

A New *Pseudepaphius* (Coleoptera, Trechinae) from Shikoku, Southwest Japan

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Abstract

A new trechine beetle belonging to the subgenus *Pseudepaphius* is described from the mountains of Shikoku, Southwest Japan, under the name of *Epaphiopsis* (*Pseudepaphius*) *morimotoi*. Because of the possession of a large copulatory piece, it is much isolated within the subgenus, and besides, it is more narrowly localized than its cohabitant, *E. (P.) ishizuchiensis*.

It has been known for more than thirty years that two distinctive species of *Pseudepaphius* occur in the Island of Shikoku, Southwest Japan. Of these, the smaller and commoner one was already described under the name of *Epaphiopsis* (*Pseudepaphius*) *ishizuchiensis* (UÉNO, 1962, p. 71, fig. 14), but the larger and more localized one has not yet been properly named, mainly because no additional specimens have been obtained from its southeastern population, for which a subspecific name was provisionally suggested (UÉNO, 1953, p. 42).

This undescribed species is not rare on the Ishizuchi Mountains in a narrow sense, but is seldom met with on the other ranges of Shikoku. Only six localities other than those on the Ishizuchis have been found up to the present; four of them are on the eastern continuations of the Ishizuchis and are expected to harbour the same species, while the other two are widely distant and isolated from the mountain range. Very unfortunately, only one specimen each has been known from the latter localities in spite of repeated collectings, a teneral male from Odami-yama and a female from Mt. Kaji-ga-mori, and the aedeagal features remain unclarified as regards the trechines of these isolated populations.

When I first recognized the trechine as a new species, only two specimens were available for my study, one from Tsuchigoya on the Ishizuchi Mountains and the other from Mt. Kaji-ga-mori. They looked different from each other in the size and convexity of eyes and in the shape of prothorax, and were surmised to be distinguishable into two geographical races. Since then, a large number of specimens of the same trechine have been obtained on the Ishizuchis and have come to my hands. A careful study of this collection has revealed that the species is considerably variable in details even within the same population, and that all the supposed differences between the Tsuchigoya and Kaji-ga-mori specimens fall in the range of individual variation.

Though there still remains some doubt about the true systematic status of the two isolated populations, I have decided to conclude the long protracted task by giving the trechine a proper scientific name, regarding it as a variable but monotypical species.

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

I wish to express my hearty thanks first of all to Dr. and Mrs. Kazuo ISHIKAWA, without whose unfailing help, this study could never have come to the present state. Deep gratitude is also due to the following persons for their kind aid in supplying me with invaluable material: Drs. Claude BESUCHET, Ivan LÖBL, Kuniyasu MORIKAWA, Katsura MORIMOTO and Kohei SAWADA, Messrs. Yoshiyuki ITO, Hiroyuki KUSUNOKI, Toshiki MOHRI, Shinji NAKAO, Yoshiaki NISHIKAWA, Masaaki SATOU, Shinzaburo SONE and Masataka YOSHIDA, and Miss Fukiko MATSUBARA.

Epaphiopsis (Pseudepaphius) morimotoi S. UÉNO, sp. nov.

[Japanese name: Morimoto-chibigomimushi]

(Figs. 1-3)

Trechus (Epaphius) morimotoi S. UÉNO, 1953, Shin Konchû, Tokyo, 6 (11), pp. 40, 42, fig. 4 upper right [nom. nud.].

Trechus (Epaphius) morimotoi tosanus S. UÉNO, 1953, Shin Konchû, Tokyo, 6 (11), p. 42 [nom. nud.].

Length: 3.80-4.55 mm (from apical margin of clypeus to apices of elytra).

Readily recognized on its large size, large fore body, dark coloration, superficial elytral striae with fine punctures, and the presence of a large copulatory piece enveloped by teeth-mat. From *E. punctatostriata* (PUTZEYS, 1877, p. 85), which is the largest of the hitherto described species in the subgenus, this species can be distinguished also by the larger eyes, more strongly contracted genae, less convex elytra, and so on.

Apterous. Colour dark reddish brown, shiny, faintly iridescent on elytra, with darker lateral margins of pronotum and elytra; palpi, apical segments of antennae, ventral surface of hind body, and legs more or less lighter than body, usually dark yellowish brown to light reddish brown.

Head small, transverse, and depressed above, with frontal furrows deep throughout and very widely divergent posteriad; frons and supraorbital areas gently convex, the latter with a foveole on each side at the root of anterior supraorbital seta; supraorbital pores close to each other on either side and lying on lines more or less divergent posteriad; microsculpture distinct, mostly consisting of transverse meshes but partially of rather isodiametric ones; eyes relatively large and gently convex; genae short, usually about one-third as long as eyes ($1/4-3/7$ in ♂♂, $2/7-1/2$ in ♀♀), hardly or slightly convex, and strongly convergent behind; neck wide, with the anterior constriction deep and sharply marked at the sides; labrum transverse, shallowly emarginate at apex; mandibles relatively slender, rather feebly arcuate at apices; mentum tooth porrect and distinctly bifid; submentum sexsetose; palpi short but fairly thin, with penultimate segments gently dilated towards apices; antennae short and stout, sub-

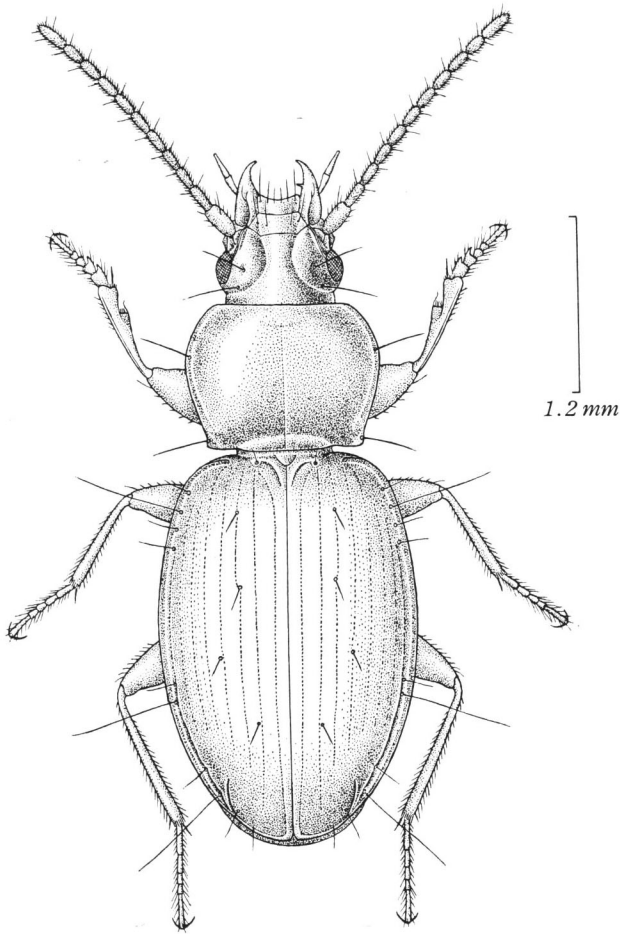


Fig. 1. *Epaphiopsis* (*Pseudepaphius*) *morimotoi* S. UÉNO, sp. nov., ♂, from Jōju on the Ishizuchi Mountains.

filiform, reaching basal sixth to fifth of elytra in ♂, basal seventh to sixth of elytra in ♀ (only basal tenth of elytra in one of the female paratypes), segments 2–5 subequal in length to one another, each slightly more than twice as long as wide, 6–10 gradually and slightly diminishing in length towards apex, terminal segment longer than segment 3 or 4, about as long as scape though only two-thirds as wide as the latter.

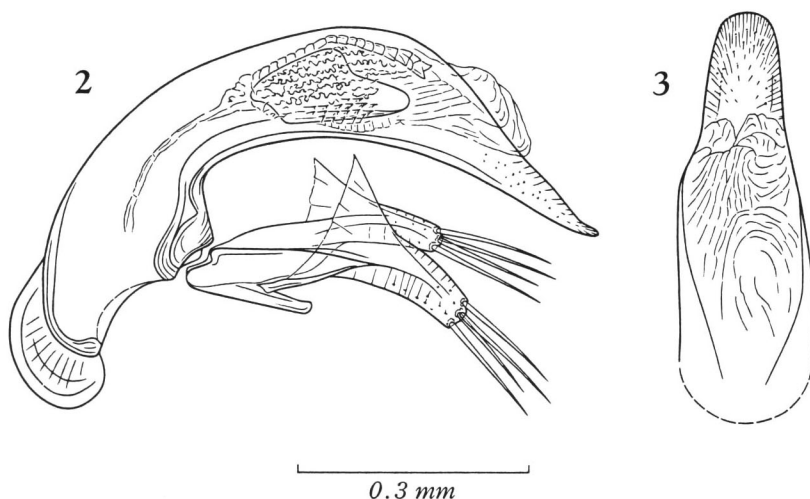
Pronotum large and ample, much wider than head, distinctly wider than long, usually widest at about three-fifths from base and more strongly contracted towards apex than towards base, but the widest part is often situated posterior to that, rarely at about five-ninths from base; PW/HW 1.44–1.59 (M 1.51), PW/PL 1.28–1.40 (M 1.33), PW/PA 1.48–1.63 (M 1.57), PW/PB 1.22–1.32 (M 1.27); sides moderately bordered throughout, widely and moderately arcuate in front, usually a little less so

behind though feebly curved to just before hind angles without distinct sinuation; apex either straight or slightly bisinuate, obviously narrower than base, PB/PA 1.16–1.33 (M 1.24), with front angles narrowly rounded and hardly or only very slightly produced; base almost straight at middle and slightly emarginate on each side; hind angles either rectangular or obtuse, though always forming a denticle on each side; surface well convex, with vague transverse striations, microsculpture formed by fine transverse lines though partially obliterated; median line deeply impressed on the disc but not widened in basal area; apical transverse impression ambiguous, usually with longitudinal wrinkles, basal transverse impression narrow and continuous, basal foveae not large though wide, and rather mal-defined; postangular carina indistinct; basal area narrow, longitudinally rugulose along the basal margin.

Elytra ovate, usually widest at about three-sevenths from base, and less narrowed towards bases than towards apices; EW/PW 1.30–1.43 (M 1.37), EL/EW 1.36–1.50 (M 1.44); shoulders distinct though rounded, with prehumeral borders perpendicular to the mid-line at the innermost portions; sides narrowly reflexed throughout, feebly arcuate from behind shoulders to apical third, then more strongly arcuate, and rather narrowly and conjointly rounded at apices, the curvature being variable according to individuals and usually more even in ♀ than in ♂, with preapical emargination either very slight or null; surface well convex though more or less depressed on the disc, with the marginal declivity steep; microsculpture composed of fine transverse lines but irregular and partially obsolete; striae very shallow though almost entire, finely punctate, becoming shallower towards the side, stria 8 deeply impressed in apical half; scutellar striole short but distinct, apical one also short but distinctly impressed, moderately curved, and directed to stria 5; intervals flat, apical carina obvious though obtuse; stria 3 with two setiferous dorsal pores at $1/8$ – $1/6$ and $3/10$ – $3/8$ from base respectively (the proximal pore is missing on the left elytron in one of the male paratypes from Jôju); preapical pore situated on interval 3 at $2/9$ – $2/5$ from apex and adjoining stria 2; interval 5 with a single setiferous dorsal pore at about middle, the pore sometimes adjoining stria 4 or 5; apical pores normal; marginal umbilicate series regular.

Ventral surface glabrous and smooth; sexual setae on anal sternite normal. Legs relatively long though similar in conformation to those of the other species of the subgenus.

Male genital organ small though moderately sclerotized, variable to some extent according to individuals in the thickness and curvature of aedeagus, the size of sagittal aileron, and the number of apical setae on styles. Aedeagus about two-sevenths as long as elytra, lightly depressed, more or less distinctly arcuate, and widely membranous on the dorsal surface, with broad flattened apical lobe and large elongate basal part, the latter of which is strongly curved ventrad and widely emarginate at the sides of basal orifice; sagittal aileron always well developed though variable in size; viewed dorsally, apical lobe long, broad and nearly parallel-sided, with the tip widely but not strongly rounded; viewed laterally, apical lobe narrow, gradually acuminate and slight-



Figs. 2-3. Male genitalia of *Epaphiopsis* (*Pseudepaphius*) *morimotoi* S. UÉNO, sp. nov., from Jôju on the Ishizuchi Mountains; left lateral view (2), and apical part of aedeagus, dorso-apical view (3).

ly reflexed at the extremity; ventral margin widely, and sometimes strongly, emarginate in profile. Inner sac largely covered with sclerotized teeth and scales, which are partly fused together, especially at the left side, and form irregularly meandering, longitudinal lines there; a large copulatory piece present at the right side, though rather difficult to be detected being masked by the teeth-mat, its ventral part is somewhat spatulate with narrowly rounded apex, and its dorsal margin is distinctly convex at middle. Styles fairly large, left style obviously larger than the right, each bearing usually four, sometimes five, slender setae at apex.

Type series. Holotype: ♂, Jôju, 1,350 m alt., 28-VII-1976, S. UÉNO, K. ISHIKAWA & F. MATSUBARA leg. Allotype: ♀, Jôju, 1,280-1,350 m alt., 30-V-1976, S. UÉNO & K. ISHIKAWA leg. Paratypes: 1 ♀, Jôju, 1,300 m alt., 26-VII-1958, H. KUSUNOKI leg.; 3 ♂♂, 2 ♀♀, Jôju, 1,300-1,400 m alt., 29-V-1976, S. UÉNO & K. ISHIKAWA leg.; 14 ♂♂, 15 ♀♀, Jôju, 1,280-1,420 m alt., 30-V-1976, S. UÉNO & K. ISHIKAWA leg.; 21 ♂♂, 14 ♀♀ (incl. teneral 4 ♂♂, 2 ♀♀), Jôju, 1,350 m alt., 28-VII-1976, S. UÉNO, K. ISHIKAWA & F. MATSUBARA leg.; 2 ♂♂, 4 ♀♀, Jôju, 1,350 m alt., 17-VII-1977, M. YOSHIDA leg.; 3 ♂♂, 2 ♀♀, Jôju, 1,380 m alt., 9-VIII-1981, M. SATOU leg.; 7 ♂♂, 4 ♀♀, Zen'ja-ga-mori, 1,200-1,250 m alt., 28-VII-1976, S. UÉNO & K. ISHIKAWA leg.; 1 ♀, Mt. Ishizuchi-san, 30-VII-1954, K. MORIKAWA leg.; 3 ♀♀, Mt. Ishizuchi-san, 1,500 m alt., 24-VII-1958, H. KUSUNOKI leg.; 3 ♂♂, 3 ♀♀, Mt. Ishizuchi(-san), 1,550 m alt., 13-VIII-1980, I. LÖBL leg.; 9 ♂♂, 6 ♀♀, Mt. Ishizuchi(-san), 13~14-VIII-1980, Cl. BESUCHET leg.; 3 ♀♀ (incl. 2 tenerals), via Mt. Ishizuchi(-san), 1,350 m alt., 13-VIII-1980, I. LÖBL leg.; 3 ♂♂, 1 ♀, via Mt. Ishizuchi(-san), 1,000 m alt., 14-VIII-1980, I. LÖBL leg.; 1 ♀, Omogo-kei, 750 m

alt., 23-IX-1954, K. MORIKAWA leg.; 1 ♀, Omogo-kei, 750 m alt., 23-IV-1972, M. YOSHIDA leg.; 3 ♂♂, 1 ♀, Omogo-kei, 750 m alt., 15-IX-1975, S. UÉNO leg.; 7 ♂♂, 1 ♀, Omogo-kei, 750-780 m alt., 24-V-1976, S. UÉNO & K. ISHIKAWA leg.; 12 ♂♂, 16 ♀♀ (incl. 3 teneral ♂♂), Omogo-kei, 750 m alt., 27-VII-1976, S. UÉNO, K. ISHIKAWA & Y. NISHIKAWA leg.; 1 ♀ (damaged), Omogo(-kei), 12-VIII-1980, Cl. BESUCHET leg.; 1 ♂, Tsuchigoya, 25-VII-1949, K. MORIMOTO leg.; 13 ♂♂, 6 ♀♀, Tsuchigoya, 1,450 m alt., 31-V-1981, M. YOSHIDA leg.; 2 ♀♀, Ibuki-yama, 1,410 m alt., 24-V-1976, S. UÉNO leg.; 1 ♂, Shiraza-tôgé, 1,440 m alt., 15-IX-1975, S. UÉNO leg.; 7 ♂♂, 10 ♀♀, Kamé-ga-mori, 1,670-1,720 m alt., 24-V-1976, S. UÉNO & K. ISHIKAWA leg.; 3 ♂♂, 2 ♀♀, Ohdaru, 1,020 m alt., 19-V-1984, S. UÉNO, Y. NISHIKAWA & S. SONE leg.

With the exception of the 29 paratypes collected by BESUCHET and LÖBL, which are deposited in the collection of the Département d'Entomologie, Muséum d'Histoire Naturelle, Geneva, all the specimens of the type series are preserved now in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Localities of the type series. Jôju (type locality!), Zen'ja-ga-mori, Mt. Ishizuchi-san, Omogo-kei, Tsuchigoya, Ibuki-yama, Shiraza-tôgé and Kamé-ga-mori, all on the Ishizuchi Mountains in Ehimé Prefecture (except for the Shiraza-tôgé which is at the Kôchi side of the eastern ridge), and Ohdaru of Teragawa in Hongawa-mura, Kôchi Prefecture, at the northwestern part of the Island of Shikoku, Southwest Japan.

Further specimens examined. 3 ♂♂, 1 ♀, Tsubuté-ga-taki, 980 m alt., Ohmori, Hongawa-mura, Kôchi Pref., 20-V-1984, S. UÉNO & Y. NISHIKAWA leg.; 2 ♂♂, Mt. Kanmuri-yama, 1,150 m alt., Hongawa-mura, Kôchi Pref., 20-V-1984, S. UÉNO leg.; 1 ♀, Ashidani-gawa Valley, 930 m alt., Hongawa-mura, Kôchi Pref., 20-V-1984, T. MOHRI leg.; 2 ♂♂, Mt. Ohzaré-yama, 1,300 m alt., Ohkawa-mura, Kôchi Pref., 25-VI-1982, Y. ITO leg.; 3 ♀♀, Mt. Ohzaré-yama, 1,300-1,400 m alt., Ohkawa-mura, Kôchi Pref., 10-IX-1983, Y. ITO leg.; 1 ♂, 1 ♀, Sakasé, 900 m alt., Motoyama-chô, Kôchi Pref., 24-VIII-1981, S. UÉNO leg.; 1 ♂ (teneral), Odami-yama, S of Myôken-mori, 1,000 m alt., Oda-machi, Ehimé Pref., 31-VII-1973, S. NAKAO leg.; 1 ♀ (chirotype of *Trechus morimotoi tosanus*), Mt. Kaji-ga-mori, 1,200 m alt., Ohtoyo-chô, Kôchi Pref., 22-VII-1952, K. SAWADA leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Notes. As was already mentioned in the introduction of this paper, *Epaphiopsis morimotoi* is not rare on the Ishizuchi Mountains in a limited sense. Of the nine localities of the type series, Jôju and Zen'ja-ga-mori lie on the northern slope of Mt. Ishizuchi-san, which is the main peak of the mountains attaining to 1,921 m in height, while the Omogo-kei Valley runs down the southern slope of the same peak. The distance between Jôju, the northernmost locality, and the Omogo-kei, the southernmost, is about 7.5 km in a bee-line. Of the remaining five localities, Tsuchigoya, Ibuki-yama, the Shiraza-tôgé and Kamé-ga-mori lie on the eastern ridge of the Ishizuchis, and Ohdaru is situated at the end of a small branch ridge south-southeast of Mt. Kamé-ga-mori; the farthest one, Kamé-ga-mori, is about 5.3 km distant to the

east beyond the Kôguchi-dani Valley from Jôju, and about 10 km distant to the north-east from the Omogo-kei. In short, *E. morimotoi* occurs anywhere on the Ishizuchis above 750 m in altitude, though it is less abundant than *E. ishizuchiensis*.

On the southeastern branch ridge of the Ishizuchis, the trechine has been known from Tsubuté-ga-taki, which is situated near the eastern end of the ridge about 14 km east-southeast of Tsuchigoya. At the eastern part of the main ridge of the Ishizuchi Range, three more localities have been known, that is, Mt. Kanmuri-yama (including the Ashidani-gawa Valley) which is about 12 km distant to the east by north from Mt. Kamé-ga-mori, Mt. Ohzaré-yama which is about 8.5 km further east by north from Mt. Kanmuri-yama, and Sakasé about 13.5 km east-northeast of Mt. Ohzaré-yama. Fully mature males are known from all these populations, so that their identity is ascertained beyond doubt. The standard ratios in the specimens from the two eastern populations are as follows: PW/HW 1.45–1.52 (M 1.49) in the Ohzaré-yama specimens, 1.50–1.51 in the Sakasé ones, PW/PL 1.29–1.36 (M 1.34) in the former, 1.32–1.34 in the latter, PW/PA 1.54–1.62 (M 1.56) in the former, 1.51–1.59 in the latter, PW/PB 1.25–1.32 (M 1.28) in the former, 1.29–1.30 in the latter, PB/PA 1.17–1.26 (M 1.22) in the former, 1.16–1.24 in the latter, EW/PW 1.34–1.39 (M 1.36) in the former, 1.36 in the latter, EL/EW 1.43–1.47 (M 1.44) in the former, 1.44–1.47 in the latter.

Of the remaining two localities, Odami-yama is about 32 km distant to the southwest from the Omogo-kei and is situated on the other side of the main course of the Niyodo-gawa Valley, while Mt. Kaji-ga-mori is about 22.5 km distant to the east-southeast from Sakasé and lies on the southern side of the Yoshino-gawa Valley. This means that the two localities are separated from each other by a distance of about 88 km, and that each of them is completely isolated from the other habitats of *E. morimotoi*. However, the single known specimen from each of these mountains accords with the type series, or falls in the range of individual variation of the latter, so far as concerned with the external morphology. The standard ratios are: PW/HW 1.52 in the Odami-yama specimen (4.35 mm in the length of body), 1.47 in the Kaji-ga-mori specimen (4.40 mm in the length of body), PW/PL 1.34 in the former, 1.33 in the latter, PW/PA 1.59 in the former, 1.56 in the latter, PW/PB 1.28 in the former, 1.27 in the latter, PB/PA 1.24 in the former, 1.23 in the latter, EW/PW 1.39 in the former, 1.36 in the latter, EL/EW 1.45 in the former, 1.40 in the latter. Further efforts to obtain fully mature males are, of course, needed for clarifying the true systematic status of these isolated populations, but I am now almost confident in my opinion that they cannot be separable as geographical races.

Epaphiopsis morimotoi seems to be an inhabitant of relatively high mountains, but it can come down to lower places along shaded streams (e.g., the Omogo-kei). It is more hygrophilous than its cohabitant, *E. ishizuchiensis*, which is humicolous and occurs in a wider variety of habitats. This may be why the former is more localized than the latter, though the two species are often found in the same heap of dead leaves. Ordinary habitats of *E. morimotoi* are found in the vicinities of narrow streams or seepages in deciduous broadleaved or mixed forests, where it is primarily semi-endogean

though often humicolous in warm seasons. Sometimes it occurs in open places at higher altitudes, under stones or rotten logs embedded in wet soil.

The present species is dedicated to Dr. Katsura MORIMOTO, Associate Professor of Entomology at Kyushu University, who obtained the first specimen of the trechine beetle thirty-five years ago.

Postscript

After the manuscript of this paper was put to the press, I received from Mr. Yoshiyuki Ito five specimens of *E. morimotoi* recently obtained by him on Mt. Inamura-yama in Kôchi Prefecture. This mountain (1,506 m in height) lies on the right side of the upper valley of the Yoshino-gawa River, and is about 8 km east-northeast of Tsubuté-ga-taki and about 7.5 km southeast of the Ashidani-gawa Valley on the southeastern slope of Mt. Kanmuri-yama. Their collecting data are as given below:

4 ♂♂, 1 ♀, Mt. Inamura-yama, E slope 1,200–1,300 m alt., Tosa-chô, Kôchi Pref., 7–VII–1984, Y. ITO leg. (NSMT).

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