch of sclerotized teeth; copulatory piece nearly one-fourth as long as aedeagus, flattened spatulate, with the apex widely rounded; dorsal teeth-patch horizontal, extending from above copulatory piece to apical orifice. Styles fairly large and relatively narrow, left style a little longer than the right, each bearing six apical setae, one of which is much shorter than the others.

Type series. Holotype: ♂, allotype: ♀, 7–VIII–1964, S. UÉNO leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.



Figs. 9–10. Male genitalia of *Trechiama* (s. str.) *yoshihikoi* S. UÉNO, sp. nov., from Uba-ga-také on Mt. Gassan; left lateral view (9), and apical part of aedeagus, dorso-apical view (10).

Type locality. Uba-ga-také, at the southwestern side of Mt. Gassan, 1,450 m in altitude, in Nishikawa-machi of Yamagata Prefecture, northeastern Honshu, Northeast Japan.

Notes. This is an interesting species probably related to *T. yoshikoae* in view of the close similarity in the aedeagal apical lobe, which is much elongated and slender with characteristically modified tip, and in the conformation of the inner armature. However, Mt. Chôkai-zan, to which *T. yoshikoae* is restricted, is more than 60 km distant to the north from Mt. Gassan beyond the deep valley of the Mogami-gawa River, whereas the latter volcano is only 26 km distant to the northeast, without appreciable topographical barrier, from Lake Ohtori-iké on the Asahis, the nearest known locality of *T. babai* belonging to the *kurosawai* lineage. Though tentatively placed in the *kurosawai* lineage, the true affinity of *T. yoshihikoi*, and the true phylogenetic status of the lineage itself, should be reconsidered in the future, since there is a wide gap in the conformation of the aedeagal inner armature between the present species and *T. babai*.

It is difficult to determine at present the ordinary condition of the elytral chaetotaxy of *T. yoshihikoi*, since only a pair of the available specimens are different in the number of setiferous dorsal pores of the external series. In *T. yoshikoae*, which is considered related to *T. yoshihikoi*, there are invariably two setiferous dorsal pores on the 5th elytral stria, whereas there is only one setiferous dorsal pore of the external series in all the hitherto known species of the *kurosawai* lineage. It is to be hoped that this will be clarified before long, because its answer may give us a clue for analysing the phylogeny of the *nivalis* subgroup of *Trechiama*.

The type locality of this interesting new species is a short but deep gully on the southeastern slope of Uba-ga-také, about 2.2 km southwest of the summit of Mt. Gassan. It is located below the timber-limit and is shaded by deciduous broadleaved trees, mostly birches. The pair of the type specimens were found from a crack of the clayey, nearly vertical side wall of the gully about 1 m above the water of the narrow stream at the bottom. No additional specimens of the same species were obtained in spite of several revisits to the gully, and besides, we have failed in finding out any other habitats of this trechine beetle.

This rare species is dedicated to the memory of Yoshihiko KUROSAWA in token of deep gratitude.

要　　約

上野俊一：朝日山地および隣接する火山に生息するナガチビゴミムシ類．—— 東北地方の南西部，山形・新潟両県にまたがって延びる朝日山地と，その北側に隣接する月山および葉山の両火山に生息する有眼のナガチビゴミムシ類を検討し，これらを 5 種に分類した．いずれもイワキナガチビゴミムシ種群のイイデナガチビゴミムシ亜群に属し，外部形態では識別できないほどたがいによく似ているが，雄交尾器内袋の棘状小片群の構造からみて，そのうちの3種は狭義のイイデナガチビゴミムシ系列のものであり，残りの2種はクロサワナガチビゴミムシ系列のものである．

イイデナガチビゴミムシ系列の種類は，東北地方南西部および南部の高山に広く分布し，北限が鳥海山に及んでいて，これまでに4種が記載されている．朝日山地南東部と月山では，この系列のナガチビゴミムシ類がおもに森林限界より上の開けた高山帯に生息し，葉山では同系列の別の1種が，樹林帯上部の沢の源頭部にすんでいる．これらにそれぞれ，アサヒナガチビゴミムシ *Trechiama solorientis* S. UÉNO，ガッサンナガチビゴミムシ *Trechiama montislunae* S. UÉNO およびハヤマナガチビゴミムシ *Trechiama montisfolii* S. UÉNO の新名を与えてこの論文に記載した．学名は，それぞれの産地の山名をラテン語に訳したもので，亡くなった黒澤良彦博士がとくに深い愛着をもたれていた山やまの名称を，博士の記念として新種名にとどめたものである．

いっぽう，朝日山地と月山の樹林帯上部にはクロサワナガチビゴミムシ系列の種が分布し，朝日山地北西部のものには，ババナガチビゴミムシ *T. babai* S. UÉNO という名がすでに与えられている．この論文では，月山のほうの種に，ヨシヒコナガチビゴミムシ *T. yoshihikoi* S. UÉNO という新名を与えた．同系列のナガチビゴミムシ類は，吾妻山から蔵王山を経て船形山にいたる奥羽山脈南部の高山に主として分布しているが，最上川の本流が流れる山形盆地の西側の山地にも局所的に生息し，しかもイイデナガチビゴミムシ系列のものとは生態的に隔離されているらしいのが，生物地理学上ひじょうに興味深い．

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