

Nemomydas, new to the Oriental region (Diptera, Mydidae)

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Abstract

Nemomydas gruenbergi HERMANN, 1914, comb. n., which was known only from Formosa, is here redescribed and illustrated, based on the specimens from the Yaeyama Islands of Japan. *Nemomydas* is new to the Oriental region. Except for *gruenbergi*, this genus contains 16 species which are distributed in North and Central America only ["Canada (British Columbia) to Panama"].

Introduction

There are 18♂♂, 4♀♀ of one species of *Nemomydas* from the Yaeyama Islands of Japan at our disposal. They agree well with the original description (HERMANN, 1914) and the redescription (SACK, 1934) of "*Leptomydas*" *gruenbergi* known from Formosa.

PAPAVERO and KNUTSON (1975) listed 10 species of Mydidae from the Oriental region and said, "all of them are yet unplaced in the appropriate genera." Then, PAPAVERO and WILCOX (1974) erected the genus *Cacatuopyga* whose type-species is *Mydas fruhstorferi* WULP, 1896 from West Java, and put 4 other species in it: *auriculosa* (SÉGUY, 1934) from North Vietnam, *basifascia* (WALKER, 1859) from Celebes, *carmichaeli* (BRUNETTI, 1913) from North India, and *ruficornis* (WIEDEMANN, 1824) from India, of which the last one was included in *Cacatuopyga* with a query. These 5 species were originally relegated to *Mydas*, "an exclusively American genus."

It is now clear that "*Leptomydas*" *gruenbergi* belongs to *Nemomydas*. Except for *gruenbergi*, *Nemomydas* contains 16 species (after CURRAN, 1965 and PAPAVERO and WILCOX, 1968) and is distributed in North and Central America only (see Map 4 in WILCOX and PAPAVERO, 1971).

The following 4 Oriental species are still uncertain in their true generic position: "*Cephalocera*" *annulata* BRUNETTI, 1912 from India, "*Syllegomydas*" *bucciferus* SÉGUY, 1928 from India, "*Leptomydas*" *indianus* BRUNETTI, 1912 from India, and "*Mydas*" *sarpedon* SÉGUY, 1928 from Viet Nam.

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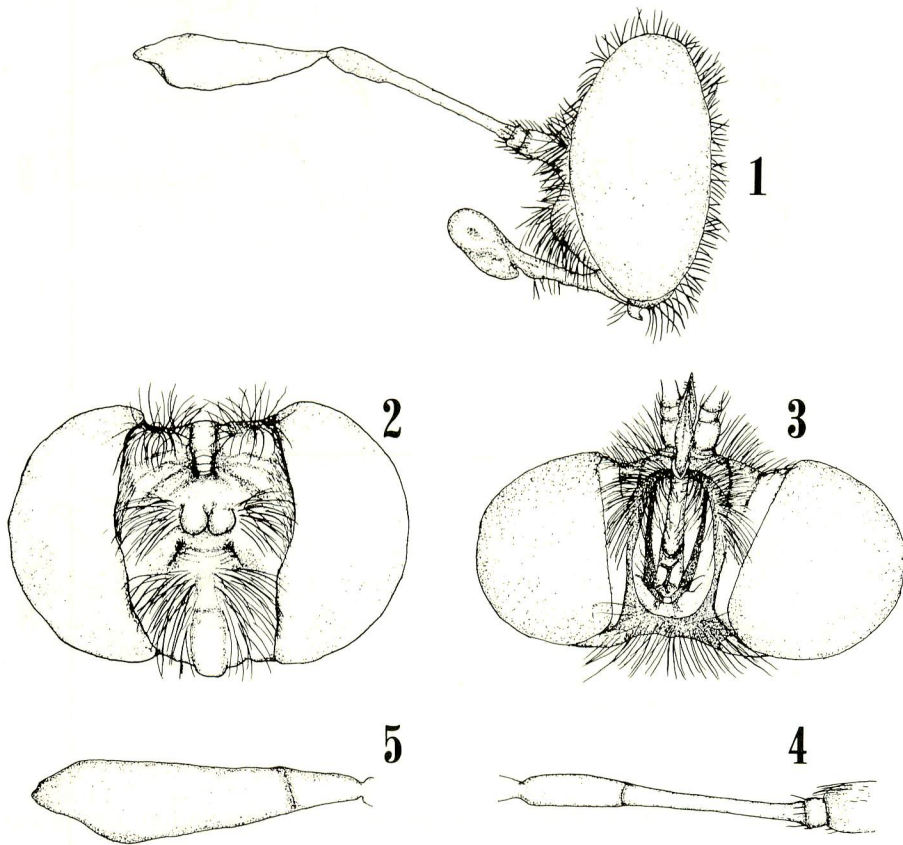
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Some noticeable characters in *Nemomydas gruenbergi*

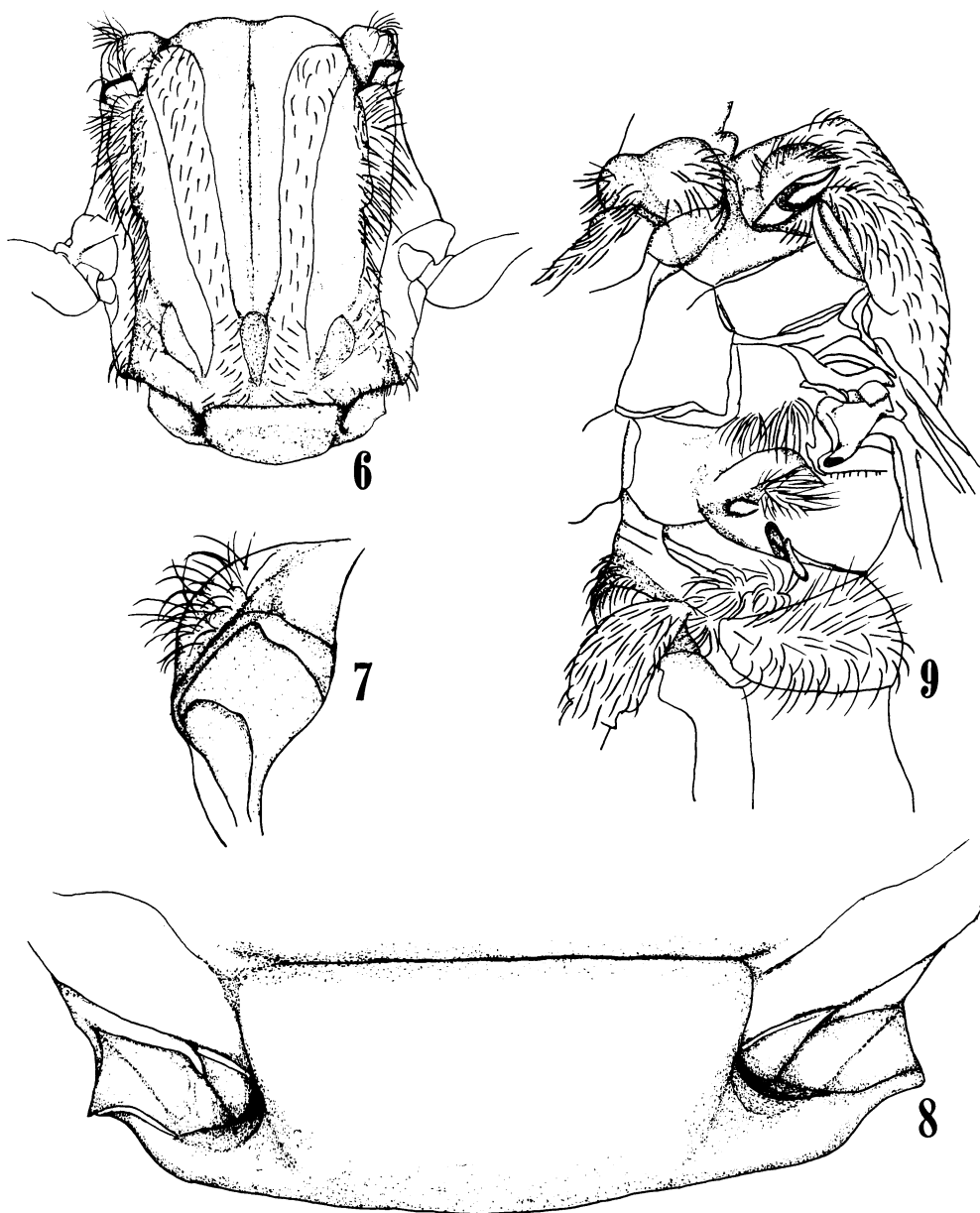
The diagnosis of Mydidae was given by BEQUAERT (1961a), WILCOX and PAPAVERO (1971) and WILCOX (in MCALPINE et al., 1981).

Some noticeable characters found in *Nemomydas gruenbergi* are here described, apart from the taxonomic importance as family, genus and species.

Head (Figs. 1-5): ocellar tubercle narrow and much longer than wide; ocelli, if present, concolorous with ocellar tubercle and difficult to recognize; front concave alongside lower part of ocellar tubercle; clypeus is divided into the upper swollen and the lower concave parts and the latter is membranous, except a pair of sclerotized longitudinal lines; each of antennal segment 3 and flagellum rather indistinctly two-jointed; apical joint of flagellum swollen, with a large, membranous, ventroinner sensory area just before apex and one or two (or several) sensory pits at apex; for the



Figs. 1-5. Head of *Nemomydas gruenbergi*, male. 1, Head, lateral view; 2, head, anterior view (antenna and proboscis are omitted); 3, head, ventral view (concave part of clypeus is kept horizontal); 4, antennal segments 1-3, inner view; 5, antennal flagellum, inner view.



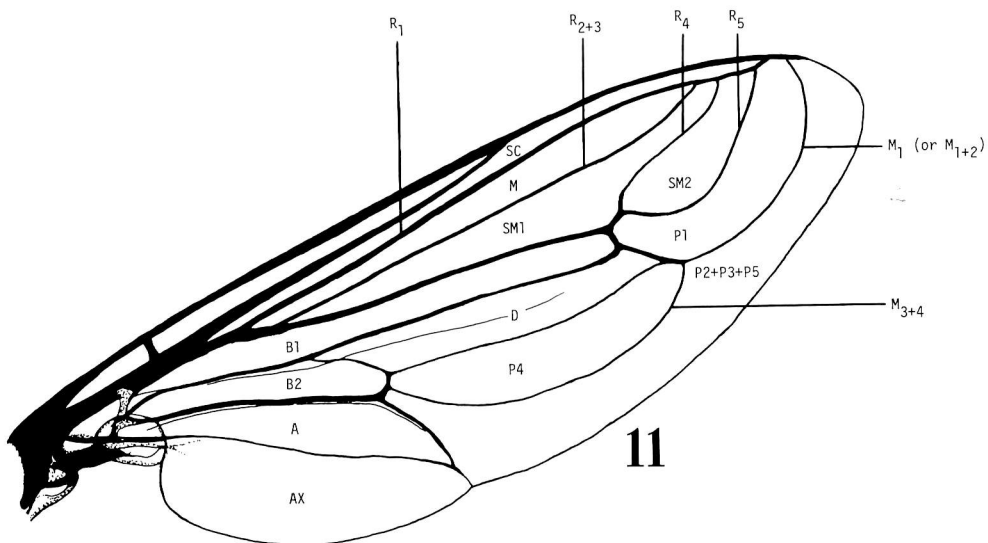
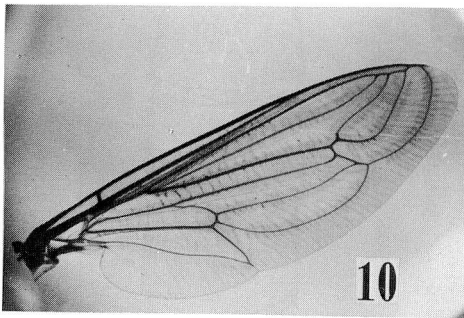
Figs. 6-9. Thorax of *Nemomydas gruenbergi*, male. 6, Mesonotum and scutellum, dorsal view ; 7, humeral callus, posterodorsal view ; 8, scutellum, posterodorsal view ; 9, thorax (with coxae and anterior part of abdomen), lateral view.

structure of proboscis and palpus, see NAGATOMI and SOROIDA (in prep.).

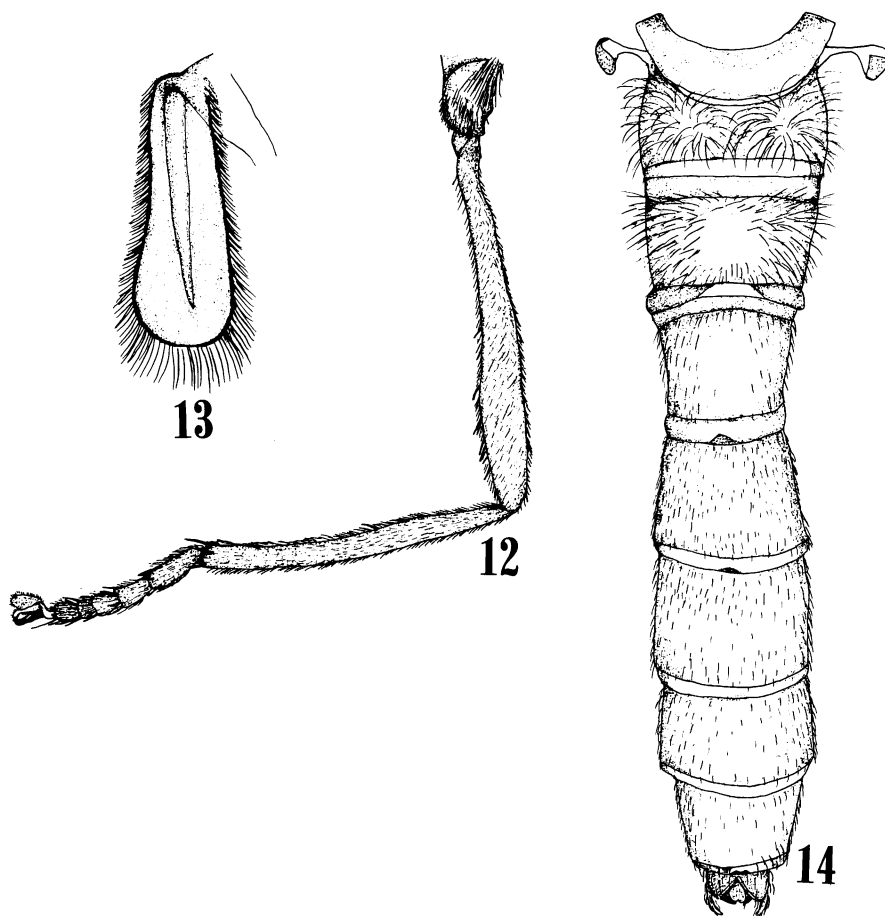
Thorax (Figs. 6-9): posterior part of humeral callus makes a precipitous cliff which is bare (Fig. 7); posterolateral part of scutellum projecting outward and shining (Fig. 8).

Wing (Figs. 10-11): costa ending far before apex of wing; veins R_{2+3} , R_4 and R_5 ending on vein R_1 ; vein M_1 ending on costa (before apex of wing); vein M_2 absent or fused with vein M_1 ; veins M_3 and M_4 united with each other and not reaching to wing margin; a short incomplete vein very often present near base of vein R_4 ; 1st basal cell conspicuously long; basal section of R_5 very short; there are three posterior cells, that is, P1, P2 + P3 + P5, and P4 (see Fig. 11).

Legs (Figs. 12-13): empodium entirely absent; pulvillus with one dorsomedian



Figs. 10-11. Wing of *Nemomydas gruenbergi*, male. A, Anal cell; Ax, axillary; B1 and B2, 1st or 2nd basal cell; D, discal cell; M, marginal cell; P1 and P4, 1st or 4th posterior cell; P2+P3+P5, a united cell composed of 2nd, 3rd, and 5th posterior cells; SC, subcostal cell; SM1 and SM2, 1st or 2nd submarginal cell.



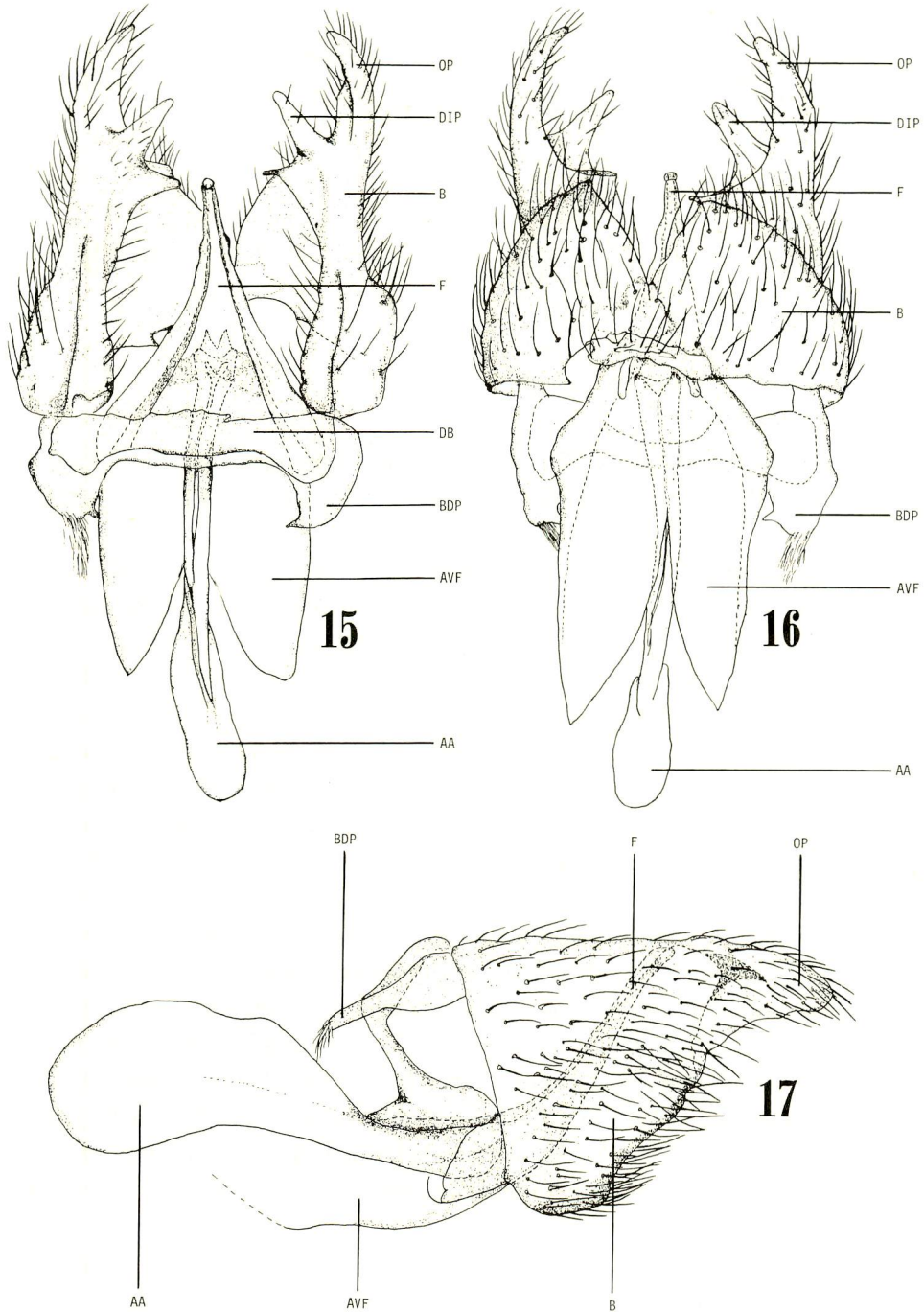
Figs. 12-14. Hind leg and abdomen of *Nemomydas gruenbergi*, male. 12, Hind leg, anterior view; 13, pulvillus, dorsal view; 14, abdomen (with postscutellum and halteres), dorsal view.

sclerotized line (Fig. 13).

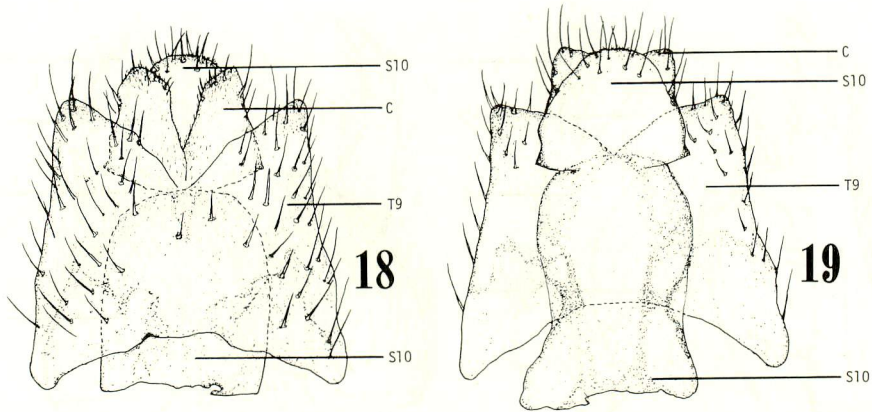
Abdomen (Fig. 14): posterior border of tergum 2 with a pair of elliptic (wider than long), flat, shining black sensory areas, that is, bullae which vary in size with individual.

Genitalia of *Nemomydas gruenbergi*

Male genitalia (Figs. 15-19). The structure of the male genitalia was described and illustrated by HARDY (1944, 1950), KARL (1959), BEQUAERT (1961a), WILCOX and PAPAVERO (1971), PAPAVERO and WILCOX (1974), WILCOX (in MCALPINE et al., 1981), etc. on several genera of Mydidae. The basistyle, the midposterior structure between basistyles (=the so-called aedeagus) especially its posterior part, tergum 9 and cerci vary



Figs. 15-17. Male genitalia of *Nemomydas gruenbergi*; hypopygium, dorsal, ventral and lateral views. AA, Anterior bar of aedeagus; AVF, anteroventral projection of "funnel-like structure"; B, basistyle; BDP, basistylar dorsomesal anterior process (=gonocoxal apodeme); DB, dorsal bridge; DIP, dorsoinner process in basistyle; F, "funnel-like structure" (=the so-called aedeagus); OP, outer process in basistyle.



Figs. 18-19. Male genitalia of *Nemomydas gruenbergi*; tergum 9, sternum 10 and cerci, dorsal and ventral views. C, Cercus; S10, sternum 10; T9, tergum 9.

considerably in shape with genus. The presence or absence of dististyle and of sternum 9 also varies with genus. A more detailed study is much needed on the structure of male genitalia in various genera and species from the taxonomic point of view.

The terminology adopted in this paper follows that in NAGATOMI (1984) on the lower Brachycera.

The male genitalia of the genus *Nemomydas* may be characterized as follows [based on *Nemomydas gruenbergi* and the literature (HARDY, 1950, and WILCOX and PAPAVERO, 1971)]: Dististyle absent, unless the dorsoinner process of basistyle is homologous with dististyle; basistyle bifurcate at apical portion; sternum 9 absent or fused with basistyle and the area corresponding to sternum 9 (=midventral part of hypopygium) deeply cleft at middle of posterior margin. There is a funnel-like structure between basistyles. It seems to be not true aedeagus but to correspond to "half-opened umbrella" or "trumpet" in Vermileonidae (*Vermileo* and *Lampromyia*) mentioned by NAGATOMI (1984). This structure has the dorsal surface strongly concave and its posterior end is simple, forming a tube. The anterior bar of the aedeagus is long and flattened laterally at least in *gruenbergi*; the posterior part of the aedeagus (=true aedeagus) is short (if present). "The tergum 9 has a V-shaped concavity on its hind margin which extends one-third to three fourths the length of the segment" (after HARDY, 1950).

For a distinction between the male genitalia of *Nemomydas* and *Pseudonomoneura*, see HARDY (1950).

The dorsoinner process of the basistyle varies in size and shape with species (see HARDY, 1950).

The following is a description of the male genitalia of *gruenbergi*, although it is difficult now to point out the specific characters.

Basistyle rather triangular in shape from a lateral view, bifurcate at apical portion and its dorsoinner process shorter and narrower than the outer; there is another

process directed mesially and transversely at the base of dorsoinner process; in basistyle, dorsobasal part narrower than ventrobasal part; basistyle covered with strong hairs.

Pair of basistylar dorsomesal anterior processes (=gonocoxal apodeme) is wide, short, may have an anteroinner short projection, and has a clump of pile at anterior end; dorsal bridge band-like and situated between the processes above.

The ventral part of funnel-like structure (between basistyles) produced anteriorly (toward base of abdomen), forming a roof, and deeply cleft at middle of anterior margin.

Anterior bar of aedeagus long, flattened laterally, wider anteriorly and rounded at anterior margin.

Tergum 9 rather trapezoid, with anterior margin gently, and posterior margin more deeply concave; hairs on tergum 9 sparse in middle.

Pair of cerci appears to be connected at anterior part, and each cercus longer than wide, narrower posteriorly and rounded at posterior margin.

Sternum 10 desclerotized at lateral and posterior parts, longer than wide, longer but narrower than tergum 9, rounded at posterior margin, and with hairs at posterior part.

Female genitalia (Figs. 20-23). According to WILCOX and PAPAVERO (1971), "The female terminalia [of Mydidae] are of three forms as outlined below." A, "Tergite 9 with a terminal circlet of strong spines"; B, "Tergite 9 with hairs only" and "Tergite 9 narrower at the apex than at the base, with short hairs directed posteriorly"; C, "Tergite 9 with hairs only" and "Tergite 9 wider at the apex than at the base, fluted, with quite long, dense erect or retrorse hairs."

Nemomydas belongs to "A" mentioned above.

HARDY (1950) say, "The eighth segment of the female is about one and one-half times broader than the ninth, including the spines (figure 7d)" [in *Nemomydas*], while "The eighth segment of the female is about equal in width to the ninth, including the spines (figure 2b)" [in *Nomoneura* (=correctly *Pseudonomoneura*)].

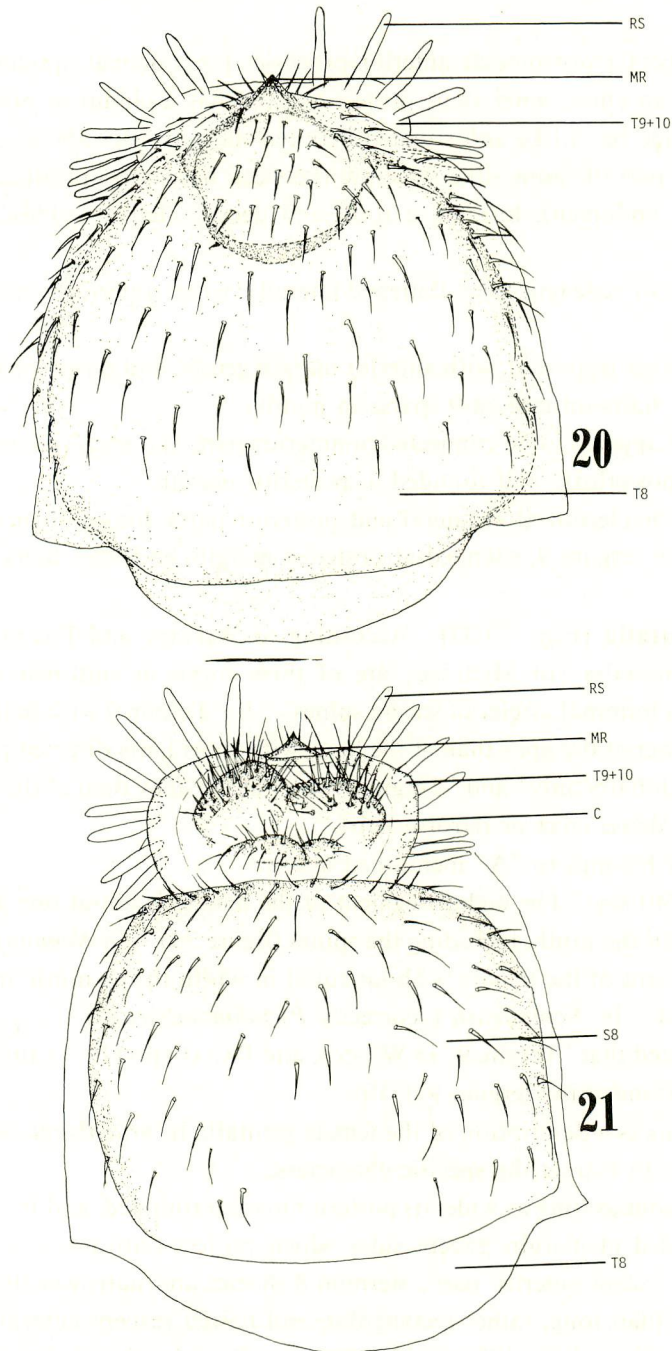
It is interpreted that "Tergite 9" in WILCOX and PAPAVERO (1971) and "the ninth" in HARDY (1950) mean the tergum 9 + 10.

The following is a description of the female genitalia in *gruenbergi*, although it is not possible now to extract the specific characters.

Tergum 8 about as long as wide, its posterior margin rounded, and its anterior part edged and rounded at margin, except sides which project outward to some degree; tergum 8 haired, except anterior part; sternum 8 shorter and narrower than tergum 8, somewhat wider than long, rather rectangular, and haired (except anterior border).

Tergum 9 + 10 is about 1/2 as wide as tergum 8, wider than long, elliptic, with 7-10 rod-like spines along lateral and posterior margin in each half, and its anterior part raises vertically, has strong hairs at posterior surface and has a midposterior line forming ridge.

Pair of cerci raises vertically, rather elliptic in horizontal outline, and has strong



Figs. 20-21. Apex of female abdomen in *Nemomydas gruenbergi*, dorsal and ventral views. C, Cercus; MR, midposterior ridge in anterior part of tergum 9 + 10; RS, rod-like spine; T8, tergum 8; T9 + 10, tergum 9 + 10; S8, sternum 8.

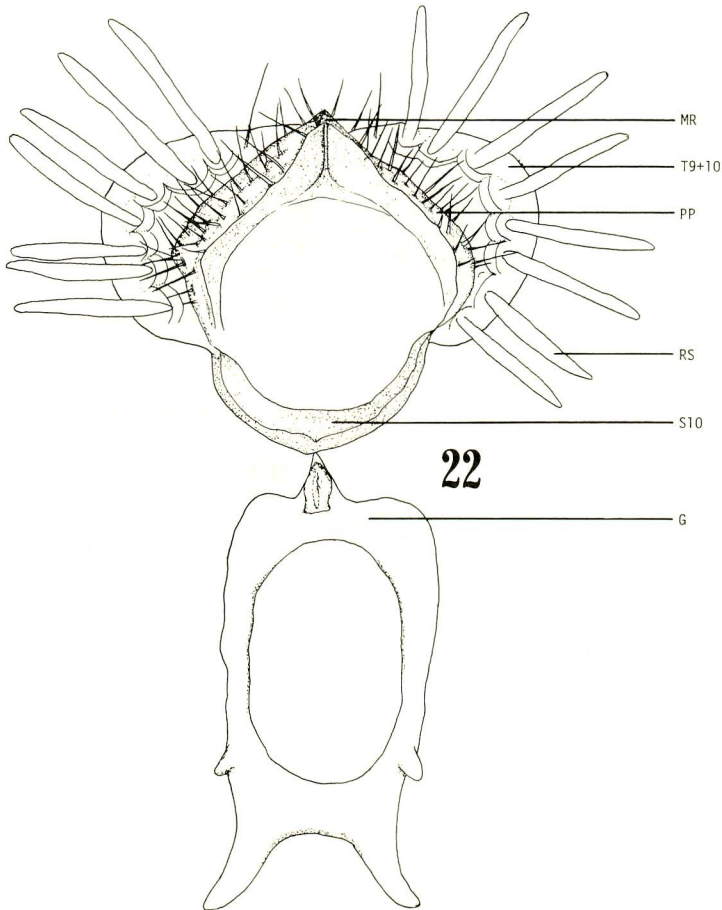


Fig. 22. Female genitalia of *Nemomydas gruenbergi*, dorsal view. G, Genital fork ; MR, midposterior ridge in anterior part of tergum 9 + 10 ; PP, posterior surface in raised part of tergum 9 + 10 ; RS, rod-like spine ; S10, sternum 10 ; T9 + 10, tergum 9 + 10.

hairs.

Sternum 10 membranous, except strongly sclerotized anterior border which is rounded.

Sternum 9 is absent or possibly fused with sternum 10.

Genital fork longer than wide, rectangular, with a long and a short processes at and near anterior border in each half, and with a large hole in middle.

Nemomydas CURRAN

Nemomydas CURRAN, 1934, Families and genera of North American Diptera. p. 165.

Type-species: *Leptomydas pantherinus* GERSTAECKER, 1868 from N. America (California) by original designation.

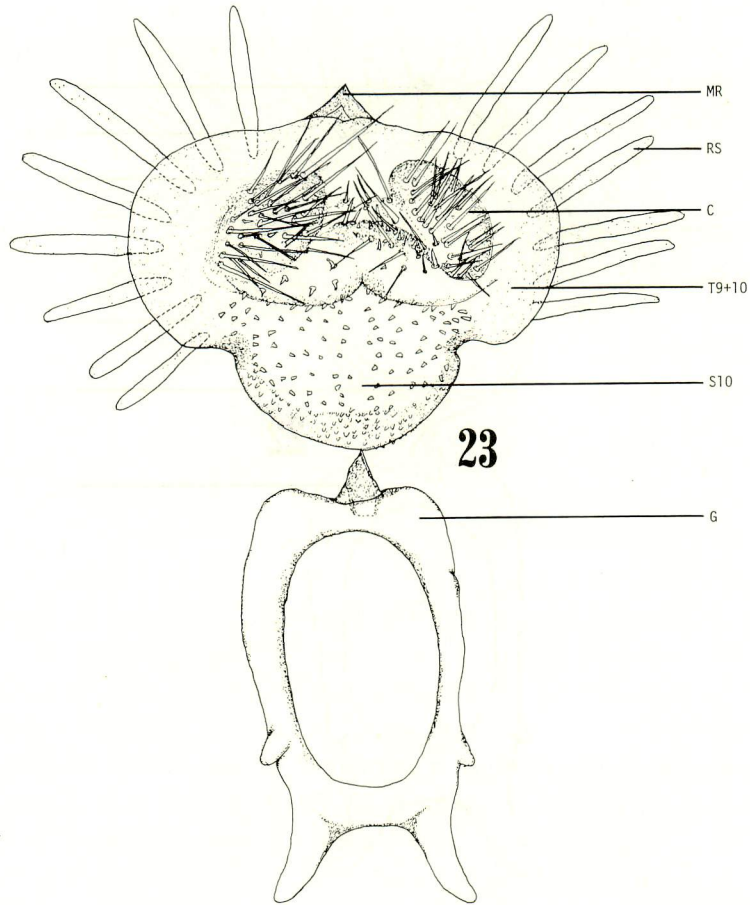


Fig. 23. Female genitalia of *Nemomydas gruenbergi*, ventral view. C, Cercus; G, genital fork; MR, midposterior ridge in anterior part of tergum 9+10; RS, rod-like spine; S10, sternum 10; T9+10, tergum 9+10.

According to PAPAVERO and WILCOX (1974), *Nemomydas* belongs to the subfamily Leptomydinae which contains 4 other genera: *Eremomydas* SEMENOV-TIAN-SHANSKI, 1896; *Leptomydas* GERSTAECKER, 1868; *Plyomydas* WILCOX and PAPAVERO, 1971; *Pseudonomoneura* BEQUAERT, 1961. For diagnosis of Leptomydinae see PAPAVERO and WILCOX (1974) and for those of *Nemomydas*, *Plyomydas* and *Pseudonomoneura* see WILCOX and PAPAVERO (1971).

CURRAN (1934: 165) states, "*Leptomydas* GERSTAECKER is not known from North America. This genus is distinguished by the hairy pleura, both the above genera [= *Nemomydas* and *Pseudonomoneura*] having pile only on the pteropleura and supraspiracular convexities."

In *Leptomydas lusitanicus*, the type-species of *Leptomydas*, the midposterior structure between basistyles (=the so-called aedeaus) is trilobed at posterior tip (see Fig.

7 in BEQUAERT, 1961a).

BEQUAERT (1961b) described or redescribed *Leptomydas lusitanicus* (♂, ♀) from Spain, *L. sardous* (♂, ♀) from Sardinia, *L. corsicanus* (♂, ♀) from Corsica, and *Eremomydas arabicus* (♀) from Arabia but did not mention their generic characters fully.

Unfortunately, we have not seen any specimens of *Leptomydas* and *Eremomydas* (whose type-species is *E. emir* SEMENOV-TIAN-SHANSKI, 1896 from "Transcaspia") and cannot compare them with *Nemomydas*.

The following diagnosis of *Nemomydas* is learned from WILCOX and PAPAVERO (1971) and WILCOX (in MCALPINE et al., 1981).

Antennal flagellum usually longer than segment 3; proboscis 0.5 to 3.0 times as long as concave part of clypeus, with comparatively small apical labella; palpus one-segmented, short and inconspicuous.

Metapleuron pilose just above posterior spiracle.

Vein R_5 ending on vein R_1 ; discal cell with 2 terminal veins, of which the posterior one is united with the vein arising from 2nd basal cell and has no independent line reaching to wing margin; anal cell closed.

Hind trochanter without stout spines; hind femur rather slender, 6-10 times as long as wide; hind tibia cylindrical, with apical bristles and without apical keel; hind basitarsus about 3 times as long as wide and subequal in length to tarsomeres 2 and 3.

In male, area corresponding to sternum 9 deeply cleft at middle of posterior margin; basistyle bifurcate at apical portion, and midposterior structure between basistyles (=the so-called aedeagus) simple and forming a tube at posterior end.

Apex of female abdomen with circlet of spines.

***Nemomydas gruenbergi* (HERMANN), comb. n.** (Figs. 1-23)
(Japanese name: Mushihiiki-abu-modoki)

Leptomydas gruenbergi HERMANN, 1914, Ent. Mitt. 3: 34. Type-locality: Chipun, Pilam, Taikorin, Kankau, or Fuhosho, Formosa.

SHIRAKI (in UCHIDA et al., 1923: 144) described and illustrated this species from southern Formosa. It appears that the specimen represented by him is not ♂ but ♀.

It is necessary to compare this species with "*Leptomydas*" *indianus* BRUNETTI, 1912 from Assam.

Male. Head (Figs. 1-5): dark brown to black; front (except sides), midupper face (including swollen part of clypeus), area below proboscis, shining; head (except shining part) pale (or yellow) gray pollinose and antenna and palpus more or less so; hairs on head pale yellow (or pale brown); middle portion of front (from vertex to antenna), area just below antennae, concave part of clypeus, side of face, antenna except segments 1 and 2, and proboscis except ventral theca, bare (labella with minute pile); hairs on front consist of 3 pairs of clusters, of which midlateral ones are recumbent; hairs on upper swollen part of clypeus consist of a pair of clusters; width

of front at widest point (at or just above antennae) 1.4–1.6 times width of one eye at broadest point, 1.3–1.5 times space between uppermost corners of eyes and 1.6–1.7 times space between lowermost corners of eyes; distance from antenna to vertex 0.6–0.7 times width of front at widest point, 0.9–1.0 times width of one eye at widest point and 0.6–0.7 times distance from antenna to ventral base of proboscis; length of concave part of clypeus (from apex to below proboscis) 1.6–1.9 times its width and 0.7–0.8 times distance from antenna to ventral base of proboscis; width of concave part of clypeus 1.3–1.6 times width of parafacials at uppermost part; swollen part of clypeus 0.3–0.4 times as long as concave part of clypeus and 2.4–3.3 times as long as midupper face (=face minus clypeus); antenna 2.3–2.7 times as long as distance from antenna to vertex; proboscis (from ventral base to apex) 1.4–1.7 times as long as concave part of clypeus; relative lengths of antennal segments 1, 2, 3 and flagellum 18(16–20): 7(5–10): 100: 111(98–126) and their relative widths 14(13–15): 13(11–14): 11(9–14): 30(28–33); in antennal segment 3, relative lengths of joints 1 and 2, 100: 52(45–57); in flagellum, relative lengths of joints 1 and 2, 100: 279(262–300); structural characters are based on 9 specimens.

Thorax (Figs. 6-9): dark brown to black and pale gray pollinose; meso- (except upper- and anterolower parts), sterno-, anteroupper part of pteropleura, and scutellum (except anterior border) shining; pollen is indistinct on 3 broad darker stripes on mesonotum; of the 3 darker stripes, the lateral ones extend from just behind humeral calli to posterior calli and the median one broadens opposite humeri, tapers posteriorly, and nearly reaches (or often reaches) to scutellum (in better preserved specimens, the median stripe has a pollinose midlongitudinal part which is further divided by a thin dark mid line); pro-, ptero- (before meta-), metapleura (just above posterior spiracle), area between mid coxae, area before hind coxae with pale, erect, and longer hairs; mesonotum with pale hairs which are absent on area above base of wing and largely so on darker stripes and which sometimes change into black on a pair of inner pollinose stripes; halter dark brown.

Wing (Figs. 10-11): membrane nearly transparent or faintly tinged with brown; veins and borders along veins brown to dark brown.

Legs (Figs. 12-13): dark brown to black; coxa largely shining; coxa and femur with pale hairs which are intermixed with shorter black ones on the latter; apicoventral part of hind femur with several brown to black spines (whose number varies considerably with individual); relative lengths of segments (excluding coxa and trochanter) of fore leg 85(81-88): 100: 9(8-10): 8(8-9): 6(5-7): 5(4-6): 14(13-14), of mid leg 100(97-104): 107(104-109): 11(10-12): 10(8-11): 7(6-8): 6(5-6): 14(14-16), of hind leg 157(153-161): 144(139-147): 27(25-29): 16(14-17): 9(8-10): 7(6-7): 16(14-17) and in hind leg viewed from the side relative widths of femur, tibia, and tarsal segments 1-3, 19(17-21): 12(9-13): 8(7-9): 7(6-8): 7(6-8) (femur 0.11-0.14, tibia 0.07-0.09, tarsal segment 1, 0.25-0.33, segment 2, 0.42-0.50, segment 3, 0.64-1.0 times as wide as long) (N=10).

Abdomen (Fig. 14): dark brown to black and shining; terga 1-7 and sterna 2-7

with pale yellow (or pale brown) posterior margins; tergum 1, tergum 2 except middle, sides of tergum 3, posterior parts of terga 4-7 (often almost whole surface of tergum 7), sterna 2-3, genitalia, and often posterior part of sternum 7 with pale yellow (or pale brown) pile which is longer and erect on terga 1-2 and sterna 2-3 and which is often intermixed with black pile in basistyle; hairs otherwise black, and those on sterna 3-7 erect and longer than in terga 3-7.

Length: body 13.2-18.8 mm; wing 9.8-13.4 mm; fore tibia 2.5-3.4 mm.

Female. Similar to male except as follows: Head: upper swollen part of clypeus yellowish (or reddish) brown or largely so; structural characters almost fit the description of ♂, but in 3 specimens measured, width of front at widest point 1.8-1.9 times (in ♂, 1.4-1.6 times) width of one eye at widest point and swollen part of clypeus 2.2-2.4 times (in ♂, 2.4-3.3 times) as long as midupper face; no significant difference was found in relative lengths and widths of antennal segments between both sexes.

Thorax: humeral and posterior calli, posteroupper part of sterno-, posterior part of meso-, pteropleura (except lower part), etc. yellowish (or reddish) brown; hairs on thorax shorter than in male.

Wing: as in male.

Legs: with the following parts paler or brown rather than dark brown: in fore and mid femora, posterior- (except apical portion) and ventral surfaces; and hind femur and tibia (except apical portions); relative lengths of segments of fore leg 85(84-86): 100: 11(10-14): 9(9-10): 7(6-8): 5(5-6): 14(13-15), of mid leg 103(103-104): 111(110-114): 13(11-15): 10(10-11): 8(8-9): 6(5-6): 14(14-15), of hind leg 163(162-164): 146(143-147): 29(26-31): 17(16-18): 10(10): 7(7-8): 16(15-16) and in hind leg viewed from the side relative widths of femur, tibia, and tarsal segments 1-3, 18(18-19): 13(11-13): 9(8-10): 7(6-7): 7(6-7) (femur 0.11-0.12, tibia 0.08-0.09, tarsal segment 1, 0.30-0.33, segment 2, 0.36-0.47, segment 3, 0.63-0.75 times as wide as long) (N=4).

Abdomen: anterolateral part of tergum 1 (=area just behind halter) and sternum 1 (=possibly anterior part of sternum 2) pale yellow (or pale brown); hairs shorter than in male and those on terga 3-6 and sterna 3-6 short and inconspicuous.

Length: body 18.6-21.3 mm; wing 14.6-15.9 mm; fore tibia 3.4-3.8 mm; (N=2).

Distribution: Yaeyama Islands of Japan (new record) and Formosa.

Specimens examined (18 ♂♂, 4 ♀♀): *Iriomote-jima*: 1 ♂, Haegishi, 4. viii. 1961, S. UEDA; 1 ♂, Hayemi, 15. viii. 1968, S. AZUMA; 1 ♂, Hayemi, 15. viii. 1968, M. KINZYO, 1 ♂, Sonai, 20. viii. 1971, T. TERUYA; 4 ♂♂, 1 ♀, Toyohara, 20. v. 1981, A. NAGATOMI; 1 ♀, Toyohara, 30. vii. 1983, A. NAGATOMI. *Ishigaki-jima*: 1 ♂, Yonehara, 9. viii. 1978, A. NAGATOMI; 3 ♂♂, 1 ♀, Yonehara, 18. vii. 1980, A. NAGATOMI; 6 ♂♂, 1 ♀, Yonehara, 23. vii. 1980, A. NAGATOMI.

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