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Morphological Peculiarities and Probable Biology of the Insular Agyrtid Beetle, *Necrophilus nomurai* (Coleoptera, Agyrtidae, Necrophilinae)

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Abstract Morphological peculiarities of the insular agyrtid beetle, *Necrophilus nomurai* (SHIBATA), are discussed in comparison with a congener, *N. hydrophiloides* GUÉRIN-MÉNEVILLE. The present species is unique in having long vestiges of parameres in the male genitalia, the abdominal sternite 7 apically emarginate in both the sexes, and so on. Discussion is also made on its biology.

Introduction

Only six species belonging to the genus *Necrophilus* LATREILLE are known to occur in the world after the New Zealand species was removed to a newly established genus, *Zeanecrophilus* NEWTON (1997), together with a partially sympatric new species. *Necrophilus nomurai* (SHIBATA) was originally described as the only species of a new genus, *Paranecrophilus* SHIBATA, which is generally recognized as a junior synonym of the genus *Necrophilus* at present (SCHAWALLER, 1986; NEWTON, 1997). This insular species has not been known from outside Amami-Ôshima Island of the Ryukyu Islands; however, Mr. H. MIYAMA made an investigation on Tokuno-shima Island, which is a medium-sized island nearest to Amami-Ôshima, and succeeded in obtaining many specimens (MIYAMA, 1996). As is cited above, NEWTON (1997) made a review of the family Agyrtidae and analysed their phylogeny and biogeography, but he was unable to dissect the type specimen of this species. As I have observed by dissection the seventh and eighth abdominal sternites and the male genitalia of the species, they will be summarized and illustrated in comparison with a congener for showing its morphological peculiarities within the genus. In addition, discussion is also made on its biology for further investigations.

Collecting Data of the Specimens Used

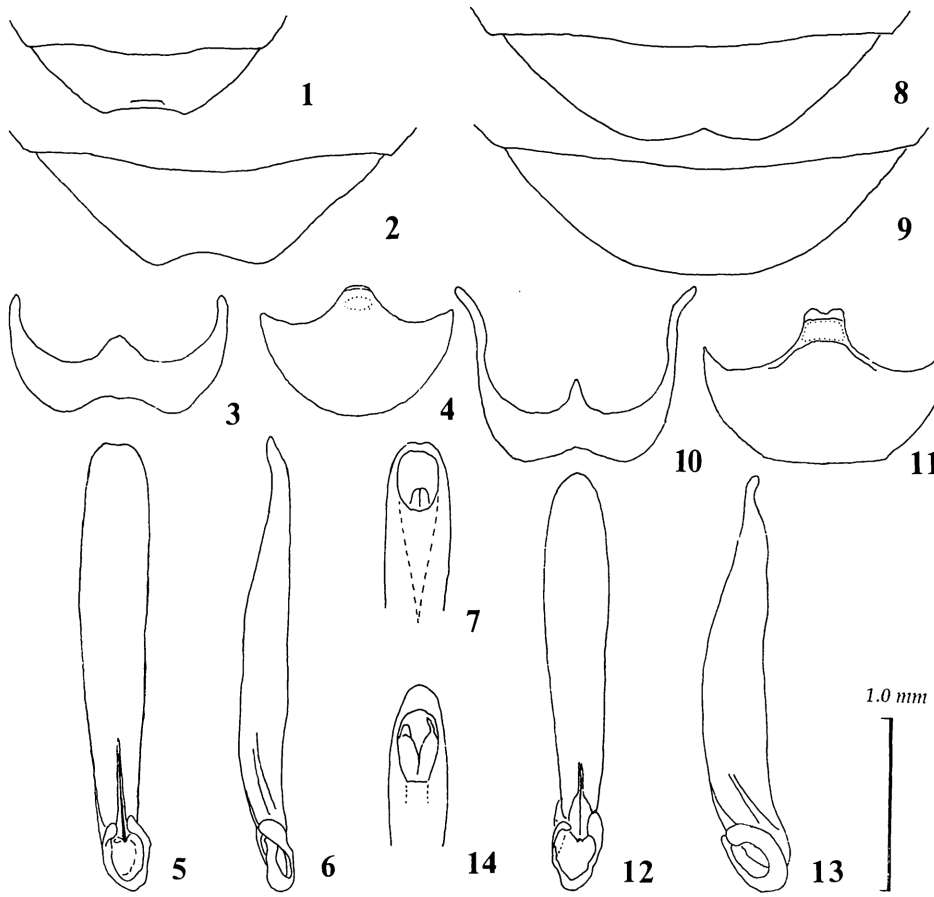
Necrophilus nomurai (SHIBATA): 1♂, 1♀, Sankyô, Tokuno-shima Is., Ryukyus, SW Japan, 30–III–1996, H. MIYAMA leg.

N. hydrophiloides GUÉRIN-MÉNEVILLE: 5♂♂, 4♀♀, Niles Canyon, Alameda Co., California, U.S.A., XII–1990, no collector's name; 1♂, 1♀, same locality, XII–1992,

no collector's name.

Comparison

Seventh and eighth abdominal sternites. In *N. nomurai*, the male abdominal sternite 7 is emarginate at the apex (Fig. 1), with a short transverse ridge in the preapical portion; in the female, the sternite is also emarginate at the apex as was described in the original description (Fig. 2); the male sternite 8 is as shown in Fig. 3, in the female, the sternite has a shallow depression in the preapical portion of mid-anterior pro-



Figs. 1–14. Seventh and eighth abdominal sternites and male genitalia of *Necrophilus* spp. —— 1–7, *Necrophilus nomurai* (SHIBATA), from Tokuno-shima Is., Ryukyus; 8–14, *N. hydrophiloides* GUÉRIN-MÉNEVILLE, from California, U.S.A.; 1, 8, outline of abdominal sternite 7 and apical portion of sternite 6, ♂; 2, 9, same, ♀; 3, 10, outline of sternite 8, ♂; 4, 11, same, ♀; 5, 12, outline of male genitalia, dorsal view; 6, 13, same, lateral view (dorsum to left); 7, 14, same, apical portion in ventral view. Scale: 1.0 mm.

jection (Fig. 4). In *N. hydrophiloides*, on the other hand, the male abdominal sternite 7 is notched at the middle of the apex (Fig. 8), without transverse stria in the preapical portion; in the female, the emargination of the sternite is absent (Fig. 9); the male sternite 8 is as shown in Fig. 10, in the female, the sternite is depressed throughout in the preapical portion of mid-anterior projection (Fig. 11).

Male genitalia. In *N. nomurai* (Figs. 5–7), the median lobe bears round apical corners and gently emarginate apex, flattened in lateral view, the apico-ventral portion is as shown in Fig. 7; the parameres are reduced, fused as relatively long cuneate vestiges, extending along basal 1/4 of the median lobe. In *N. hydrophiloides* (Figs. 12–14), the median lobe is projected apicad, with round apex, still robust in lateral view, the apico-ventral portion is as shown in Fig. 14; the parameres are also reduced, fused as triangular vestiges, extending along basal 1/5 of the median lobe.

Discussion

Judging from the comparison between *N. nomurai* and *N. hydrophiloides*, and other congeners (cf. SCHAWALLER, 1978, 1986; NEWTON, 1997), the former possesses several unique characteristics. One of them is deviation from the diagnostic characters of the genus *Necrophilus* newly proposed by NEWTON (1997), that is, the abdominal sternite 7 of *N. nomurai* is distinctly emarginate at the apex in both the sexes. Other peculiarities are pointed out in the comparison: the median lobe is weakly emarginate at the apex; vestiges of the parameres are long; a short ridge is present in the preapical portion of the sternite 7 in the male. In the female, the presence of depression in the mid-anterior projection of the sternite 8 is one of the characteristics common between the two species examined. The presence or absence of the depression seems important for phylogenetic consideration at a lower level. For example, the depression is absent in two Japanese pterolomatine species (NISHIKAWA, 1986, figs. 10d, 11b), also absent in *Pteroloma sibiricum* SZÉKESSY and *Apteroloma discicolle* (LEWIS). PERREAU (1989) has used them as one of a series of characteristics for reconstruction of the phylogeny of the family Cholevidae. However, further scrutiny of the characteristics is needed for further discussion.

The type series of *N. nomurai* was obtained by a trap baited with carrion (SHIBATA, 1968), and according to MIYAMA (1996), this species was attracted to a dead bird at a roadside. These observations suggest that the species is a typical scavenger, no feeding specialization observed in *N. subterraneus* (DAHL) having been known. The adults of the species seem active only in the spring, so far as recognized on the published data of the specimens known. However, a dead body of an adult beetle was found in Amami-Ôshima in December (pers. comm. from S. MORITA). The male specimen examined from Tokuno-shima seems to be a newly emerged individual, because its median lobe is somewhat teneral in being weakly sclerotized. MIYAMA (1996) also reported a collection of a teneral female in April on Mt. Yuwan-dake of Amami-Ôshima. The North American congeners, *N. hydrophiloides* and *N. pettittii* HORN, are

both winter-active (PECK, 1981; ANDERSON & PECK, 1985; NEWTON, 1997). Though included in a different subfamily, *Apteroloma discicolle* shows mating activity in the late autumn (HIRANO, 1995). Thus, it seems possible that the life cycle of the present species can be surmised as follows: univoltine; the adults are active during the autumn and winter, new generation appears in the spring and estivates till the autumn.

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要　約

西川正明：オオツヤシデムシ（甲虫目ツヤシデムシ科）の形態的特異性と予想される生活史．—— ツヤシデムシ科の再検討が NEWTON（1997）によって行われ，本科の諸属についても，従来の知見と新たに発見された鑑別形質を基に再記載され，新たな位置づけが提唱されている．琉球列島の奄美大島と徳之島（見山，1996）の特産種であるオオツヤシデムシ *Necrophilus nomurai*（SHIBATA）については，新亜科 Necrophilinae のもとに配列されたが，基準系列以外の標本が入手できず，細部についての検討は行われなかった．そのため，*Necrophilus* 属の再記載に若干の追加・訂正が必要となった．この論文では，徳之島産のオオツヤシデムシと，北米産の *N. hydrophiloides* GUÉRIN-MÉNEVILLE の雌雄の第7–8 腹節腹板，雄交尾器を比較し，属内における本種の形態的特異性を明らかにし，あわせて予想される生活史についても論じた．

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A New *Rafflesia* Associate: *Micronemadus pusillimus* (KRAATZ) (Coleoptera, Leiodidae), and its Additional Records from the Crocker Range, Sabah, Malaysia

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The International Crocker Range Scientific Expedition 1999, jointly organized by the Sabah Parks (SP), Universiti Malaysia Sarawak (UNIMAS) and Universiti Malaysia Sabah (UMS), was held from the 14th to the 23rd of October with the aim of inventorying the biodiversity components and their ecological relationships found within the park area. The second author (MIZOTA) mainly surveyed the beetle fauna of the Crocker Range Park (CRP) during the expedition period and collected many beetles and other insects. Although CRP is noted for its rich fauna of beetles, a greater part of the fauna lacks documentation and still awaits discovery. In this paper are given additional records of *Micronemadus pusillimus* as a result of the survey. The present material suggests that it seems to be a generalized scavenger and one of the commonest cholevines in CRP, and is an occasional associate of *Rafflesia* flowers, probably acting at twilight (cf. DAVIS & LANTOH, 1996; MIZOTA, HIRONAGA & MOHAMED, 2000; MIZOTA, in preparation).

Micronemadus pusillimus (KRAATZ, 1877)

(Fig. 2)

Catops pusillimus KRAATZ, 1877, Dt. ent. Z., **21**, p. 108; type area: Japan.
Other references are omitted.