

Redescription of *Goneccalypsis lucida* (Diptera, Asilidae)*

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Abstract

Goneccalypsis lucida, belonging to the tribe Atomosini, is redescribed and illustrated. This species, known from Formosa, is newly recorded from Iriomote I. of Japan. One of the aims of this paper is to show the male genitalia of this species.

Key words: Taxonomy, Robber fly, Atomosini, Male genitalia, Formosa, Yaeyama Is.

Introduction

Goneccalypsis lucida HERMANN, 1912, known from Formosa, is redescribed and illustrated, based on the material from Iriomote I. (Yaeyama Is.) of Japan.

Goneccalypsis contains 3 species distributed in southern Africa (2 species), and Formosa and Iriomote I. of Japan (1 species). This genus is closely related to *Loewinella* which contains 9 species known from the Afrotropical (6 species), Oriental (Pakistan; 1 species) and Palaearctic (Russia and central Asia; 2 species) regions (after LONDT, 1982). It is still very necessary to detect sound distinguishing characters between these two genera, and it may be found in the structure of male genitalia. One of the aims of this paper is to show the male genitalia of *G. lucida*.

Tribe Atomosini

Goneccalypsis belongs to the tribe Atomosini. OLDROYD (1970 : 257) wrote, "Atomosini are divided into a very large number of genera, most of which are confined to South America. HERMANN (1912) established most of them. These genera are justified

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by the number of structural variations that occur, especially in the head and antennae, but it is doubtful how far these differences are of generic value. The tribe is generally placed in the subfamily Laphriinae, but a much fuller study is needed to establish its true relationships. (cf. KARL, 1959).” THEODOR (1976 : 32) concluded that ”Examination of the genitalia, however, shows that they [=Atomosiini] are typical for Laphriinae.”

OLDROYD (1974 : 130) wrote, “Atomosiini are small, compact, usually metallic Asilidae, which look like sawflies, or like small solitary bees (fig. 122). Diagnostic features are the alignment of the veins at the apex of the discal cell into a cross, or something near this, and also (according to HULL 1962 : 369) the sclerotization of the postmetacoxal area, i. e. the recess behind the rear coxae, which is membranous in most Asilidae. The latter structure is difficult to observe, and Atomosiini are best recognized by the sawfly-like appearance combined with the crossed veins of the wing. The few other genera that have this alignment of veins are distinctive: e.g. *Orthogonis* (Oriental and Madagascar) is very much bigger, and *Anypodetus* has no pulvilli.”

LONDT (1982 : 221–222) added the following two tribe features among the Afrotropical asilid fauna, “short, usually black, bristles on the metanotal callosities; a pair of tiny forwardly directed bristles on the anterior margin of the mesonotum which may prove to be a characteristic common only to *Goneccalypsis* and *Loewinella*.” However, the latter feature appear to be absent in *Goneccalypsis lucida*.

Atomosiini may easily be separated from other tribes or subfamilies by having the following set of characteristics (after OLDROYD, 1974 : 10–11) : “Marginal cell of wing closed by the union of veins R_1 and R_{2+3} , which continue as a single vein, forming a short stalk, Antennae blunt, third segment club-shaped, with only a tiny apical style. If antennae are broken, look for one or more bristles on posterior margin of mesopleuron, just in front of wing-base and a robust, blunt-ended abdomen, often bare and shining, perhaps punctate, Small flies resembling sawflies. Vein M_3 straight, and parallel with outer margin of discal cell, often in line with it.”

HULL (1962) tried to prepare a key to genera of Atomosiini of the world.

Genus *Goneccalypsis* HERMANN

Goneccalypsis HERMANN, 1912, Nova Acta Leop.–Carol. Akad. Naturf. 96 : 108. Type species: *Atomosia argenteoviridis* HERMANN (from South Africa), by original designation.

Goneccalypsis is very similar to *Loewinella* HERMANN, 1912 (Nova Acta Leop.–Carol. Akad. Naturf. 96 : 104; type species: *Atomosia virescens* LOEW, 1871 [from Russia], by original designation). LONDT (1982 : 223) wrote, “Ratio of width of one eye (in anterior view): width of face >1.5 (Fig. 4); mesonotum punctate; mystax of both sexes lacking dorsoventrally flattened, ‘scale-like’ bristles” (in *Loewinella*) and “Ratio of width of one

eye: width of face < 1.5 (Fig. 6); mesonotum shiny with at most a few shallow punctations; mystax of males with dorsoventrally flattened, shiny bristles" (in *Goneccalypsis*). In *Goneccalypsis lucida*, width of one eye is over 1.5 times width of face. *Goneccalypsis* will become a synonym of *Loewinella*, unless a more sound generic character is found.

LONDT (1982) reviewed 2 species of *Goneccalypsis* from the Afrotropical (= Ethiopian) region and 9 species of *Loewinella* from the entire world.

***Goneccalypsis lucida* HERMANN**

(Figs. 1–13)

(Japanese name: Hachigata-ko-mushihiki)

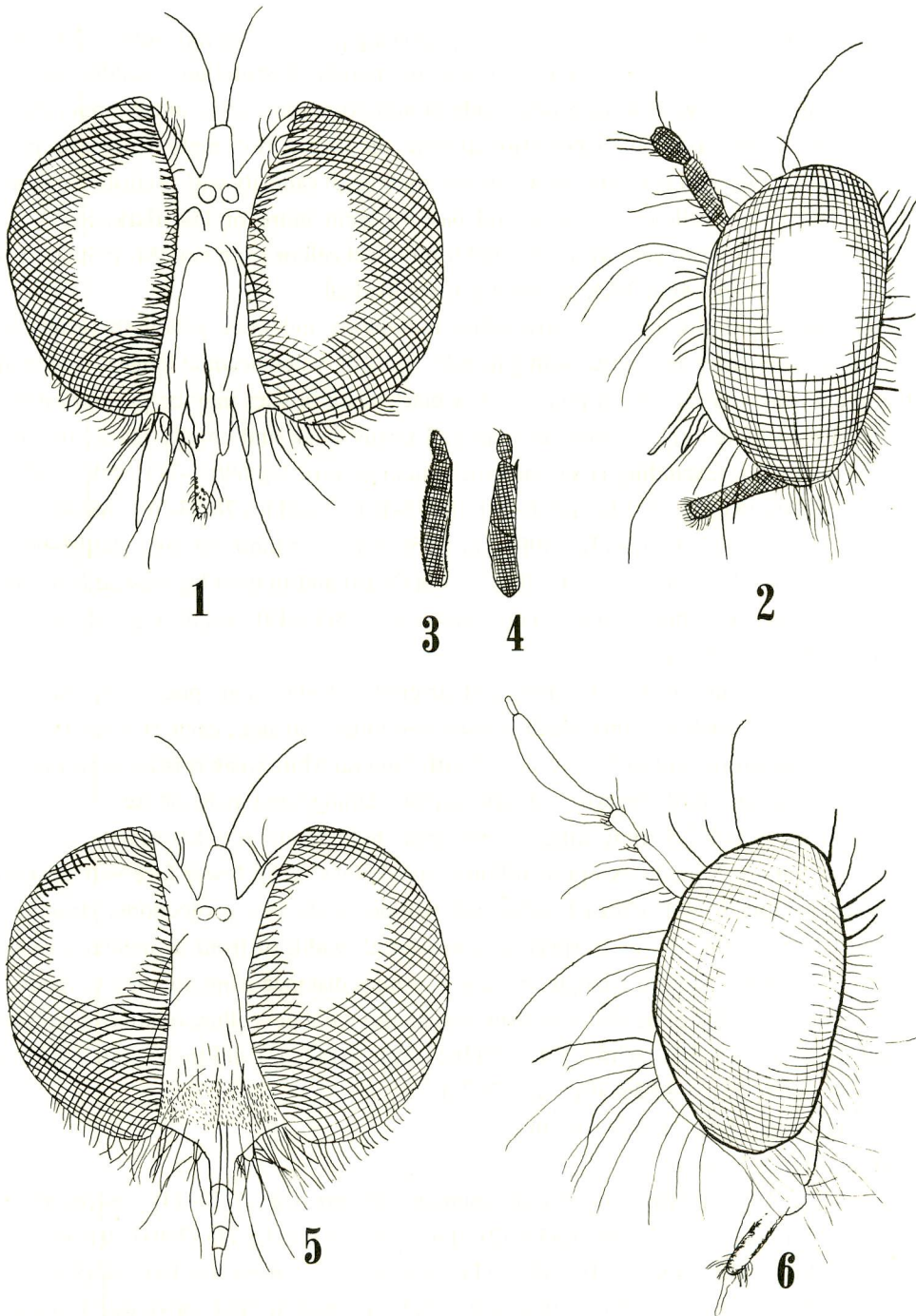
Goneccalypsis lucida HERMANN, 1912, Nova Acta Leop.-Carol. Akad. Naturf. 96 : 110.

Type locality: Formosa.

This species is a unique representative of Atomosiini throughout Formosa and Japan.

Male. Head (Fig. 1–4): black, and pale (or white) gray tomentose; ocellar tubercle and area just behind it, and proboscis shining; antennal segments 1–2 and side of front with black hairs; antennal segment 3 with a short black dorsoapical spur; occiput (except area behind a row of bristles), cheek, and proboscis (at base and apex) with pale (or white) pile which is shorter on upper occiput and apex of proboscis; ocellar triangle with 2–4 (usually 2) and upper face with 4–7 (or so) weak black bristles which may be intermixed with shorter black or pale hairs; lower face and area alongside clypeus with white weak bristles, and the former with several white scale-like projections, forming mystax; upper occiput with a row of shorter, stout, black bristles which are distant from eye margin; width of one eye on a mid line from a direct facial view 0.6 times length (=height) of eye, 1.9–2.2 times width of face at antenna, and 3.4–4.6 times distance from antenna to median ocellus; width of front at median ocellus 1.1–1.4 times width of face at lowest portion from a direct frontal view, 3.3–4.6 times width of ocellar triangle, and 2.2–3.0 times distance from antenna to median ocellus; width of ocellar triangle 0.7–1.0 times its length; distance from antenna to median ocellus 0.2 times that from antenna to lower margin of eye, which is 1.2–1.4 times length of face (minus clypeus); antenna 0.8 times length (=height) of eye and 5.2–6.1 times distance from antenna to median ocellus; when measured along midouter surface, relative lengths of antennal segments 1–4, 100 : 72(67–75) : 165(142–180) : 51(42–60) and their relative widths 34(29–40) : 43(41–50) : 43(41–45) : 24(20–27); structural characters are based on 10 specimens.

Thorax: mesonotum and scutellum blue black and shining; pleura black, and white tomentose, but posterolower part of meso-, posterior part of sterno- (each part excludes patch just before pteropleura) and upper part of hypopleura shining, as well as anteprenotum; mesonotum and anterior part of scutellum with pale pile (some of which become longer and black on the former), but in mesonotum, anterior border and 3 broad



Figs. 1-6. *Goneccalypsis lucida*. 1-4, Male; 5-6, female; 1 & 5, anterior view; 2 & 6, lateral view; 3 & 4, antennal segments 3-4, outer and inner views.

stripes bare; weak black bristles present in the following parts: 1–2 before suture, 1 behind suture, 1 on posterior callus and 4–6 on posterior margin of scutellum; middle part of anteprenotum with a row of stout bristles; side of anteprenotum, pro-, anteroupper parts of meso- and sterno-, area below posterior spiracle, anterior part of metapleura with pale pile, and the last one also with long pale bristles; metanotal callosity with a cluster of stout black bristles; halter yellowish brown, and base of stem more or less darkened.

Wing: brown fumose; vein M_2 originated from discal cell or from vein M_3 (which runs vertically and ends on vein M_4), according to individual.

Legs: black and shining, but coxa white tomentose and knee yellowish brown to brown; coxa, trochanter and femur with pale pile, some of which become longer, erect and bristle-like on the ventral part of femur (a few black weak bristles may be present on the dorsoapical part of femur); bristles on tibia and tarsus weak and chiefly black; relative lengths of segments (excluding coxa and trochanter) of fore leg 69(67–71) : 80(77–83) : 25(22–26) : 17(16–18) : 13(12–14) : 11(10–11) : 16(15–16), of mid leg 76(73–78) : 88(86–90) : 24(23–26) : 16(15–17) : 12(12–13) : 10(9–11) : 15(14–16), of hind leg 100 : 94(91–96) : 36(34–38) : 19(18–21) : 14(13–15) : 11(10–12) : 16(14–16) and in hind leg viewed from the side, relative widths of femur, tibia, and tarsomeres 1–3, 18(17–19) : 16(16–17) : 12(12–13) : 11(10–11) : 8(8–9); (N=10).

Abdomen: dorsum black and shining and covered with short pale pile (except narrow posterior margin of each tergum) which is erect and longer on side; each of terga 1–2 (or 1–3) with several lateral and each of terga 3–7 with 1 lateral white weak bristle; venter more or less membranous, dark brown to black, partly shining, and pale pilose.

Length: body 6.4–7.8 mm; wing 5.1–6.0 mm; hind femur 0.8–1.0 mm.

Female. Similar to male except as follows: Head (Figs. 5–6): lower face with several weak black (or black and white) bristles and without scale-like projections; structural characters almost as in ♂; in 10 specimens measured, width of front at median ocellus 3.7–5.0 times width of ocellar triangle and 2.4–3.3 times distance from antenna to median ocellus; antenna 5.1–6.7 times distance from antenna to median ocellus; relative lengths of antennal segments 1–4, 100 : 67(57–73) : 169(162–182) : 51(42–62) and their relative widths 34(27–38) : 40(33–45) : 42(36–46) : 22(17–27).

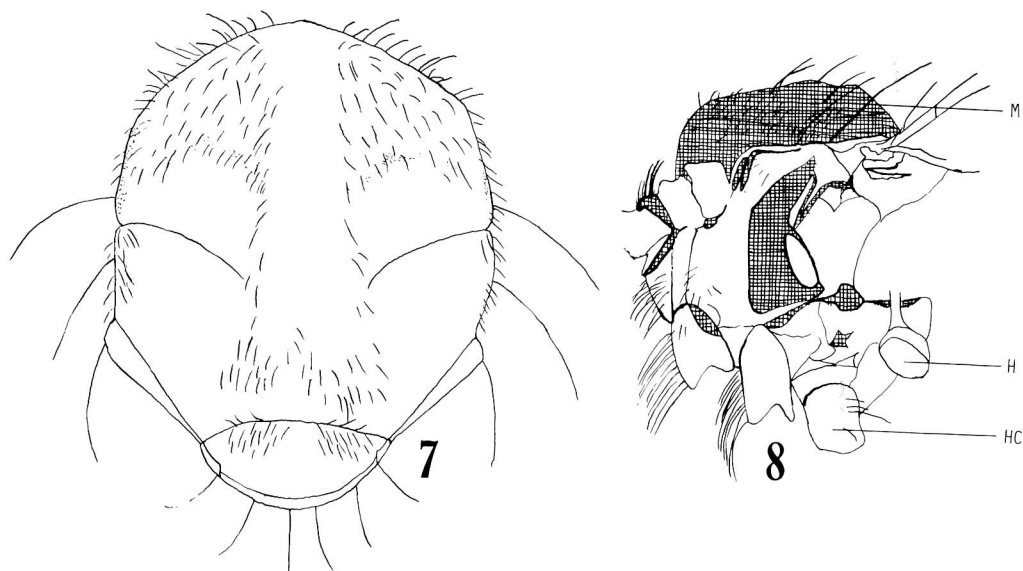
Thorax (Figs. 7–8, 11–13) : as in ♂.

Wing (Fig. 9) : as in ♂.

Legs (Fig. 10) : relative lengths of segments of fore leg 72(70–74) : 84(81–85) : 25(23–26) : 17(15–19) : 13(12–13) : 11(10–12) : 15(15–16), of mid leg 80(77–84) : 91(90–95) : 25(23–27) : 16(15–18) : 13(12–14) : 10(9–11) : 16(15–16), of hind leg 100 : 93(90–95) : 34(33–35) : 19(18–21) : 14(13–14) : 10(10–12) : 15(15–16) and in hind leg viewed from the side, relative widths of femur, tibia, and tarsomeres 1–3, 18(17–20) : 16(15–17) : 12(11–13) : 11(10–13) : 8(7–9); (N=10).

Abdomen (Figs. 12–13) : as in ♂.

Length: body, 6.9–8.5 mm; wing 5.5–6.5 mm; hind femur 0.9–1.0 mm.



Figs. 7-8. *Goneccalypsis lucida*, female. 7, Mesonotum and scutellum, dorsal view; 8, mesonotum, pleuron, and coxae (metapleuron is omitted) (showing shining black parts), lateral view; H, halter; HC, hind coxa; M, mesonotum.

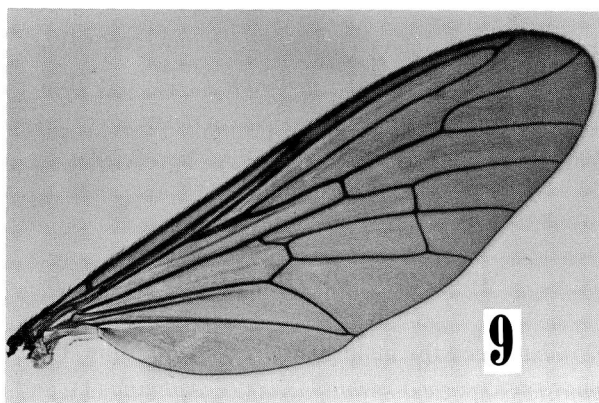
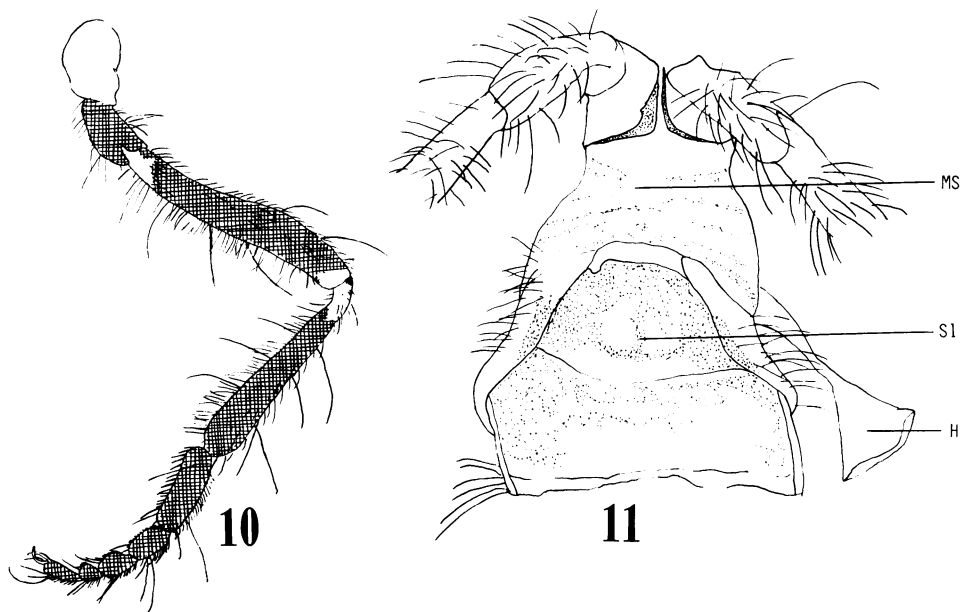


Fig. 9. *Goneccalypsis lucida*, female. Wing.



Figs. 10–11. *Goneccalypsis lucida*, female. 10, Hind leg, anterior view; 11, base of hind leg, metasternum, halter, and abdominal sternum 1, ventral view; H, halter; MS, thoracic metasternum; S1, abdominal sternum 1.

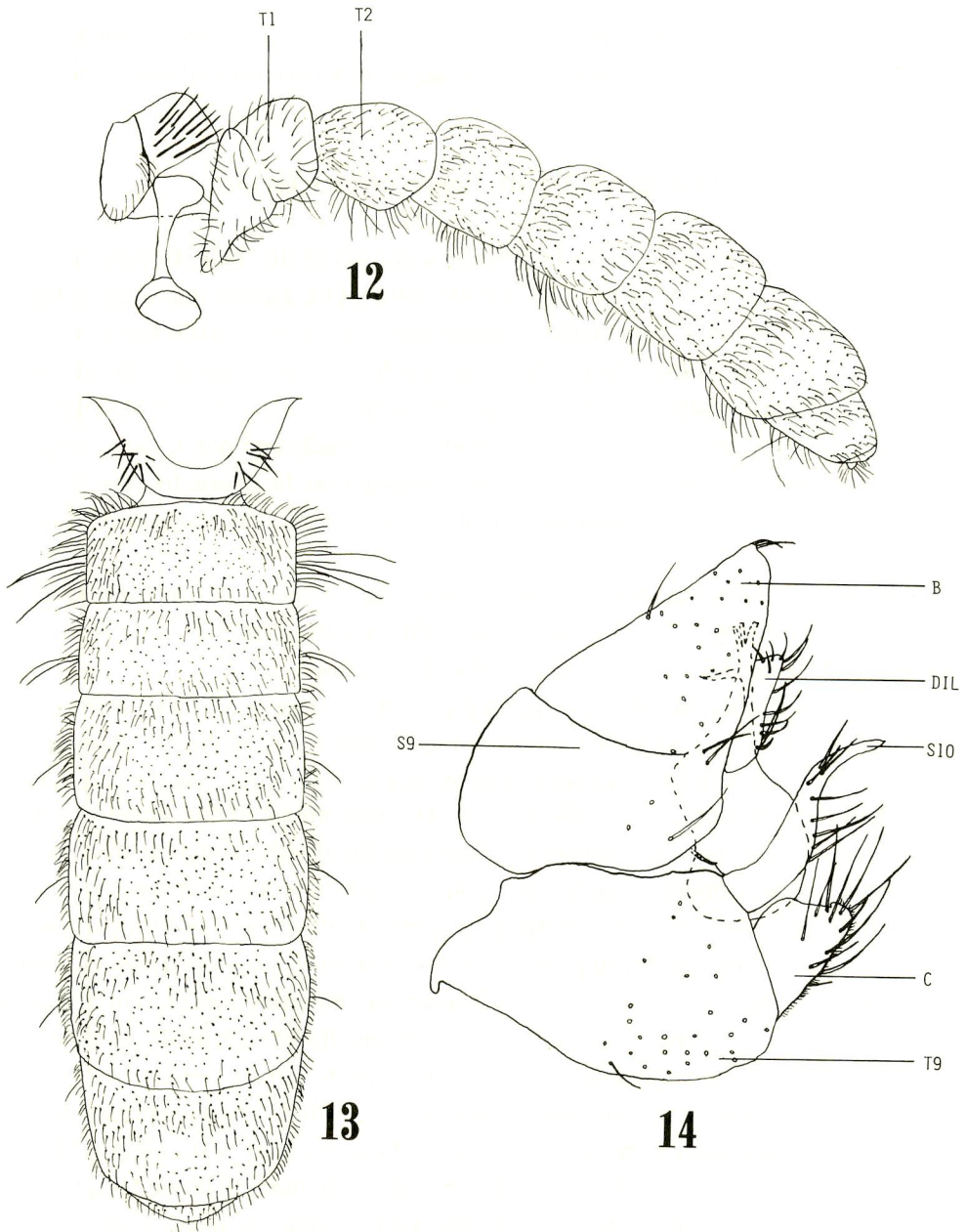
Distribution. Formosa and Japan (Iriomote I.; new record).

Specimens examined (14♂♂, 28♀♀): *Iriomote I.*: 12♂♂, 16♀♀, Komi, 2. v. 1976, A. NAGATOMI; 3♀♀, Komi, 19. v. 1981, A. NAGATOMI; 2♂♂, 4♀♀, Ôtomi, 30. iv. 1982, A. NAGATOMI; 5♀♀, Komi, 1. v. 1982, A. NAGATOMI.

Male genitalia of *Atomosiini*

THEODOR (1976) examined the male genitalia of *Atomosiini*, based on 4 genera and 9 species, that is, *Atomosia* (4 species), *Atoniomyia* (2), *Aphestia* (1), and *Cerotainia* (2), and wrote, “KARL (1959) came to the conclusion that they [*Atomosiini*] show ‘fundamental differences’ from those of other Laphriinae. However, he apparently considered specific characters and secondary modifications as typical characters of the group.” THEODOR (1976 : 32) continued to write, “The male genitalia of the *Atomosiini* are thus reduced in size and simplified, but there are no fundamental differences from those of other Laphriinae, and the structure of the genitalia confirms the position of the *Atomosiini* in the Laphriinae.”

In the genera and species of *Atomosiini* discussed by THEODOR (1976), “The aedeagus forms three apical tubes” and “There is a well developed, separated hypandrium [= sternum 9] without setae.” The aedeagus of three apical tubes is seen in 3 *Goneccalypsis* (including *lucida*) and at least 4 *Loewinella* species, but may not be seen in some



Figs. 12–14. *Goneccalypsis lucida*. 12–13, Female; 14, male; 12, metapleuron, halter, and abdomen, lateral view; 13, metanotal callosities and abdomen, dorsal view; 14, genitalia, lateral view; T1 & T2, abdominal terga 1–2.

Loewinella, such as *aphaea* and *virescens*, judging from the illustrations by LONDT (1982). Sternum 9 is entirely or partly fused with basistyle in *Goneccalypsis* and *Loewinella*.

Male genitalia of *Goneccalypsis lucida*

(Figs. 14–25)

LONDT (1982 : 239) wrote as to *Loewinella nitidicollis* LEHR, 1958 (from Kazakhstan, central Asia), “LEHR’s reference to a mirror-like lustre of the mesonotum suggests that he may have had a species of *Goneccalypsis* rather than *Loewinella*. I shall, however, retain *nitidicollis* as a valid *Loewinella* on the basis that he does not describe the mystax as possessing scale-like bristles, and he illustrates the male genitalia as having what appear to be longish upturned styli similar to those found in *Loewinella* and not in *Goneccalypsis*.” ‘Longish upturned styli’ seem to be sternum 10. Judging from the figures by LONDT (1982), tergum 9 and sternum 10 are small in relation to basistyle in *Goneccalypsis* but large in *Loewinella*.

Among *Goneccalypsis* and *Loewinella*, basistyle, sternum 10, and the so-called aedeagus, vary greatly in shape with species (after LONDT, 1982).

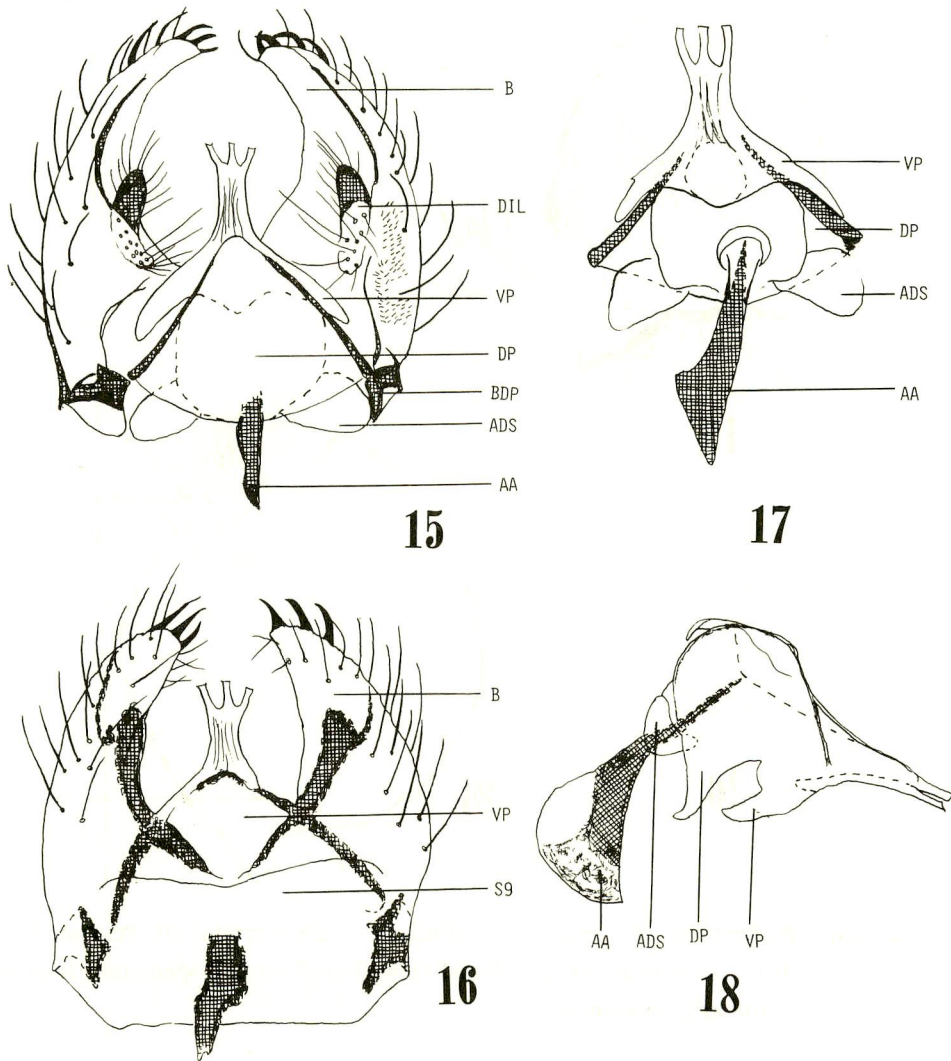
The male genitalia of *G. lucida* are described below.

Basistyle roughly triangular and tapering posteriorly from outer view, with concave inner surface, and near base with a short dorsoinner lobe whose outline is elliptical from inner view; basistyle with 3 (or 4) stout bristles at apex and with strong hairs at outer surface (except base); dorsoinner lobe with shorter hairs. Dististyle absent, if dorsoinner lobe is not homologous with dististyle. Sternum 9 wider than long, fused with basistyle at anterior part. Basistylar dorsoinner anterior process short, rather rectangular, and with concave anterior margin. In the so-called aedeagus, dorsal plate consisting of anterior swollen part (whose lateral margins are sclerotized) and posterior narrow part which is tri-lobed at apex; ventral plate widely divergent anteriorly and each arm narrow; posterior part of ventral plate is fused with that of the dorsal. Anterior bar of aedeagus flattened laterally, with ventral margin concave and dorsal margin strongly convex (from lateral view).

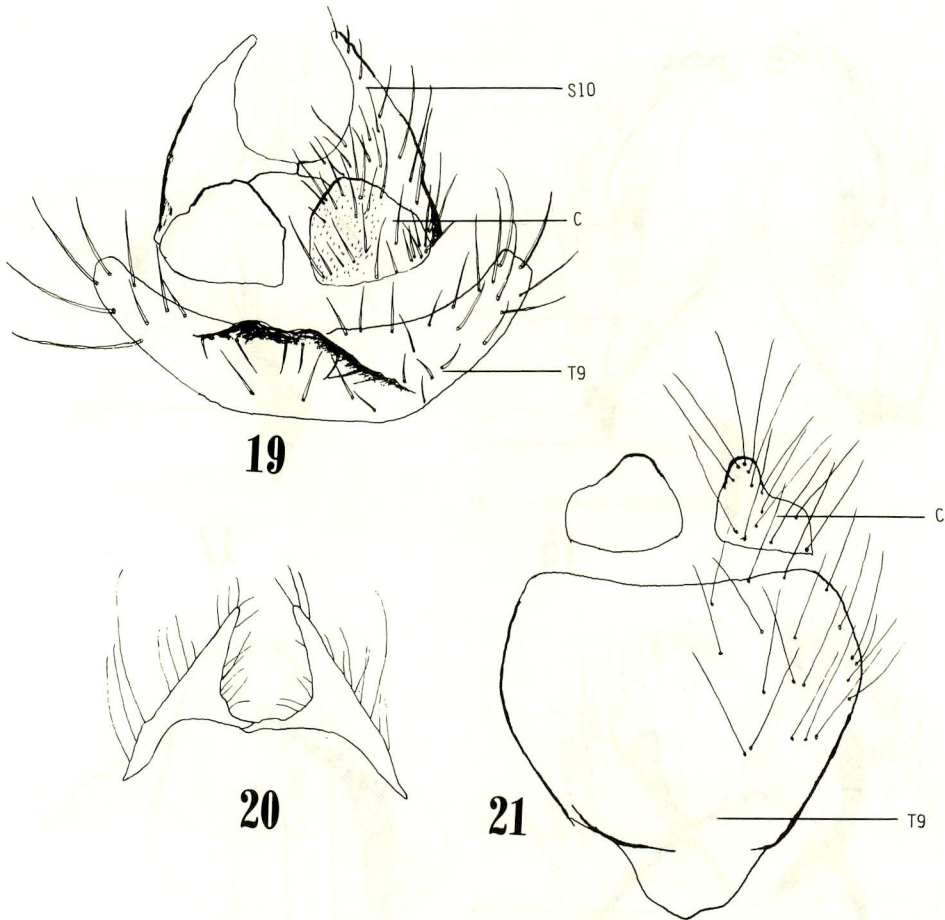
Tergum 9 (when not flattened) about as long as wide, with lateral and anterior margins rounded, with midanterior part convex, and with dorsal hairs at posterior part. Cercus wider than long, roughly triangular, and with dorsal hairs. Sternum 10 divided into a pair of processes which are abruptly widened and fused with each other at anterior part; sternum 10 with dorsal hairs.

Tergum 8 is a narrow, long, ring-like sclerite which is interrupted at midventral part and has a short, widened knob-like, anterior process rather far before ventral end. Tergum 7 wider than long and with lateral and posterior margins rounded. Sternum 7 more or less membranous, rectangular, much shorter and narrower than tergum 7.

Specimens dissected (4♂♂) : 2♂♂, Komi, Iriomote I., 2. v. 1976, A. NAGATOMI; 2♂♂, Ôtomi, 30. iv. 1982, A. NAGATOMI.



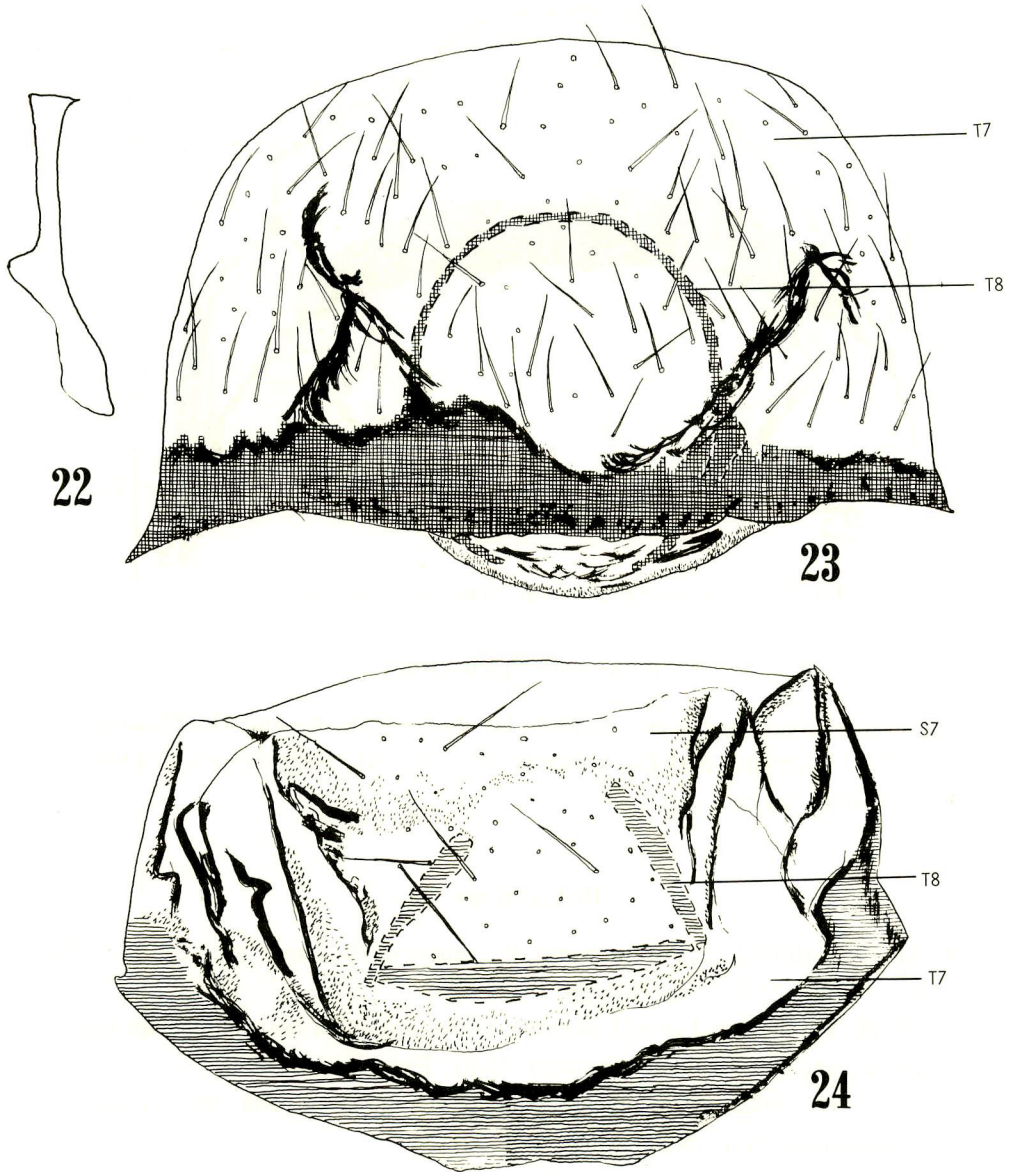
Figs. 15–18. *Gonecalypsis lucida*, male. 15, Dorsal view; 16–17, ventral view; 18, lateral view.



Figs. 19–21. *Goneccalypsis lucida*, male. 19, Dorsal view; 20, sternum 10, ventral view (based on 2nd specimen); 21, dorsal view (based on 2nd specimen; tergum 9 is kept nearly horizontal).

Abbreviations used in Figs. 14–25

AA, Anterior bar of aedeagus (=aedeagal apodeme); ADS, aedeagal dorso–anterior sclerite (=endophallic supporting sclerite); B, basistyle (=gonocoxite); BDP, basistylar dorso–inner anterior process (=gonocoxal apodeme); C, cercus; DIL, dorsoinner lobe (in basistyle); DP, dorsal plate (=paramere); S7, sternum 7; S9, sternum 9 (=hypandrium); S10, sternum 10; T7, tergum 7; T8, tergum 8 ; T9, tergum 9 (=epandrium); VP, ventral plate (=aedeagal guide).



Figs. 22–24. *Goneccalypsis lucida*, male. 22, Tergum 8, lateral view; 23 & 24, dorsal and ventral views.

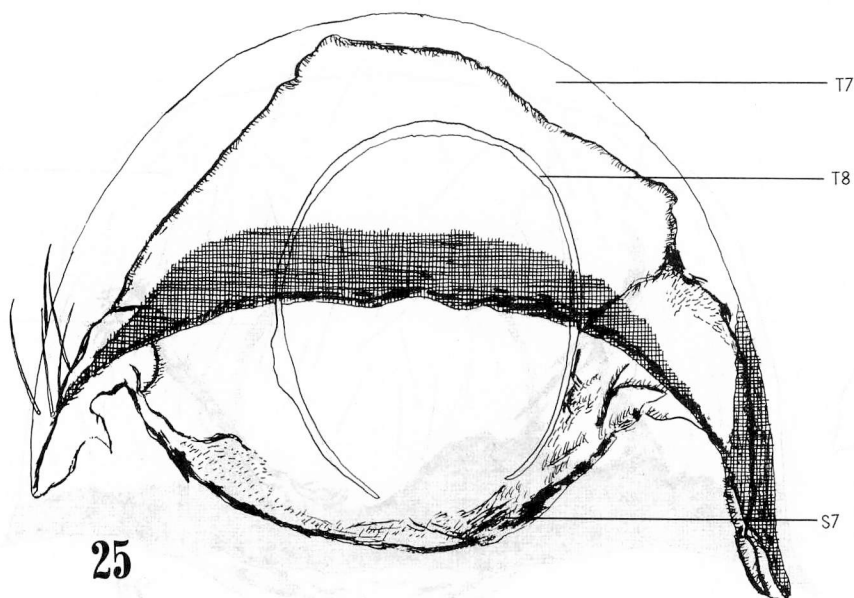


Fig. 25. *Goneccalypsis lucida*, male, posterior view.

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