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Discovery of the genus *Ochthebius* LEACH from the Ryukyu Islands, with description of a new species (Coleoptera: Hydraenidae)

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Abstract

The genus *Ochthebius* LEACH (Coleoptera: Hydraenidae) is reported firstly from the Ryukyu Islands: *O. nipponicus* JÄCH [loc. typ.: Izu, Honshu, Japan] from Okinawa-hontô Island and Miyako-jima Island, and a new species, which is here described as *O. amami* sp.n., from Amami-Ôshima Island.

Key words: Coleoptera, Hydraenidae, *Ochthebius*, Ryukyu Islands, new species, taxonomy.

Introduction

Up to the present, no species of the genus *Ochthebius* LEACH have been recorded from the Ryukyu Islands, though many field investigations were made mainly by Japanese entomologists.

JÄCH (1998b) reviewed the Taiwanese and Japanese species of this genus, and recognized eight species from mainland Japan and six from Taiwan. As was mentioned in his study, the Taiwanese and Japanese faunas of this genus are closely related to each other, and therefore we expected this genus to occur on the Ryukyu Islands, which stretch between Taiwan and Japan.

In 1999, we were fortunate to find two different species of this genus on Amami-Ôshima, Okinawa-hontô and Miyako-jima, respectively, both belonging to the Ryukyu Islands. The Amami-Ôshima species is clearly distinguishable from all the previously known Japanese and Taiwanese species, and the Okinawa-hontô / Miyako-jima species belongs to *Ochthebius* (s.str.) *nipponicus* JÄCH, which was originally described from Honshu, Japan. In this paper, we are going to describe the former as a new species under the name of *O.* (*Enicocerus*) *amami* sp.n., and to record the latter for the first time from the Ryukyu Islands.

In the terminology and the treatment of the subgenus *Enicocerus* STEPHENS we follow JÄCH (1998a, b).

Abbreviations used in the present paper are as shown in the following lines:

Measurements: EL - length of elytra; EW - width of elytra; HL - length of head (to apex of labrum); HW- width of head; PL - length of pronotum; PW - width of pronotum; TL - total length (HL+PL+EL)

Institutions and private collections: EUM - Entomological Laboratory, Ehime University, Matsuyama; NMW - Naturhistorisches Museum, Wien; NSMT - National Science Museum, Tokyo; NWU - Nagoya Women's University; HY - H. Yoshitomi private collection

Ochthebius (*Enicocerus*) *amami* sp.n.

TYPE LOCALITY: Yakkachi-gawa (a small stream running near a natural forest), Hatsuno, Amami-Ôshima, Kagoshima Prefecture, Ryukyu Islands, Japan (see Fig. 7).

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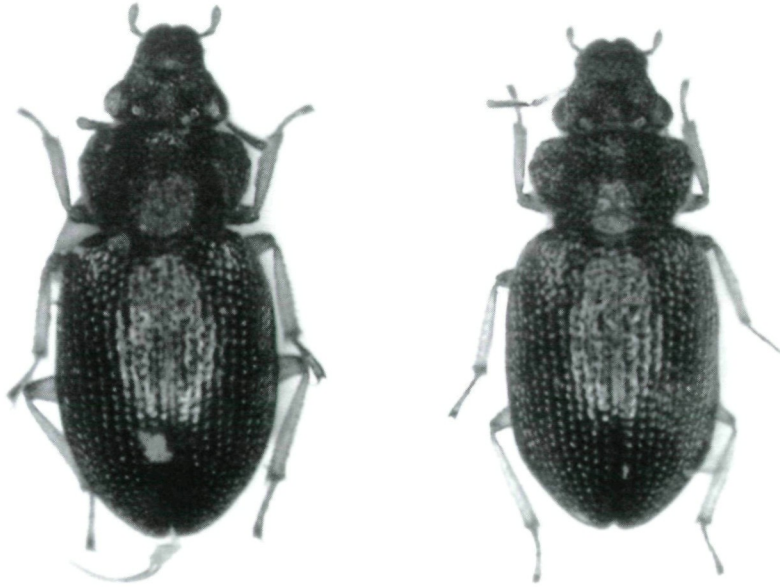

Fig. 1: *Ochthebius amami* sp.n., left - male (holotype); right – female (paratype)

Type Material: **Holotype** ♂ (NSMT): "Hatsuno, Amami-Ôshima, 31. III. 1999, M. Satô & H. Yoshitomi leg." **Paratypes** 13 ♂♂, 11 ♀♀ (EUM, NMW, NSMT, HY), same data as for the holotype (1 ♂ mounted on slides nos. HY 468 - 472; male genitalia on slide no. HY 505; female abdominal segment on slide no. HY 504); 10 ♂♂, 9 ♀♀ (NWU), same locality, 2.V.1999, M. Satô & Y. Utsunomiya leg.

DESCRIPTION: Male. Body oblong, moderately convex above, strongly shining in dorsal aspect. Coloration of elytra and upper surface of head and pronotum black with greenish lustre; undersurface of body brownish black, but labium, labial palpi, epipleura, and 6th and 7th abdominal sternites paler; antennae and legs yellowish brown, except for fuscous flagellum, knees and tarsi.

Head strongly and densely punctate, with deep and distinct ocular grooves, shallowly concave between ocelli; fronto-clypeal suture short and almost straight, indistinct in lateral parts; HW/HL 1.11 - 1.43 (1.23). Ocelli and eyes well developed, close to each other. Clypeus covered with small punctures denser than on frons, anterior corners spiniform. Labrum transverse, covered densely with small punctures, excised deeply at anterior margin; surrounding part of anterior margin glabrous and slightly upturned. Lateral margin of mandible provided with a row of strong spinous setae. Labial palpi provided with small peg-like terminal segment; approximate ratio of segments 1.0 : 1.5 : 0.4 (paratype, n = 1). Antennae moderate in length; scape long, curved abruptly in proximal part, slightly enlarged apically; pedicel large, abruptly constricted in caudal part; 3rd segment small and petiolate; 4th short and cupuliform; approximate ratio of all nine segments 12 : 4 : 2 : 1 : 3 : 3 : 3 : 3 : 5 (paratype, n = 1).

Pronotum transversely rectangular, widest near anterior 1/4, slightly convex above, though the lateral portion ("ear" in JÄCH 1998b) is depressed; anterior margin weakly bisinuous, without postocular tooth; posterior margin slightly arcuate; lateral margin rather crenulate in anterior part; PW/PL 1.30 - 1.56 (1.42). Discal portion covered closely with large and shallow punctures; distance between the punctures about one puncture diameter; median groove distinct, approximately reaching anterior 1/8 to posterior 1/4 of pronotal length; posterior discal foveae

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oval and shallow, located at about posterior 1/3; anterior discal foveae indistinct. Lateral portion (see above) densely and rugosely punctate. Hyaline membrane present on anterior and posterior margins and caudal 2/3 of lateral margin; anterior one protruding anteriorly just behind eyes; posterior one bisinuous.

Elytra oval, broadest at the middle, with eleven straight and regular striae, though somewhat irregularly punctate on shoulder; intervals between strial punctures flat, covered sparsely with minute punctures; EL/EW 1.33 - 1.47 (1.39); EL/PL 2.40 - 2.67 (2.52); EW/PW 1.21 - 1.31 (1.28); TL/EW 2.29 - 2.53 (2.40). Lateral margin of elytra evenly arcuate. Epipleura almost reaching apices of elytra.

Ventral surface of thorax densely covered with short silvery hairs except for metasternum, on which the hairs are somewhat longer. First to 5th abdominal sternites closely covered with long silvery hairs; 6th and 7th glabrous; 7th abdominal tergite with short setae at apical margin.

Aedeagus ca. 0.5 mm ("PL - projected length", sensu JÄCH 1998a), gently curved ventrad; main piece pointed at apex, with some minute hairs in apical area. Parameres very short, connected with main piece at about apical 1/6, bearing some long setae.

Female. Sexual dimorphism distinct in the following characteristics: surrounding part of anterior margin of labrum covered with fine setae, not upturned; lateral margins of elytra clearly projecting laterad in caudal 1/4, almost parallel-sided in basal 1/4 to 3/4. HW/HL 1.11 - 1.43 (1.27); PW/PL 1.40 - 1.56 (1.46); EL/EW 1.39 - 1.50 (1.44); EL/PL 2.40 - 2.78 (2.59); EW/PW 1.20 - 1.29 (1.23); TL/EW 2.39 - 2.56 (2.47).

Measurements:
Male (n = 12). TL = 1.95 - 2.25 (2.09) mm; HL = 0.35 - 0.45 (0.40) mm; HW = 0.50; PL = 0.45 - 0.50 (0.48) mm; PW = 0.65 - 0.70 (0.68) mm; EL = 1.15 - 1.30 (1.20) mm; EW = 0.85 - 0.90 (0.87) mm.
Female (n = 10). TL = 2.05 - 2.30 (2.17) mm; HL = 0.35 - 0.45 (0.41) mm; HW = 0.50 - 0.60 (0.50) mm; PL = 0.45 - 0.50 (0.49) mm; PW = 0.65 - 0.75 (0.72) mm; EL = 1.15 - 1.35 (1.27) mm; EW = 0.80 - 0.90 (0.88) mm.

BIOLOGICAL NOTES: All specimens were collected in a small stream (Fig. 7), where they were found usually in the wet splash zone a little above the water line of the surface of half-submerged rocks. They probably live on diatoms growing on the surfaces of the medium-sized rocks in the wet splash zone.

DIFFERENTIAL DIAGNOSIS: Judging from the similarity in both external and male genitalic features, this species forms a species-group with *Ochthebius* (*Enicocerus*) *hasegawai* NAKANE & MATSUI, *O.* (*E.*) *ilanensis* JÄCH and *O.* (*E.*) *japonicus* JÄCH. Particularly, the parameral feature (reduced and bearing some long setae) is very similar to that of *O.* (*E.*) *japonicus*. It is, however, very easily distinguished from the latter by the shape of the head and pronotum. Besides, the sexual dimorphism of the elytra (lateral margins of female elytra laterally projecting in caudal 1/4) is a unique feature for the new species; this characteristic has been known neither in the Asian species nor in other Holarctic ones.

Ochthebius (s.str.) *nipponicus* JÄCH

Ochthebius (s.str.) *nipponicus* JÄCH, 1998b: 181.

ADDITIONAL MATERIAL EXAMINED:
1 ♂, 6 ♀♀ (NMW, NWU), "Nakagusuku, Is. Okinawa, 29. IV. 1963, Y. Arita leg."
9 ♂♂ (NMW, NWU, HY), "Shimajiri, Miyako-jima Is., 6. VIII. 1999, M. Satô & T. Mizoguchi leg."

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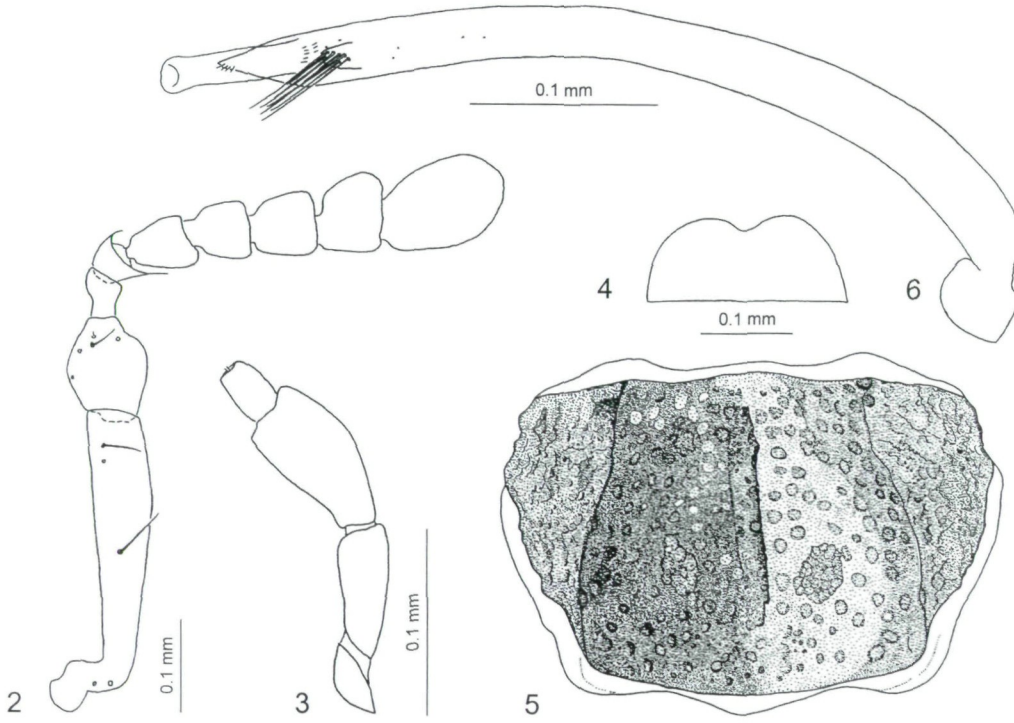

Figs. 2 - 6: *Ochthebius amami* sp.n., 2) antenna; 3) maxillary palpus, 4) labrum, 5) pronotum, 6) aedeagus in lateral view.

BIOLOGICAL NOTES: The collecting sites in the Ryukyus are situated near the sea shore. As at the type locality (JÄCH, 1998b), Miyako-jima specimens were found on sandstone cliffs with flowing freshwater. Some specimens were covered with minute grains of whitish sand dorsally.

DIFFERENTIAL DIAGNOSIS: This species is closely related to the Taiwanese *O.* (s.str.) *jengi* JÄCH. It can be distinguished from the latter on the basis of the following two characteristics: ventral margin of the main piece of male genitalia somewhat evenly arcuate in apical part (more closely similar to Fig. 25 than to Fig. 24 in JÄCH 1998b); 4th abdominal sternite covered with long setae throughout. However, closer examination based upon a longer series of additional materials and enzymatic analysis or genetic studies are needed for clarifying the true taxonomic status of this complex of species.

Discussion

When *Ochthebius* specimens were obtained on the Island of Miyako-jima lately, we believed that they should belong to *O.* (s.str.) *jengi* JÄCH, since the island is geographically much closer to Taiwan, where the type locality of *O. jengi* lies, rather than to Izu in Honshu (type locality of *O.* (s.str.) *nipponicus* JÄCH). It was therefore an utter surprise for us to find, after a careful examination, that they actually belong to the latter species. Besides, we have examined specimens of *O. nipponicus* from Okinawa-hontô, though they were regarded to be a new species by M.A. Jäch (pers. com.). How such a large distribution evolved in *O. nipponicus* is difficult to

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elucidate at the present moment, but anyway it is of considerable interest from a zoogeographical viewpoint. The distance between Miyako-jima and Okinawa-hontô is about 270 km, though the distance between Okinawa-hontô and Izu in Honshu is about 1,300 km. As was mentioned above, the question of the dispersal of this species is a crucial one. The current of the wind including the typhoon is mostly moving from south to northeast along the Ryukyus and the Mainland of Japan. Therefore, for instance, the distribution pattern of *O. nipponicus* seems to be influenced by the prevailing winds. Miyako-jima is a flat island formed by recent coral reef and has only a few surface streams not shaded by thick forest. As a result, the case of *O. nipponicus* can be inferred as the immigration from island to island in long distance, as can be seen from the following record. *Hydraena scabra* d'ORCHYMONT is recorded from Mindanao and Luzon of the Philippines the distance between which is about 1,000 km (YANO et al. 1983). Then, both species are small in size and we presumed that the separate distribution of long distance may have been possible according to the direction of the wind.

In addition, *O. nipponicus* and its allied species are closely related to each other and may be regarded as problematic taxonomically. Therefore, we think that detailed taxonomic studies on the Ryukyuan population of *O. nipponicus* should be carried out more thoroughly after obtaining more material.

On the other hand, *Ochthebius* (*Enicocerus*) *amami* sp.n. is probably endemic to the Island of Amami-Ôshima. It is related to the two Japanese species, *O.* (*E.*) *hasegawai* and *O.* (*E.*) *japonicus*, as well as to the Taiwanese *O.* (*E.*) *ilanensis*. In this case, therefore, their distributional pattern is reasonable as an allopatric example, and the Amami species seems to have become differentiated due to the isolation of the islands of the central Ryukyus. The development of a sexual dimorphism of the elytra in the species seems to have been formed or evolved independently in response to the environmental factor or something else. It seems worth to note that Amami-Ôshima is an old island of moderate height and is wholly covered with thick natural forest. This island may have been separated from other islands in the lower Pleistocene, about 1.5 million years before present.

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Fig. 7: Habitat of *Ochthebius amami* sp.n.

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