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Two New Anophthalmic Species of the Group of *Trechiama oni* (Coleoptera, Trechinae) from the Tajima Area, Central Japan

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Abstract Two new species of the group of *Trechiama oni* are described under the names of *T. kameyamai* and *T. soumai*, respectively, from the Tajima area in the northern part of Hyôgo Prefecture, Central Japan. Both the species are closely related to *T. notoi* S. UÉNO which is recorded from mine adits and the upper hypogean zone in the northern tip of Osaka Prefecture, but they are clearly distinguished from the latter species by the shape of the aedeagal tip and the copulatory piece in the inner sac.

Introduction

The anophthalmic trechine fauna of Hyôgo Prefecture was well documented in the revision by UÉNO (1985 b) concerning the group of *Trechiama oni*. In that revision, nine species belonging to this group were recorded from Hyôgo. After that two additional species of *Trechiama* were described from the central and the southwestern parts of Hyôgo, respectively (UÉNO, 1985 c; UÉNO & MORI, 2000). However, a considerably large blank still remains in the northern area of Hyôgo, which is called the Tajima area. Recently, a series of *Trechiama* specimens was brought from the upper hypogean habitats of several localities in eastern Tajima mainly by SOUMA and KAMEYAMA, members of the Kansai Trechine Research Group. Surprisingly, these populations have similarities in many respects to *T. notoi* (UÉNO, 1981, p. 82, figs. 5–7, 1985 a, p. 73, pl. 14, fig. 7, 1985 b, pp. 166, 189; KITAYAMA & ASHIDA, 1999, p. 11) which occurs in the mine adits and the upper hypogean zone in the northern tip of Osaka Prefecture, more than 60 km distant and topographically remote from Tajima. Although *T. notoi* was included in the *kosugei* complex of the group of *T. oni*, its male genital features are remarkably different from all the other members of the *kosugei* complex. *Trechiama notoi* has extremely large male genitalia with large and heavily sclerotized copulatory piece. The populations from the Tajima area show basically similar characteristics of male genital organ, though clearly different in detail. In this paper, I am going to classify these populations into two new species and to describe them.

The abbreviations used herein are as follows: HW – greatest width of head; PW – greatest width of pronotum; PL – length of pronotum, measured along the mid-line; PA – width of pronotal apex; PB – width of pronotal base; EW – greatest width of elytra; EL – greatest length of elytra; M – arithmetic mean.

Trechiama (s. str.) ***kameyamai*** ASHIDA, sp. nov.

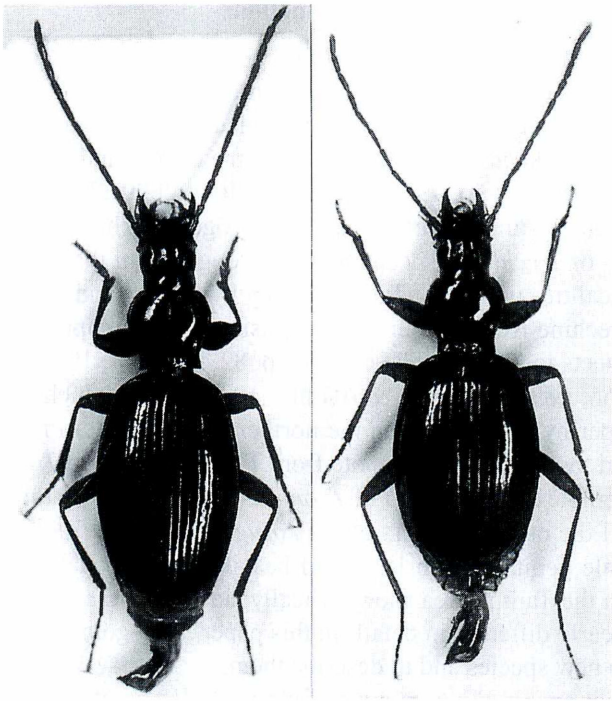
[Japanese name: Takeno-mekura-chibigomimushi]

(Figs. 1, 3–6)

Length: 6.05–6.65 mm in ♂, 5.40–6.25 mm in ♀ (from apical margin of clypeus to apices of elytra).

Relatively large species with extremely large and evolved male genitalia. Similar to *T. notoi* S. UÉNO of the group of *T. oni*, which was described from mine adits lying at the northern tip of Osaka Prefecture, in both external and male genitalic characteristics, but easily distinguished from the latter species by the shape of the aedeagal tip and the copulatory piece in the inner sac.

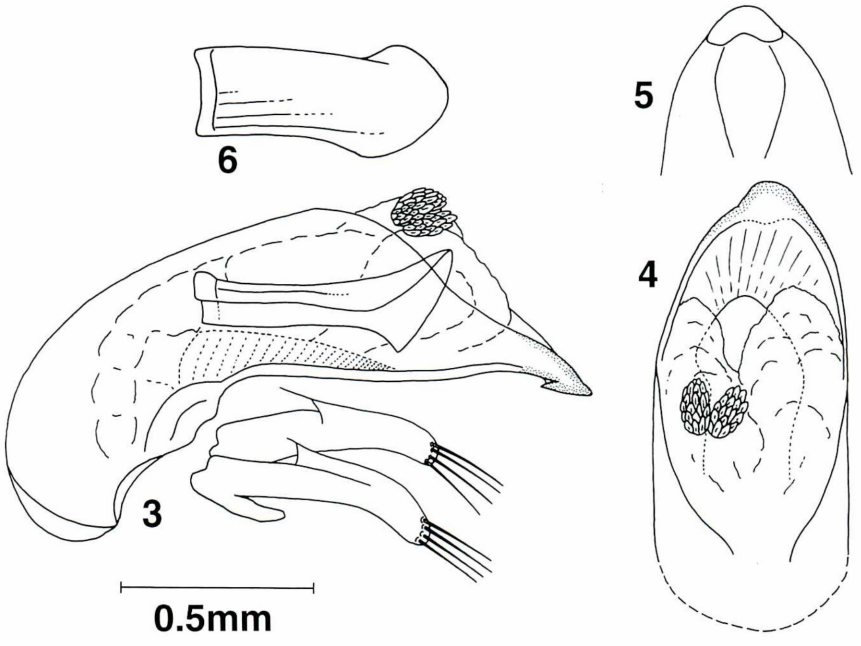
Color dark reddish brown with yellowish brown appendages, usually darker than in *T. notoi*. Head similar to that of *T. notoi*, though somewhat narrower; genae less convex; antennae somewhat stouter; remnant of eyes distinct but small. Pronotum more transverse and less constricted behind than in *T. notoi*, wider than length, and widest at two-thirds from base; PW/HW 1.42–1.50 (M 1.46), PW/PL 1.10–1.17 (M 1.13),



Figs. 1–2. *Trechiama* (s. str.) spp., dorsal views; *T. kameyamai*, ♂, from Akaganeyama in Takeno-chô (1), and *T. soumai*, ♂, from the Itoi-keikoku Valley in Wadayama-chô (2).

PW/PA 1.43–1.57 (M 1.50), PW/PB 1.34–1.41 (M 1.37); disc as in *T. notoi* though a little more convex; apex slightly emarginate at the median part; front angles obtuse; sides strongly arcuate in front, sinuate at about one-fourth from base, and then usually more or less divergent again towards hind angles, which are almost rectangular; postangular setae present; base almost straight, and wider than apex; PB/PA 1.03–1.14 (M 1.09). Elytra similar to those of *T. notoi*, elongated ovate, ample, and obviously larger in ♂ than in ♀; EW/PW 1.67–1.75 (M 1.71) in ♂, 1.58–1.63 (M 1.61) in ♀; EL/PL 2.97–3.10 (M 3.03) in ♂, 2.78–2.95 (M 2.89) in ♀; EL/EW 1.54–1.58 (M 1.56) in ♂, 1.53–1.62 (M 1.58) in ♀; prehumeral borders, shoulders and sides as in *T. notoi*; striae on surface shallower than in *T. notoi*; setiferous dorsal pores on stria 5 located at 1/8–1/5 and 1/2–4/7 from base, respectively. Legs stouter than in *T. notoi*.

Male genital organ basically similar to that of *T. notoi*, but clearly different in the shape of aedeagal tip and copulatory piece. Aedeagus heavily sclerotized, very large and robust, about three-eighths as long as elytra, with ample basal part, short flattened apical lobe and very large apical orifice whose left wall is much reduced as compared with the right; basal part weakly curved ventrad with fairly large basal orifice, whose sides are briefly emarginate; sagittal aileron narrow and hyaline; viewed dorsally, apical lobe short, broad at the base, rapidly narrowed towards apex, and provided with a semicircular apical protuberance which is wider than that of *T. notoi*; viewed laterally,



Figs. 3–6. Male genitalia of *Trechiama* (s. str.) *kameyamai* from Akaganeyama in Takeno-chô; left lateral view (3), apical part of aedeagus, dorso-apical (4) and ventral (5) views, and separated copulatory piece, dorsal view (6).

apical part abruptly narrowed towards short apical lobe which is feebly curved ventrad and looks like a hook by ventral thickening; viewed ventrally, median part concave just before apex, and apical tip provided with semitriangular plate whose anterior margin is carinate and deeply emarginate. Inner sac covered with poorly sclerotized scales, and armed with a very large copulatory piece and two small plates formed by fused teeth; copulatory piece very large, elongate, four-ninths as long as aedeagus, spatulate, and rolled ventrally, whose left side is sinuate at middle and feebly arcuate in apical half, and the right side is steeply dilated in basal two-thirds and prominent ventro-laterally in basal three-fourths, and apical part is rounded; two plates lying close together at the right dorsal side of apical orifice. Styles as in *T. notoi*.

Type series. Holotype: ♂, 4–VI–2000, H. ASHIDA leg. Allotype: ♀, 3–VI–2000, S. YAMASHITA leg. Paratypes: 2♂♂, 1♀, 3–VI–2000, S. YAMASHITA leg.; 5♂♂, 4–VI–2000, H. ASHIDA leg.; 1♀, 18–VI–2000, A. SOUMA leg.; 1♀, 2–VII–2000, T. SAITÔ leg. The holotype and allotype will be preserved in the collection of the National Science Museum (Nat. Hist.), Tokyo.

Type locality. Akaganeyama, 200 m in altitude, on the western slope of Mt. Yatsugi-yama (568 m in height) in Takeno-chô, Hyôgo Prefecture, Central Japan.

Additional specimens examined. 1♂, 31–V–2000, T. KAMEYAMA leg.; 6♂♂, 10♀♀, 2–VII–2000, S. YAMASHITA, A. SOUMA, T. SAITÔ & Y. OKUDA leg.; 1♀, 9–VII–2000, A. SOUMA leg. Locality: Morimoto, 60 m in altitude, Takeno-chô, Hyôgo Prefecture.

Notes. The present new species is found at two localities, Akaganeyama (type locality) and Morimoto, both in the same drainage area of the Takeno-gawa River emptying into the Japan Sea. The distance between these two localities is about 4 km. Although the population from Morimoto cannot be distinguished from the type series by external characteristics, it shows a slight difference in the configuration of the copulatory piece, of which the apex is more regularly rounded and the projection on the right side is a little longer. At both localities, *T. kameyamai* was dug out from the upper hypogean zone of a streamside at the depth of about 20–50 cm.

Trechiama (s. str.) ***soumai*** ASHIDA, sp. nov.

[Japanese name: Itoi-mekura-chibigomimushi]

(Figs. 2, 7–10)

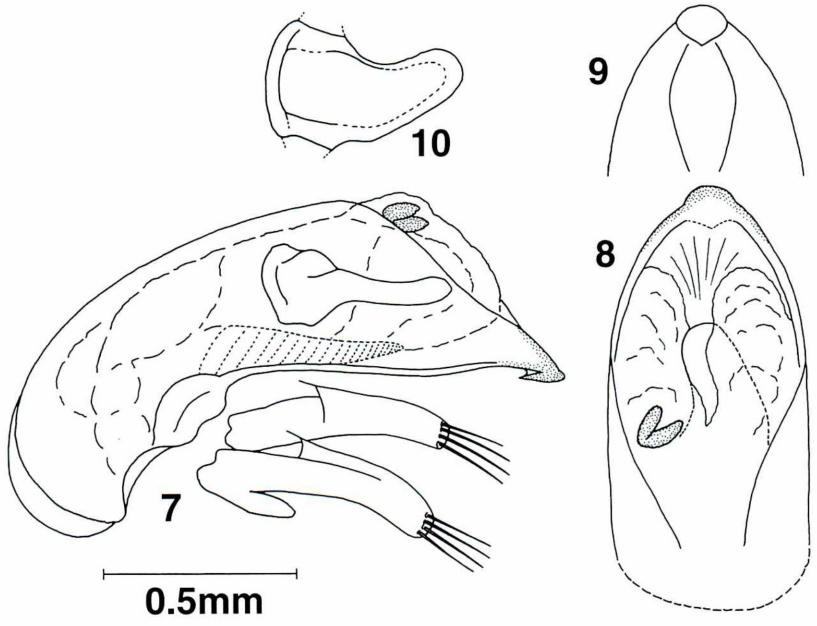
Length: 6.20–6.60 mm in ♂, 5.70–6.30 mm in ♀ (from apical margin of clypeus to apices of elytra).

Closely related to the preceding species, and not clearly distinguished from that species by external characters alone, but easily discriminated by the shape of the aedeagal tip and the copulatory piece in the inner sac.

Color as in *T. kameyamai*. Body exactly similar to that of *T. kameyamai*, though the hind body is usually less elongate than in the latter. Head as in *T. kameyamai*; antennae more or less slenderer than in *T. kameyamai*. Pronotum somewhat less trans-

verse and a little more strongly contracted behind than that of *T. kameyamai*; PW/HW 1.40–1.51 (M 1.45), PW/PL 1.08–1.18 (M 1.12), PW/PA 1.40–1.48 (M 1.44), PW/PB 1.33–1.47 (M 1.39); disc as in *T. kameyamai*; sides as in *T. kameyamai* except for the basal part which is feebly but obviously divergent towards hind angles; base more or less wider than apex; PB/PA 1.00–1.09 (M 1.04). Elytra similar to those of *T. kameyamai*, though less elongate than in the latter; EW/PW 1.77–1.84 (M 1.80) in ♂, 1.65–1.79 (M 1.71) in ♀; EL/PL 2.90–3.03 (M 2.98) in ♂, 2.83–2.96 (M 2.87) in ♀; EL/EW 1.45–1.54 (M 1.49) in ♂, 1.46–1.51 (M 1.48) in ♀; prehumeral borders less oblique and shoulders more distinct than in *T. kameyamai*; sides, striation and chaetotaxy as in *T. kameyamai*. Legs as in *T. kameyamai*.

Male genital organ very similar to that of *T. kameyamai*, but clearly different in the structure of aedeagal tip and inner armature. Aedeagus as in *T. kameyamai* except for the apical part; viewed dorsally, apical tip provided with a smaller apical protuberance than that of *T. kameyamai*; viewed ventrally, apical plate oval, wider than length, smaller than that of *T. kameyamai* but larger than that of *T. notoi*, its anterior margin being sharply carinate and weakly projecting at central part. Inner sac covered with minute scales, and armed with a large copulatory piece and two teeth plates; scales as in *T. kameyamai*; two teeth plates much smaller than those of *T. kameyamai*, seemingly fused with each other to form a horseshoe shape; copulatory piece heavily sclerotized,



Figs. 7–10. Male genitalia of *Trechiama* (s. str.) *soumai* from the Itoi-keikoku Valley in Wadayama-chô; left lateral view (7), apical part of aedeagus, dorso-apical (8) and ventral (9) views, and separated copulatory piece, dorsal view (10).

flat though thick, three-tenths as long as aedeagus, wide at the base, gradually narrowed towards apex, bent to the right at middle, and rounded at apex. Styles as in *T. kameyamai*.

Type series. Holotype: ♂, 11–VI–2000, A. SOUMA leg. Allotype: ♀, the same data as holotype. Paratypes: 13♂♂, 8♀♀, 11–VI–2000, A. SOUMA leg.; 11 ♂♂, 13♀♀, 2–VII–2000, H. ASHIDA, S. YAMASHITA, T. SAITÔ & Y. OKUDA leg. The holotype and allotype will be preserved in the collection of the National Science Museum (Nat. Hist.), Tokyo.

Type locality. Itoi-keikoku Valley, 450–500 m in altitude, on Mt. Higashi-tokonoo-san (839 m in height), Wadayama-chô, Hyôgo Prefecture, Central Japan.

Additional specimens examined. 1♂, 2♀♀, 6–X–2001, A. SOUMA leg.; 2♂♂, 1♀, 8–X–2001, A. SOUMA leg. Locality: Waya in Kamimura, 250 m in altitude, Izushi-chô, Hyôgo Prefecture.

Notes. This new species is quite similar to *T. kameyamai* and *T. notoi*, and some body proportions show intermediate ranges between those of the latter two species, but is clearly distinguished by the configuration of the copulatory piece. The type population of *T. soumai* was found in a gully near the head of the Itoi-gawa, one of the tributaries of the Maruyama-gawa River flowing into the Japan Sea. The Itoi-keikoku Valley is located between the known localities of *T. kameyamai* and *T. notoi*, i.e., 23 km southeast of Akaganeyama, the type locality of the former, and 64 km northwest of Toyono Mine, the type locality of the latter. The type specimens of *T. soumai* were dug out from the colluvia deposited in a dried riverbed and a streamside at the depth of about 10–50 cm. Waya, the second known locality of *T. soumai*, is about 6 km west of the type locality. The specimens from Waya are identical with the type series, except for more or less thicker apical part of the copulatory piece.

Discussion

In this paper, I described two new species belonging to the group of *T. oni* from the Tajima area in the northern part of Hyôgo Prefecture. Both the species are very similar to *T. notoi* of the *kosugei* complex, and have the following peculiar characteristics in common with the latter: relatively large body, sexual dimorphism in body size, large male genitalia with the unique modification of the aedeagal tip, and highly developed copulatory piece in the inner sac. These facts suggest that the three species are closely related with one another. However, the Tajima area and the known localities of *T. notoi* are geographically remote, and besides, two other species of the *kosugei* complex, *T. yoshiakii* (UÉNO, 1978, p. 298, figs. 5–8) and *T. silicicola* (UÉNO, 1981, p. 79, figs. 1–4), occur between the two areas. Although *T. kameyamai* and *T. soumai* should be included in the *kosugei* complex together with *T. notoi* according to the present system of classification (UÉNO, 1985 b), there is a considerably wide gap in morphological features between the three species and the other members of the *kosugei* complex including *T. yoshiakii* and *T. silicicola*. Only a candidate of intermediary is *T. tangonis*

(UÉNO, 1985 b, pp. 166, 183, figs. 15–16) from the northern tip of the Tango Peninsula, which shows a similar modification of the aedeagal tip to those of *T. notoi*, *T. kameyamai* and *T. soumai*. In spite of the adjacency of the Tango Peninsula to the Tajima area, however, *T. tangonis* has none of the peculiarities of the large body, sexual dimorphism in body size, large male genitalia and highly developed copulatory piece. As pointed out by UÉNO, *T. tangonis* shows the most likely ancestral type of the *kosugei* complex, because of possessing the less developed copulatory piece and the symmetrical lateral walls of the aedeagus. It is highly possible that the two lineages, namely, the *notoi*-like species and the other members of *kosugei* complex, were derived from a common *tangonis*-like ancestral species. I have already examined several undescribed species of the *notoi*-like species not only from the Tajima area and its vicinity but also from southeastern Hyôgo Prefecture. Since the number of the available specimen is not sufficient for description yet, I will deal with them in near future. Anyhow, the *notoi*-like species will show a wide distribution beyond expectation and may form a distinct species-complex in the group of *T. oni*. To confirm this hypothesis, further investigation of the remaining blank areas in the northern Kinki District including Tajima is necessary.

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要　　約

芦田　久：但馬地方から発見されたオニメクラチビゴミムシ群の2新種．—— 兵庫県北部の但馬地方には，メクラチビゴミムシ類の記録の大きい空白地帯があった．関西チビゴミ研究グループの亀山　剛，相馬明直の両氏によりこの地域から見いだされた盲目のナガチビゴミムシ属を調べたところ，南東に60 km以上離れた大阪府北部の廃坑および地下浅層から記録されているノトメクラチビゴミムシ *Trechiama notoi* S. UÉNOに近縁の新種であることが明らかになった．本論文ではこれらを2種に分類し，それぞれ，タケノメクラチビゴムシ *T. kameyamai*, イトイメクラチビゴミムシ *T. soumai* と命名，記載した．前者は兵庫県竹野町銅山および森本の地下浅層に，後者は和田山町糸井渓谷および出石町上村和屋の地下浅層に生息する．いずれも，雄交尾器中央片の先端部の形状や，内袋中の交尾片の形状の顕著な違いにより，ノトメクラチビゴミムシから容易に区別される．

References

KITAYAMA, K., & H. ASHIDA, 1999. Records of anophthalmic trechine beetles from Osaka Prefecture, Central Japan. *Nejirebane, Osaka*, (85): 10–13. (In Japanese, with English title.)

UÉNO, S.-I., 1955. Studies on the Japanese Trechinae (IV) (Coleoptera, Harpalidae). *Mem. Coll. Sci. Univ. Kyoto*, (B), **22**: 29–34.

——— 1978. Two new anophthalmic *Trechiama* (Coleoptera, Trechinae) found in non-calcareous areas of Central Japan. *Bull. natn. Sci. Mus., Tokyo*, (A), **4**: 293–301.

——— 1981. Two new anophthalmic *Trechiama* (Coleoptera, Trechinae) found in mine adits of Central Japan. *Ibid.*, (A), **7**: 79–85.

——— 1985 a. Carabidae (Nebriinae, Elaphrinae, Loricerinae, Scaritinae, Broscinae, Trechinae). *In* UÉNO, S.-I., Y. KUROSAWA & M. SATÔ (eds.), *The Coleoptera of Japan in Color*, **2**: 54–88 [incl. pls. 11–16]. Hoikusha, Osaka. (In Japanese, with English book title.)

——— 1985 b. The group of *Trechiama oni* (Coleoptera, Trechinae) —its distribution and differentiation—. *Mem. natn. Sci. Mus., Tokyo*, (18): 163–198.

——— 1985 c. Additions to the group of *Trechiama oni* (Coleoptera, Trechinae). *J. speleol. Soc. Japan*, **10**: 1–7.

——— & M. MORI, 2000. A new upper hypogean *Trechiama* (Coleoptera, Trechinae) from near the southwestern corner of Hyôgo Prefecture, West Japan. *Elytra, Tokyo*, **28**: 31–36.