

The Coenomyiidae of Japan (Diptera)

Akira NAGATOMI and Toyohei SAIGUSA¹

(*Entomological Laboratory*)

The Coenomyiidae of Japan is revised. It contains 5 genera and 7 species of which 2 seem to be new to science.

The Coenomyiidae resembles the Rhagionidae, Tabanidae, and Stratiomyidae. It is usually separated with ease from the Rhagionidae by having the annulated 3rd antennal segment, but the genus *Arthroceras* Williston, 1866, whose antenna is composed of 7 or so segments, can be more preferably placed under the Rhagionidae (Williston, 1866; Malloch, 1932a; Nagatomi, 1966) and the same may be true of the genus *Arthroteles* Bezzi, 1926.

The distribution and number of species of Coenomyiidae or coenomyiid-like Rhagionidae and Pelecorhynchidae (which may be either coenomyiid-like Tabanidae or tabanid-like Coenomyiidae) are shown in Tables 1-2. *Coenomyiodes* Brunetti, 1920 of Assam belongs to the Solvidae (one of us [Nagatomi] had seen the type) and *Pararthropeas* Brunetti, 1920 of Assam is a synonym of the genus *Solva* Walker, 1860 (after Pleske, 1925) and these 2 genera are excluded from the tables. The true family relationships of the genera given in Table 2 are uncertain to us but the supposition is attached to the table. Now it is clear that *at least most of the genera of Coenomyiidae live only in the Holarctic region especially at the Far East and North America.*

The diagnoses of Coenomyiidae are as follows: (1) body robust or fairly so but rarely (in *Odontosabula*) slender; (2) 3rd antennal segment annulated and apex of flagellum thus formed acute or bluntly pointed; (3) mesonotum strongly arched but rarely (in *Pseudoerinna*) rather flat; (4) scutellum (a) trapezoidal or (b) obtuse subtriangular in shape, with or without spine-like processes; (5) integument of body strong as in *Stratiomys* Geoffroy, 1762, but rarely (in *Glutops esakii* n. sp.) that of abdomen rather weak as in *Rhagio* and its allies.

This family is at once distinguished from other small families such as the Xylophagidae, Rachiceridae, and Solvidae (each of these 3 families is characteristic in ♂ genitalia, as well as in other features). It is also easily separated from the Stratiomyidae (including the Chiromyzinae) in which "Prefurca (1st section of Rs) short, i. e. Rs arising opposite 1st fork of M which forms the base of the discal cell; tibial spurs wanting, at most middle tibiae with a slight spur; proboscis short" (after Brues, Melander and Carpenter, 1954:324-325).

In the Rhagionidae, the genera *Arthroceras* and *Arthroteles* are similar to the Coenomyiidae

1) Address of junior author: Biological Laboratory, College of General Education, Kyushu University, Fukuoka.

Table 1. Distribution and no. of species of (1) Coenomyiidae and (2) coenomyiid-like Rhagionidae of which some representatives we have examined

	Names of genera	No. of species*	Distribution
(1)	<i>Coenomyia</i>	3	Europe, Sikkim, Nepal, Japan, N. America
	<i>Odontosabula</i> (= <i>Stratiroleptis</i>)	2 or 3**	Siberia, Manchuria, Korea, Japan
	<i>Anacanthaspis</i>	1 (1)	Siberia, Manchuria, Japan
	<i>Pseudoerinna</i>	1	Japan
	<i>Glutops</i> (= <i>Tamayura</i>)	6	Japan, N. America
(2)	<i>Arthroceras</i> (= <i>Pseudocoenomyia</i>)	7 (2)	E. China, Siberia, Japan, N. America
	<i>Arthroteles</i>	3	S. Africa

Notes: (1) * The number of subspecies is parenthesized.

(2) ** *O. licenti* (Séguy, 1952) is probably a synonym of *O. czerskii* (Pleske, 1925).

Table 2. Distribution and no. of species of (1) Coenomyiidae or coenomyiid-like Rhagionidae and (2) Pelecorhynchidae of which any representatives we have not seen

	Names of genera	No. of species	Distribution	Remark
(1)	<i>Arthropeas</i> Loew, 1850	4 or 6*	Tibet, Siberia, Korea, Sakhalin, N. America	apparently Coenomyiidae
	<i>Desmomyia</i> Brunetti, 1912	1	India	probably not Coenomyiidae
	<i>Heterostomus</i> Bigot, 1857	1	Chile	probably Tabanidae
	<i>Austroleptis</i> Hardy, 1915	5	Australia, Chile, Patagonia	coenomyiid-like Rhagionidae or rhagionid-like Coenomyiidae
	<i>Atherimorpha</i> White, 1915	36	Australia, Chile, Patagonia, S. Africa	apparently Rhagionidae
(2)	<i>Pelecorhynchus</i> Macquart, 1850	33	Australia, Chile	
	<i>Bequaertomyia</i> Brennan, 1935	1	N. America	

Note: *The status of *A. sibirica* var. *fenestralis* Malloch, 1932 and that of *A. sibirica* var. *semifusca* Malloch, 1932 are uncertain.

in having the character of (2) mentioned above, and the genera *Bolbomyia* Loew, 1850 and *Ptiolina* Zetterstedt, 1842 in (3) and (4b) (in the former, 3rd antennal segment with segmented style). *There may be no definite distinguishing characters between the Coenomyiidae and the Rhagionidae* and the same may possibly be true of the relationship between the Coenomyiidae and the Tabanidae.

The 5 genera of Coenomyiidae given in Table 1 are divided into 2 groups, i. e. (1) *Coenomyia*, *Odontosabula*, and *Anacanthaspis*, and (2) *Pseudoerinna* and *Glutops* (see the key to genera), and the latter group appears to be more closely related to the Rhagionidae than in the former.

The Coenomyiidae is certainly a living fossil which may show evolution from the suborder Nematocera to Brachycera and may keep a key to the solution of the phylogeny of lower Brachycera.

In the description of the relative length of leg segments, coxa and trochanter are excluded.

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Key to genera of Coenomyiidae known from Japan

- 1. Mid-lower face flat; palpus 1-segmented; front in ♀ narrower at vertex; scutellum trapezoidal and with a pair of spine-like processes or concave at middle of posterior margin and without processes; R₁₊₂ and R₃ rather closely situated to each other at apices; subscutellum not seen; mid-posterior part of abdominal sternum 1 protuberant and longer pilose; tibial spurs 1 : 2 : 2 2
- Mid-lower face swollen; palpus 2-segmented; front in ♀ nearly parallel sided; scutellum obtuse-subtriangular in shape and without processes; R₁₊₂ and R₃ widely separated from each other at apices; subscutellum present; mid-posterior part of abdominal sternum 1 not protuberant and without longer pile; tibial spurs 0 : 2 : 1 or 1 : 2 : 2 4
- 2(1). Scutellum with a pair of spine-like processes 3
- Scutellum without processes; head distinctly narrower than thorax, and abdomen much broader than thorax; eyes practically bare *Anacanthaspis*
- 3(2). Body robust; eyes densely pilose; antennal segments 1+2 much over ½ as long as flagellum; distance between base of vein M₂ and that of M₃ equal to or roughly so distance between base of M₃ and that of M₄ *Coenomyia*
- Body slender; eyes practically bare; antennal segments 1+2 less than ½ as long as flagel-

- lum; distance between base of vein M_2 and that of M_3 much shorter than distance between base of M_3 and that of M_4 *Odontosabula*
 4(1). Tibial spurs 1 : 2 : 2; mesonotum rather flat *Pseudoerinna*
 Tibial spurs 0 : 2 : 1; mesonotum strongly arched; either facial swelling or side of face large and produced forward *Glutops*

Genus *Coenomyia* Latreille

Coenomyia Latr., 1796, *Precis. d. Charact. Gen. Ins.* p. 159.

Body robust; head much narrower than thorax which is strongly arched; abdomen oval or elongate elliptical in shape. Eyes densely pilose in both sexes, contiguous or narrowly separated in ♂ while broadly separated in ♀; mid-lower face flat and much over ½ as long as face; front with a small, inconspicuous protuberance near antenna at least in *basalis*; front in ♀ narrower at vertex; cheeks well developed below eyes; antennal segment 1 longer than wide, segment 2 shorter than 1, and flagellum 7-8 segmented and acute at tip; palpus 1-segmented. Mesonotum with a pair of small knob-like processes at middle just before scutellum; scutellum trapezoidal and with 2 spine-like processes at postero-outer angles; postscutellum are seen from above but its mid-length is much shorter than scutellum; metapleura especially lower part swollen. Tibial spurs 1 : 2 : 2. Apices of R_{1+2} and R_3 rather closely situated to each other; discal cell bluntly pointed at apex; M_4 directly arising from discal cell and its insertion widely separated from that of m-cu crossvein; anal cell narrowly open or closed at wing margin. Abdomen broadest at segment 2 or 3; mid-posterior part of sternum 1 protuberant and longer pilose.

Type-species: *Musca ferruginea* Scopoli, 1763.

Coenomyia basalis Matsumura (Figs. 1 & 2; Pl. 1; Pl. 6, A & B)

Coenomyia basalis Matsumura, 1915, *Konchu-bunruigaku*, Part 2, p. 47.

Coenomyia apicalis Matsumura, 1915, *Konchu-bunruigaku*, Part 2, p. 47.

Coenomyia comans Enderlein, 1927, *SitzBer. Ges. naturf. Fr.* 1927. p. 47. **New Synonymy.**

Coenomyia japonica Séguy, 1955, *Boll. Lab. Ent. agr. Portici, Naples* 14:288. **New Synonymy.**

The works of Matsumura (1915 and 1916) were overlooked by Enderlein (1927) and Séguy (1955).

Shiraki (1932, *Icon. Ins. Jap. Tokyo.* p. 47) figured this species as *C. grandis* Matsumura which was an unpublished manuscript name.

C. basalis is very similar to *C. ferruginea* (Scopoli, 1763) of Europe; but may be separated from the latter by having the antenna in both sexes longer, the hairs on eye in both sexes longer, eyes in ♂ separated, and front in ♀ broader.

We have not seen any specimen of *C. errans* (Fabricius, 1794) of Europe and *C. pallida* Say, 1824 of N. America both of which Séguy (1955) revived and *C. bituberculata* Enderlein, 1921 of Sikkim. But Oldroyd (1966) suppressed *errans* and *pallida* and redescribed the 3 species, namely, *comans* (which is a synonym of *basalis*), *ferruginea*, and *bituberculata*.

♂. Head: Dark brownish to blackish, pale gray pollinose; proboscis and antenna partially (sometimes almost wholly) tinged with reddish brown; eye densely covered with blackish or yellowish brown pile; ocellar triangle, antennal segments 1-2, palpus, ventro-lower part of proboscis with black hairs which may partially or almost wholly change into yellowish brown and

which are shorter on antennal segment 2; side of face, occiput, and cheeks with long yellowish brown pile; proboscis (except ventro-lower part) short pale pilose; hairs on upper corner of each

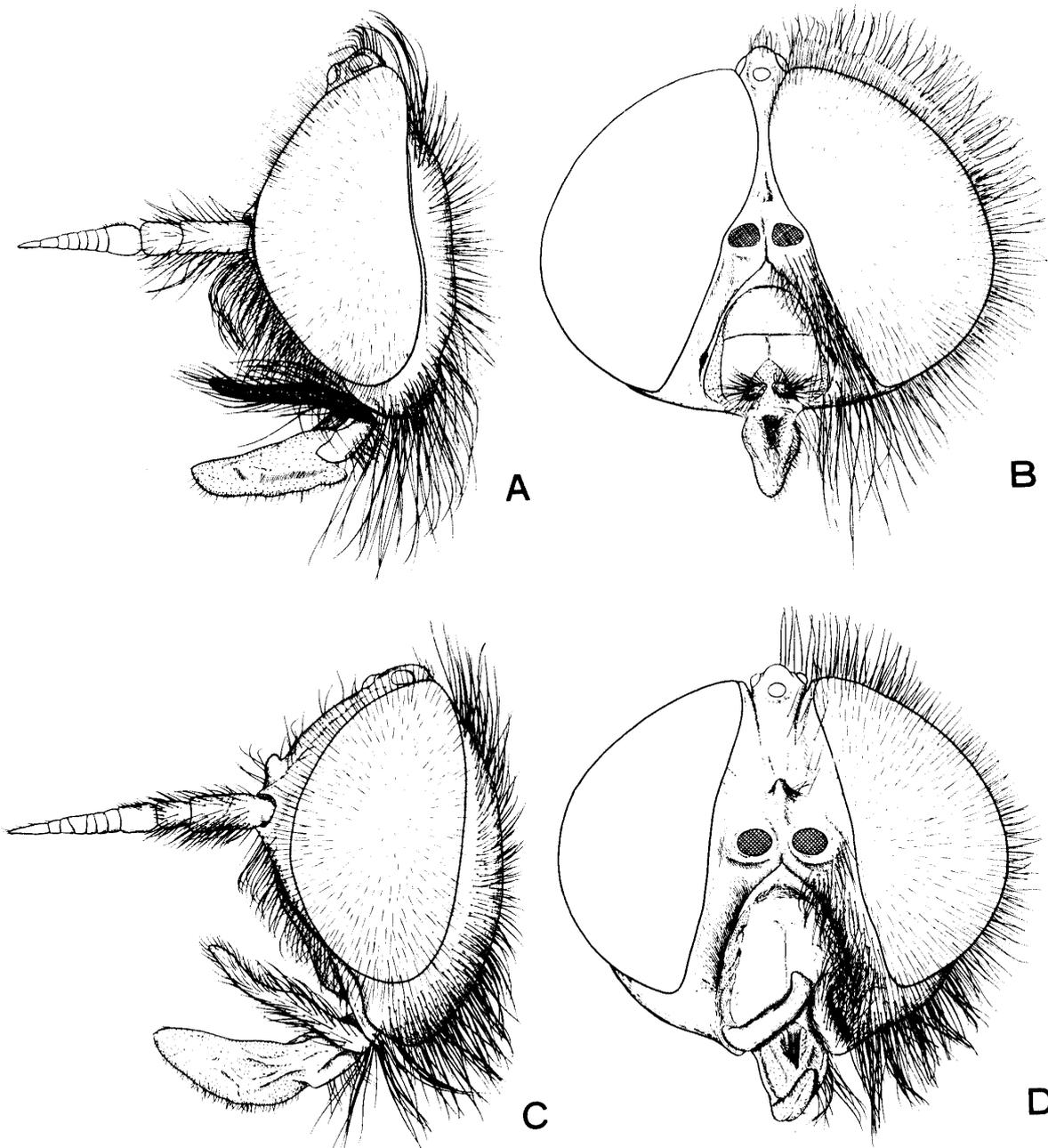


Fig.1. Head of *Coenomyia basalis* Matsumura (A & B: ♂; C & D: ♀; A & C: lateral view; B & D: anterior view)

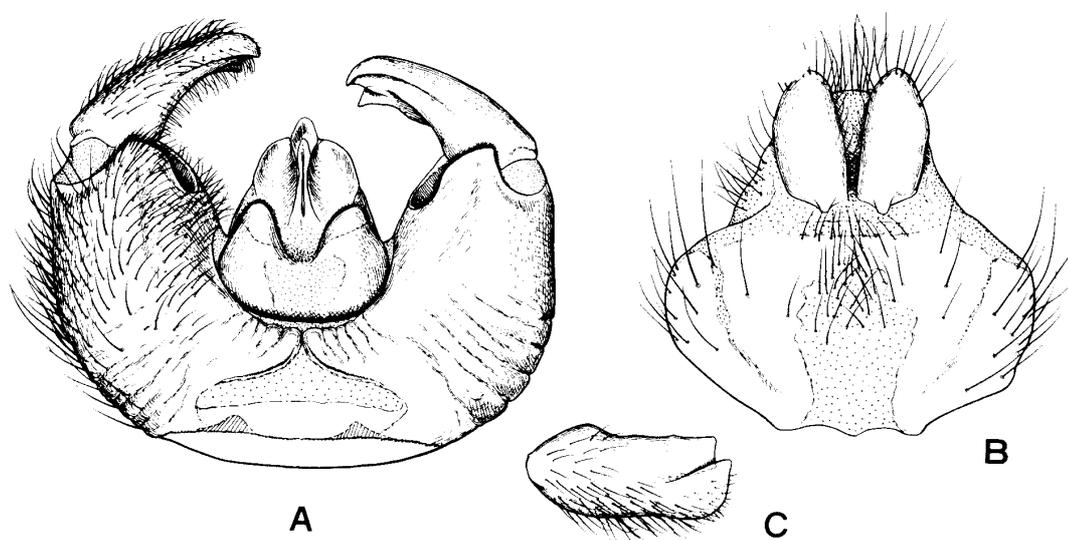


Fig.2. Male genitalia of *Coenomyia basalis* Matsumura (from Sasayama, Tamba) (A: genitalia excluding epandrium and cerci, ventral view; B: epandrium and cerci, dorsal view; C: left dististyle, posterior view)

eye about as long as width of ocellar triangle ($0.9-1.0\times$); eyes separated for a space which is equal or narrower than width of median ocellus ($0.4-1.0\times$); total width of head over twice distance from antenna to median ocellus ($2.3-2.6\times$) and width of face at lowest portion from a direct frontal view ($2.2-2.8\times$) respectively; distance from proboscis to antenna about equal to that from antenna to median ocellus ($1.0-1.1\times$); face tapering on upper portion; width of mid-lower face equal to or roughly so its length ($0.8-1.0\times$) and width of face at top portion of mid-lower face ($0.9\times$); mid-lower face over $\frac{1}{2}$ as long as face ($0.7-0.8\times$); when measured along inner surface antenna longer than distance from antenna to median ocellus ($1.2-1.4\times$), its segment 1, $1\frac{1}{2}-2\times$ as long as wide, segment 2 about or roughly as long as wide ($0.9-1.3\times$), and relative length of segments 1, 2, and flagellum (based on 6 specimens) $100 : 54 (50-62) : 203 (188-244)$; palpus about as long as face; space between antennae less than width of ocellar triangle ($0.25-0.7\times$; in specimens on hand mostly $0.3\times$).

Thorax: Dark brownish to blackish, pale gray pollinose; in better preserved specimens mesonotum with 3 broad paler gray pollinose stripes of which median one may be divided by a thin line and may extend to posterior border of mesonotum and lateral ones are separated from humeral callus but are connected with postero-inner part of posterior callus; thorax covered with conspicuous yellowish brown pile which is longer on scutellum and sides of mesonotum (especially posterior callus), becomes very long on posterior part of meso- and lower part of metapleura, and is often intermixed with black one on posterior portion of mesonotum; hypo- and lower $\frac{1}{2}$ of pteropleura lagrely bare; haltere yellowish brown to dark brownish.

Leg: Dark brownish, knee yellowish (or reddish) brown; leg sometimes almost wholly reddish brown; coxa pale gray pollinose and femur more or less so; coxa and femur with yellowish brown pile which is very long on former and on posterior surfaces of fore and mid femora; relative length of segments of fore leg $242 (232-257) : 277 (262-295) : 100 : 31 (27-33) : 31 (27-33) : 24 (23-26) : 50 (48-52)$, of mid leg $261 (252-276) : 273 (256-285) : 90 (86-95) : 29 (26-33) : 30 (27-33) : 24 (22-24) : 50 (48-52)$, of hind leg $388 (344-410) : 402 (380-410) : 121 (114-127) : 36 (33-40) : 34 (32-40) : 27 (23-29) : 50 (48-52)$, these were calculated from 6 specimens.

Wing: Membrane tinged with yellowish brown to brownish; veins brownish to dark brownish; stigma not differentiated; vein between discal- and 1st basal cell less than twice as long as that between discal- and 2nd basal cell ($0.9-1.4 \times$); relative length of distance (1) between base of M_1 and that of M_2 , (2) base of M_2 and that of M_3 , (3) base of M_3 and that of M_4 , and (4) vein between discal- and 5th posterior cell $16 (14-19) : 100 : 113 (98-138) : 72 (58-83)$ (based on 6 specimens); mouth of anal cell closed or less than $\frac{1}{2}$ ($0.1-0.3 \times$) as long as m-cu crossvein.

Abdomen: Dark brownish to black, sometimes partially or almost wholly reddish brown; dorsum shining; venter, anterior margins of terga 1-3, and sides of tergum 1 pale gray pollinose; terga 2-3 each with postero-lateral yellowish spots which are larger on tergum 2; posterior margins of terga 4-7 yellowish to yellowish brown; abdomen covered with yellowish brown pile which is longer on sides of terga 1-2 and middle part of sternum 1 but terga 1-3 (or 1-4) (except sides) with short black hairs.

Genitalia: Tergum 7 quadrate, shorter than wide, with short hairs on posterior margin; sternum 7 similar to tergum 7, and with a few hairs on disc in addition to posterior and lateral marginal hairs; tergum 8 shorter than wide, without hairs, and with posterior margin produced and anterior margin incised; sternum 8 almost as long as wide, bare; genitalia broad, widest at middle; epandrium broadly desclerotized from anterior margin to middle portion, haired on postero-medial and lateral portions; cercus moderately large, with long hairs on apical margin; hypandrium desclerotized on posterior half and not sharply separated from basistyle on anterior portion; basistyle short and broad, touching to each other for short distance at ventro-medial portion; dististyle moderately long, more or less lamellate, almost parallel sided and ending in 2 short dentations at posterior margin; basistyle and dististyle evenly short haired.

Length: Body 14-16 mm; wing 13-14; fore basitarsus 1.3-1.5.

♀. Similar to ♂ except as follows: Body reddish brown to yellowish brown; vestiture on head, thorax, abdomen, coxa, and femur wholly yellowish brown (middle parts of abdominal terga 2-4 may have some short black pile); front sparsely pilose; hairs on metapleura very long as in ♂; total width of head $3-3\frac{1}{2} \times$ distance from antenna to median ocellus, about $2 \times$ width of face at lowest portion from a direct frontal view ($2.0-2.1 \times$), and $3 \times$ width of front just above antenna which is nearly $2 \times$ that at median ocellus ($1.8 \times$) which is $1\frac{1}{2}-2 \times$ width of ocellar triangle; distance from proboscis to antenna longer than that from antenna to median ocellus ($1.5-1.7 \times$); when measured along inner surface antenna nearly $2 \times$ distance from antenna to median ocellus ($1.8-1.9 \times$), and relative length of segments 1, 2, and flagellum (based on 3 specimens) $100 : 56(46-64) : 196(172-215)$; space between antennae about as wide as ocellar triangle ($0.9-1.2 \times$); relative length of segments of fore leg $226 (209-235) : 258 (244-266) : 100 : 32 (31-33) : 29 (28-30) : 22 (19-23) : 46 (45-57)$, of mid leg $260 (250-266) : 257 (244-266) : 88 (84-91) : 29 (28-30) : 29 (28-30) : 24 (22-27) : 46 (45-47)$, of hind leg $367 (350-380) : 394 (387-400) : 114 (109-123) : 36 (34-37) : 32 (31-33) : 25 (23-27) : 46 (44-50)$, these were calculated from 3 specimens; in specimens on hand, vein between discal- and 1st basal cell $1.2-1.6 \times$ as long as that between discal- and 2nd basal cell and relative length of (1)-(4) mentioned in description of ♂ $25 (20-28) : 100 : 112 (97-131) : 77 (54-89)$ (based on 3 specimens).

Length: Body (without ovipositor) 21-23 mm; wing 19-20; fore basitarsus 1.8-2.0.

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Type-locality: Sapporo, Hokkaido. Type in Hokkaido University, Sapporo.

Specimens examined (6 ♂♂, 3 ♀♀): Hokkaido: 1 ♀, Sapporo, 10. vii. 1953, S. Ito. Honshu:

1 ♂, Hyonosen, Tajima, 10. vi. 1951, A. Nagatomi; 1 ♂, Mt. Kogane (near Sasayama), Tamba, 18. v. 1952, K. Takeuchi; 1 ♀, Mt. Kogane, 28. v. 1958, K. Iwata; 4 ♂♂, 1 ♀, Sasayama, Tamba, 4. v. - 13. vi. 1952-59, Iwata, T. Okutani, K. Nohara, and Nagatomi. Kyushu: 1 ♀, Mt. Wakasugi, Chikuzen, 21. v. 1957, K. Morimoto.

Genus *Anacanthaspis* Röder

Anacanthaspis Röd., 1889, Wien Ent. Ztg. 8:8.

Similar to *Coenomyia* except as follows: Eyes bare; cheeks not so distinctly developed below eyes; scutellum without spine-like processes and its posterior margin concave at middle; lower part of metapleura not so strongly swollen as in *Coenomyia*; discal cell normal in shape; vein M₄ directly arising from discal cell at insertion of m-cu crossvein or from a point separated from discal cell; in specimens on hand anal cell open; abdomen broadest at segment 3 or 4.

Type-species: *Anacanthaspis bifasciata* Röder, 1889.

Anacanthaspis bifasciata japonica Shiraki (Figs. 3 & 4; Pl. 2, A; Pl. 6, C & D)

Anacanthaspis bifasciata var. *japonica* Shiraki, 1932, Trans. Nat. Hist. Soc. Formosa 22:489.

It is uncertain to us whether or not the Japanese form is identical with or different sub-specifically or specifically from *A. bifasciata* Röder, 1889 of Siberia.

♂. Head: Head and its appendages dark brownish to blackish, more or less pale gray pollinose; inner surface of antennal flagellum (except apical portion and base) brownish; antenna including flagellum, side of face, and palpus with black hairs which are longer on ventral surface of antennal segment 1; occiput, cheeks, and proboscis with pale yellowish brown pile which is long on cheeks; eyes practically contiguous or very narrowly separated; width of one eye on a mid line from a direct frontal view somewhat longer than distance from antenna to median ocellus (1.1-1.2 ×) and roughly 1½ width of face at lowest portion from a direct frontal view (1.3-1.6 ×); distance from proboscis to antenna nearly equal to that from antenna to median ocellus (0.8-0.9 ×); face tapering on upper portion; width of mid-lower face roughly equal to its length (0.8-1.1 ×) and width of face at top portion of mid-lower face (0.8-0.9 ×); mid-lower face over ½ as long as face (0.6-0.7 ×); when measured along inner surface antenna somewhat longer than distance from antenna to median ocellus (1.2 ×), its segment 1 longer than wide (1.3-1.5 ×), segment 2 as long as or longer than wide (1.0-1.3 ×), and relative length of segments 1, 2, and flagellum 100 : 71 (61-77) : 283 (256-325) (based on 7 specimens); palpus extends to top of mid-lower face; space between antennae about ½ width of ocellar triangle (0.4-0.6 ×).

Thorax: Dark brownish to blackish, more or less pale gray pollinose; mesonotum with a pair of distinct yellowish pollinose rings whose outer lines are at lateral margins of mesonotum and with a median narrow darker stripe which is sometimes indistinct; mesonotum, scutellum, pro- and metapleura covered with yellowish pile; upper- and posterior parts of meso-, sterno- (except anterior part), hypo-, and pteropleura (at upper ½ and just below spiracle) with blackish pile; haltere yellowish brown, base somewhat darker.

Leg: Dark brownish to blackish but tibia, tarsal segments 1-2, and apical portion of femur yellowish brown; coxa and femur more or less pale gray pollinose and with pale yellowish pile

which may be intermixed with black one on coxa; relative length of segments of fore leg 205 (191-219) : 239 (227-255) : 100 : 32 (30-34) : 27 (26-28) : 22 (20-24) : 41 (37-45), of mid leg

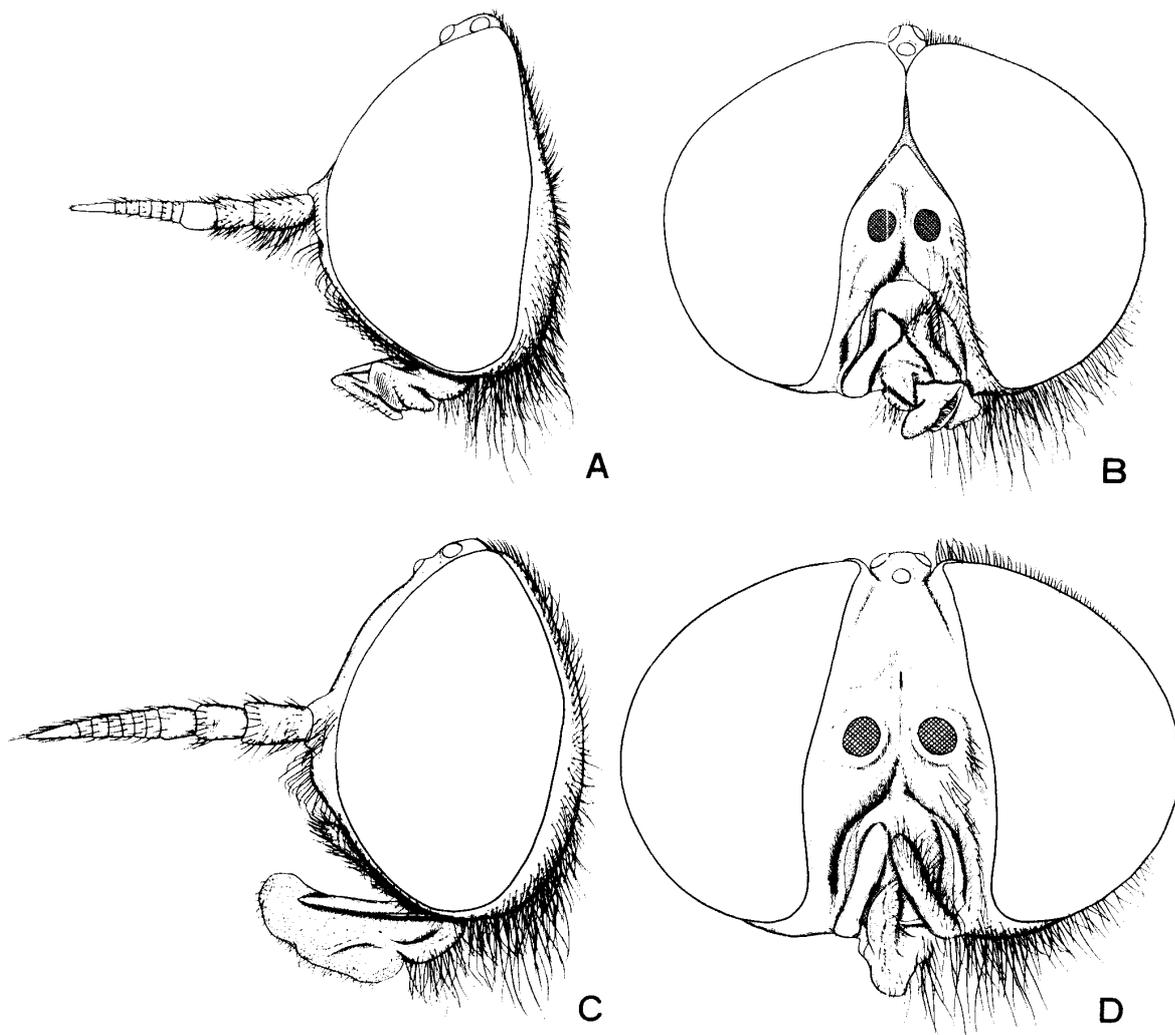


Fig. 3. Head of *Anacanthaspis bifasciata japonica* Shiraki (A & B: ♂; C & D: ♀; A & C: lateral view; B & D: anterior view)

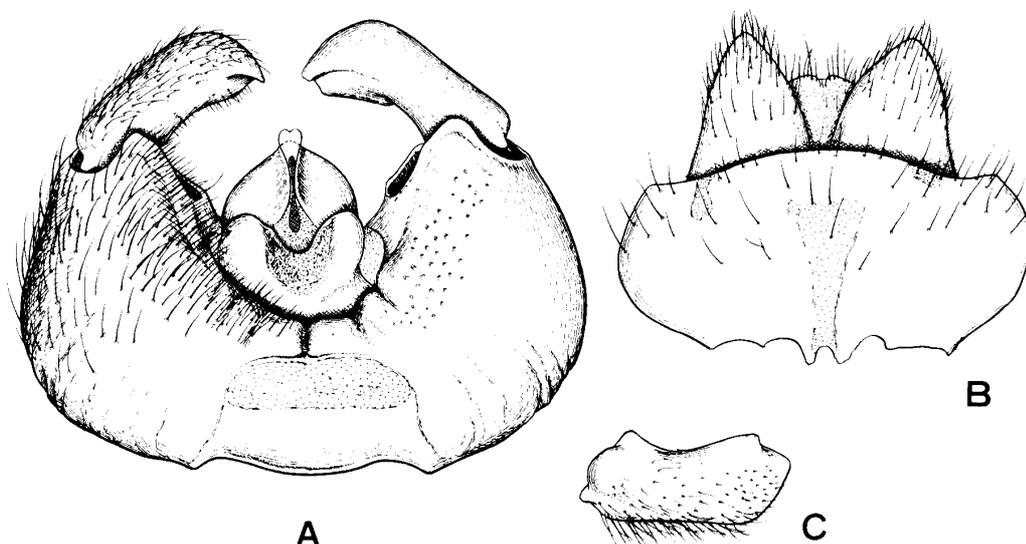


Fig.4. Male genitalia of *Anacanthaspis bifasciata japonica* Shiraki (from Kanayama, Kai) (A: genitalia excluding epandrium and cerci, ventral view; B: epandrium and cerci, dorsal view; C: left dististyle, posterior view)

223 (206-242) : 238 (217-253) : 79 (76-82) : 29 (27-31) : 24 (22-28) : 19 (17-22) : 41 (37-45), of hind leg 327 (312-348) : 338 (325-353) : 109 (103-115) : 38 (35-42) : 28 (24-30) : 20 (19-21) : 42 (38-45), these were calculated from 7 specimens.

Wing: Membrane tinged with yellowish brown, but apical and posterior margins of wing broadly, a band from above stigma through discal cell and a large elongate basal spot extending through 1st and 2nd basal cells dark brown; in 7 specimens on hand, vein between discal- and 1st basal cell $1.2-1.9\times$ as long as that between discal- and 2nd basal cell, relative length of distance between (1) base of M_1 and that of M_2 , (2) base of M_2 and that of M_3 , and (3) base of M_3 and that of M_4 56 (43-64) : 100 : 282 (238-308), mouth of anal cell $0.4-0.9\times$ as long as m-cu crossvein, and vein M_4 directly arising from discal cell at insertion of m-cu crossvein or vein M_4 with short basal section.

Abdomen: Dark brownish to blackish; posterior margin of each segment of dorsum with a distinct yellowish pollinose band; venter pale gray pollinose; dorsum with pale yellowish pile which is longer on sides and which becomes very short in the middle of terga 2-3 (except posterior borders); venter short pale pilose.

Genitalia: Tergum 7 and sternum 7 slightly shorter than wide, with yellow hairs on posterior marginal portion; tergum 8 shorter than wide, with posterior margin weakly rounded and anterior margin almost straight, bare and polished; sternum 8 as long as wide, weakly widening anteriorly, almost bare; genitalia broad, widest before middle; epandrium desclerotized along dorso-median line from anterior margin to near posterior submargin, evenly short haired on posterior half; cercus large, evenly short haired; hypandrium desclerotized on posterior half, not sharply separated from basistyle on its anterior half; basistyle short and broad, touching to each other for short distance at ventro-medial portion; dististyle moderately long, almost cylindrical, weakly concave on dorsal margin, with its apical margin weakly produced and a weak angle at dorsodistal portion; basistyle and dististyle evenly short haired.

Length: Body 12-14 mm; wing 11.5-13; fore basitarsus 1.3-1.5.

♀. Similar to ♂ except as follows: Head: Pile on occiput black and that on proboscis chiefly so (this may be true of ♂); width of one eye on a mid line from a direct frontal view about equal to width of face at lowest portion from a direct frontal view ($1.1\times$), and somewhat broader than width of front just above antenna ($1.2\times$) which is nearly twice that at median ocellus ($1.8\times$) which is $1\frac{1}{2}$ width of ocellar triangle; distance from proboscis to antenna somewhat longer than that from antenna to median ocellus ($1.2\times$); when measured along inner surface antenna over $1\frac{1}{2}$ distance from antenna to median ocellus ($1.7\times$), and relative length of segments 1, 2, and flagellum 100 : 71 : 247 (based on 1 specimen).

Thorax: Pile on propleura appears to be black.

Leg: Hairs on coxa and femur chiefly black; relative length of segments of fore leg 206-236-100-34-31-23-43, of mid leg 226-233-85-29-25-22-40, of hind leg 334-340-108-40-31-20-40 (based on 1 specimen).

Wing: Apex of wing dark brown but wing margin of 2nd, 3rd, and 5th posterior cells not bordered with dark brown; vein 1st A largely bordered with yellowish brown; vein between discal- and 1st basal cell $1.9\times$ as long as that between discal- and 2nd basal cell, relative length of (1)-(3) mentioned in description of ♂ 41 : 100 : 253, mouth of anal cell $0.7\times$ as long as m-cu crossvein (based on 1 specimen).

Length: Body (without ovipositor) and wing 14 mm; fore basitarsus 1.6.

Distribution: Japan (Honshu).

Type-locality: Kamikochi or Ibuki. Two syntypes (1 ♂, 1 ♀) in "the Entomological Museum of Government Research Institute, Taihoku, Formosa."

Specimens examined: 1 ♂, 1 ♀, Kanayama, Kai (Yamanashi-Pref.), 30. vi. 1963, A. Nagatomi and T. Saigusa; 6 ♂♂, Narai, Shinano (Nagano-Pref.), 27-29. vii. 1969, Nagatomi.

Genus *Odontosabula* Matsumura

Odontosabula Matsumura, 1905, Thousand Insects of Japan 2. p. 78.

Stratiroleptis Pleske, 1925, Encyc. ent. B. II. Dipt. 2:182. New Synonymy.

Body especially in ♂ slender; head about as wide as (in ♂) or somewhat narrower than (in ♀) thorax which is strongly arched; abdomen about as wide as thorax. Eyes bare in both sexes, contiguous in ♂ and widely separated in ♀; mid-lower face flat and not much over $\frac{1}{2}$ as long as face; front in ♀ narrower at median ocellus; cheeks in ♂ not so well developed below eyes; antennal segments 1 and 2 subglobose in form and subequal in size in roughly speaking (segment 1 somewhat larger than 2), and flagellum 7-8 segmented and acute at tip; palpus 1-segmented. Scutellum trapezoidal and with 2 spine-like processes at postero-outer angles; post-scutellum well developed. Tibial spurs 1 : 2 : 2. R_{1+2} and R_3 closely situated to each other at apices; discal cell narrower at apical portion; M_4 directly arising from discal cell; anal cell narrowly open or closed at wing margin. Abdomen nearly parallel-sided; mid-posterior part of sternum 1 protuberant and longer pilose.

Type-species: *Odontosabula gloriosa* Matsumura, 1905.

Odontosabula gloriosa Matsumura (Figs. 5 & 6; Pl. 3; Pl. 7, A)

Odontosabula gloriosa Matsumura, 1905, Thousand Insects of Japan 2. p. 78.

Stratioleptis pleskei Séguy, 1926, Encyc. ent. B.II. Dipt. 3:11. New Synonymy.

The work of Matsumura (1905) was overlooked by Pleske (1925) and Séguy (1926 and 1952). Ouchi (1943) already suggested this fact.

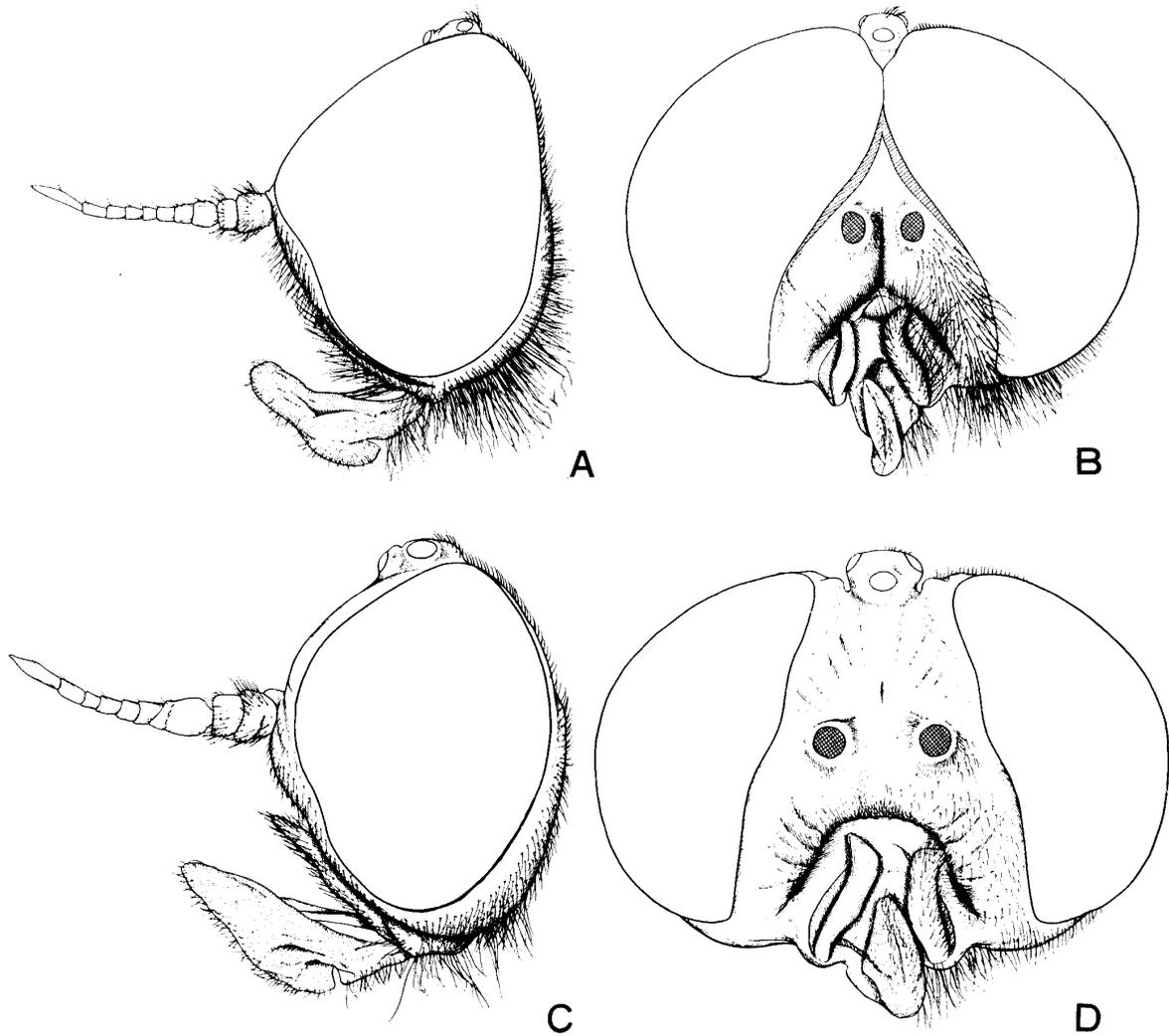


Fig.5. Head of *Odontosabula gloriosa* Matsumura (A & B: ♂; C & D: ♀; A & C: lateral view; B & D: anterior view)

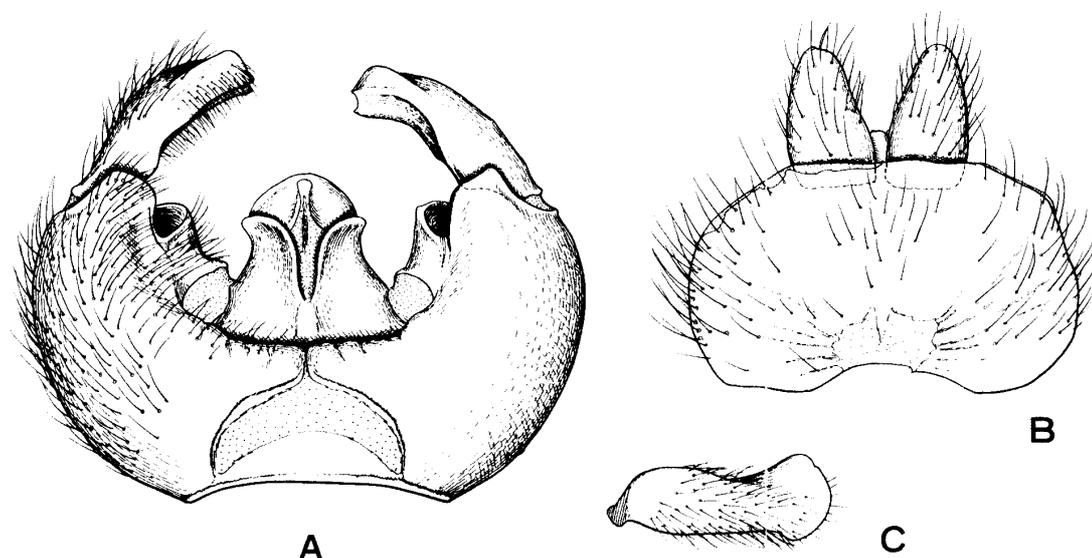


Fig.6. Male genitalia of *Odontosabula gloriosa* Matsumura (from Mt. Kirishima, Satsuma) (A: genitalia excluding epandrium and cerci, ventral view; B: epandrium and cerci, dorsal view; C: left dististyle, posterior view)

O. licenti (Séguy, 1952) of Manchuria is probably a synonym of *O. czerskii* (Pleske, 1925) of East Siberia and Korea whose redescription is given by Nagatomi (in press).

♂. Head: Head and its appendages dark brownish to blackish, pale gray pollinose; apical parts of antennal segments 1 and 2 (often almost whole surface of segment 2) and basal portion of flagellum yellowish (or reddish) brown and proboscis with a yellowish brown to brownish tinge; side of face, antennal segments 1 and 2, vertex, occiput, cheeks, palpus, and proboscis with black hairs which are longer on cheeks and change into yellowish on cheeks near proboscis and palpus; some hairs on each of antennal segments 1-2 as long as or longer than respective segment; eyes contiguous for a distance which is equal to or roughly so length of ocellar triangle ($0.6-1.3\times$); width of one eye on a mid line from a direct frontal view about equal to distance from antenna to median ocellus ($1.1-1.2\times$) and width of face at lowest portion from a direct frontal view ($1.0-1.1\times$); distance from proboscis to antenna equal to or nearly so that from antenna to median ocellus ($0.8-1.0\times$); face tapering on upper portion; width of facial swelling equal to or roughly so its length ($1.0-1.2\times$) and about $\frac{1}{2}$ width of face at top portion of facial swelling ($0.6\times$); facial swelling about $\frac{1}{2}$ as long as face ($0.5-0.6\times$); when measured along inner surface antenna about as long as distance from antenna to median ocellus ($1.0-1.1\times$), each of segments 1 and 2 somewhat shorter than wide ($0.7-0.8\times$) and relative length of segments 1, 2, and flagellum $100 : 82 (75-88) : 547 (500-600)$ (based on 7 specimens); last segment of antennal flagellum $\frac{1}{2}$ or roughly so as long as rest of flagellum ($0.4-0.6\times$); palpus shorter than face ($0.7-0.8\times$); space between antennae less than width of ocellar triangle ($0.4-0.7\times$).

Thorax: Dark brownish to blackish but scutellum yellowish brown to brownish; thorax pale gray (in certain lights yellowish gray) pollinose; mesonotum with 3 broad dark stripes of which middle one runs from anterior margin of mesonotum to posterior margin and is narrower posteriorly, and lateral ones are separated from humeral callus but connected with posterior callus; mesonotum and scutellum rather short black and metapleura long pale pilose; pro-, sterno- (except posterior part), upper and posterior parts of meso-, upper $\frac{1}{2}$ of pteropleura with black

hairs which are often intermixed with pale ones on propleura; and antero-lower portion of mesopleura with pale hairs; postscutellum, ptero- (below spiracle), and hypopleura either chiefly black or pale haired; haltere yellowish brown.

Leg: Yellowish (or reddish) brown, but coxa, apical portion of tarsus, that of hind femur, and hind tibia except base and tip dark brownish to blackish (yellowish brown parts of hind femur and hind tibia variable in size); coxa pale gray pollinose; hairs on coxa and femur chiefly black; relative length of segments of fore leg 152 (149-162) : 194 (188-203) : 100 : 34 (32-37) : 29 (27-30) : 23 (21-25) : 35 (33-36), of mid leg 176 (170-185) : 185 (179-196) : 75 (70-78) : 28 (27-29) : 25 (23-26) : 19 (18-20) : 32 (31-33), of hind leg 347 (338-364) : 344 (331-356) : 99 (87-106) : 33 (31-35) : 26 (24-27) : 19 (17-20) : 33 (30-35), these were calculated from 7 specimens.

Wing: Membrane tinged with yellowish brown to brownish; stigma not distinctly marked; vein between discal- and 1st basal cell less than twice as long as that between discal- and 2nd basal cell (1.1-1.3 ×); relative length of distance between (1) base of M₁ and that of M₂, (2) base of M₂ and that of M₃, (3) base of M₃ and that of M₄, and (4) vein between discal- and 5th posterior cell 63 (21-96) : 100 : 479 (361-600) : 57 (20-100) (based on 7 specimens); mouth of anal cell closed or less than ½ as long as m-cu crossvein (0.2-0.4 ×).

Abdomen: Reddish brown, with following dark brownish to blackish parts: anterior about ½ of tergum 1; antero-lateral angles of terga 2-7; median, basal rather small, subtriangular spot of terga 2-3; median apical large spot of tergum 4 (which extends to anterior margin of segment); terga 5-7 except postero-lateral angle which becomes gradually larger in posterior segments; basal median spot of sterna 2-6 which is variable in size but gradually larger posteriorly and extends to posterior margin of segments on sterna 3 (or 2) -6; basal spot of sternum 7 whose middle and lateral parts are produced posteriorly; and nearly whole surface of sternum 1; abdomen above and below clothed with short black hairs but sides of terga 1-3 (or 1-4) with longer pale yellowish hairs which are present on sternum 1 and often on sterna 2-3.

Genitalia: Tergum 7 rectangular, shorter than wide, evenly short haired, without prominent marginal hairs; sternum 7 as long as wide, short haired on posterior half; tergum 8 slightly shorter than wide, almost bare; sternum 8 gradually narrowing posteriorly, weakly bilobed and short haired on posterior margin; genitalia broad, widest beyond the middle; epandrium rounded on lateral and posterior margins, with a small desclerotized portion on antero-medial portion; cercus moderately large, evenly long haired; hypandrium desclerotized on posterior half, but rather sharply separated from basistyle by a suture; basistyle short and broad, touching to each other for short distance at ventro-medial portion; dististyle moderately long, with its dorsal margin weakly concave at middle, and posterior margin evenly rounded; basistyle and dististyle short haired.

Length: Body 12-16 mm; wing 10.5-13.5; fore basitarsus 1.5-1.8.

♀. Similar to ♂ except as follows: Pile shorter than in ♂. Head: Pile on occiput, cheeks, side of face and sometimes palpus and proboscis chiefly pale yellowish; width of one eye on a mid line from a direct frontal view narrower than width of face at lowest portion from a direct frontal view (0.7 ×) and equal to width of front just above antenna which is about 1½ × that at median ocellus (1.5-1.6 ×) which is about 2 × width of ocellar triangle (2.0-2.1 ×); distance from proboscis to antenna longer than that from antenna to median ocellus (1.2-1.4 ×); when measured along inner surface antenna 1½ × or somewhat more distance from antenna to median ocellus (1.5-1.7 ×), its segment 1, ½ or more as long as wide (0.5-0.7 ×), segment 2 nearly as long as wide (0.8-1.0 ×), and relative length of segments 1, 2, and flagellum 100 : 114 (100-133)

: 676 (575-817) (based on 5 specimens); space between antennae about equal to width of ocellar triangle (0.9-1.1 \times).

Thorax: Pile wholly pale yellowish.

Leg: Apical part of hind tibia and that of hind femur often not dark brownish to blackish; pile on coxa and femur pale yellowish; relative length of segments of fore leg 168 (158-174) : 202 (185-213) : 100 : 32 (30-33) : 29 (27-30) : 22 (20-24) : 34 (30-37), of mid leg 198 (185-207) : 206 (191-217) : 82 (79-87) : 29 (27-30) : 25 (21-27) : 18 (15-20) : 34 (30-37), of hind leg 346 (318-363) : 345 (327-358) : 106 (103-110) : 32 (27-35) : 25 (18-29) : 18 (15-20) : 33 (30-35), these were calculated from 5 specimens.

Wing: In 5 specimens on hand, vein between discal- and 1st basal cell 1.0-1.2 \times as long as that between discal- and 2nd basal cell, relative length of (1)-(4) mentioned in description of ♂ 68 (22-106) : 100 : 436 (311-625) : 18 (0-43).

Abdomen: Blackish part of tergum 1 confined to anterior margin but its middle produced posteriorly; segments 4-7 above and below and sometimes sternum 3 almost wholly dark brownish to blackish; pile on venter often wholly pale yellowish.

Length: Body (without ovipositor) 13-14 mm; wing 14-15.5; fore basitarsus 1.8-2.0.

Distribution: Japan (Honshu and Kyushu).

Type in Hokkaido University, Sapporo.

Specimens examined (7 ♂♂, 5 ♀♀): Kyushu: 1 ♂, Kurinodake, Satsuma, 7. vi. 1963, A. Nagatomi; 1 ♂, Kurinodake, 25. v. 1966, K. Kusigemati; 5 ♂♂, 2 ♀♀, Mt. Kirishima, Satsuma, 11. vi. 1963, Nagatomi; 1 ♀, Mt. Kirisima, Hyuga, 23. vi. 1963, K. Hashimoto; 2 ♀♀, Senganbira, Satsuma, 3. vi. 1966, Kusigemati.

Genus *Pseudoerinna* Shiraki

Pseudoerinna Shiraki, 1932, Trans. Nat. Hist. Soc. Formosa 22:490

Body robust; head nearly as wide as thorax which is not as strongly arched as *Coenomyia* or *Anacanthaspis*; abdomen as wide as thorax. Eyes practically bare in both sexes (at least in ♂ sparse, minute pile is present), contiguous in ♂ and broadly separated in ♀; facial swelling, which is not flat, levels with side of face and is over ½ as long as face; front in ♀ nearly parallel sided; cheeks somewhat developed below eyes; antennal segments 1 and 2 subglobose in shape and subequal in size, and flagellum 8-9 segmented and acute at tip; palpus 2-segmented. Scutellum obtuse-subtriangular in shape and without processes; postscutellum is short and may be concealed by scutellum; subscutellum present. Tibial spurs 1 : 2 : 2. Wing with 5 posterior cells and with anal cell narrowly open; apices of R₁₊₂ and R₃ widely separated from each other. Abdomen broadest at segment 1 or 2; mid-posterior part of sternum 1 not protuberant and without longer pile.

Type-species: *Pseudoerinna fuscata* Shiraki, 1932.

Pseudoerinna fuscata Shiraki (Figs. 7 & 8; Pl. 2, B; Pl. 7, B)

Pseudoerinna fuscata Shiraki, 1932, Trans. Nat. Hist. Soc. Formosa 22:491.

♂. Head: Dark brownish to blackish, more or less pale gray pollinose; antenna yellowish brown to reddish brown and palpus and proboscis (especially former) with a brownish tinge; antennal segments 1 and 2, front between eyes, ocellar triangle, vertex, and occiput with black hairs and facial swelling, side of face, cheeks, and palpus with long black tomentum; proboscis

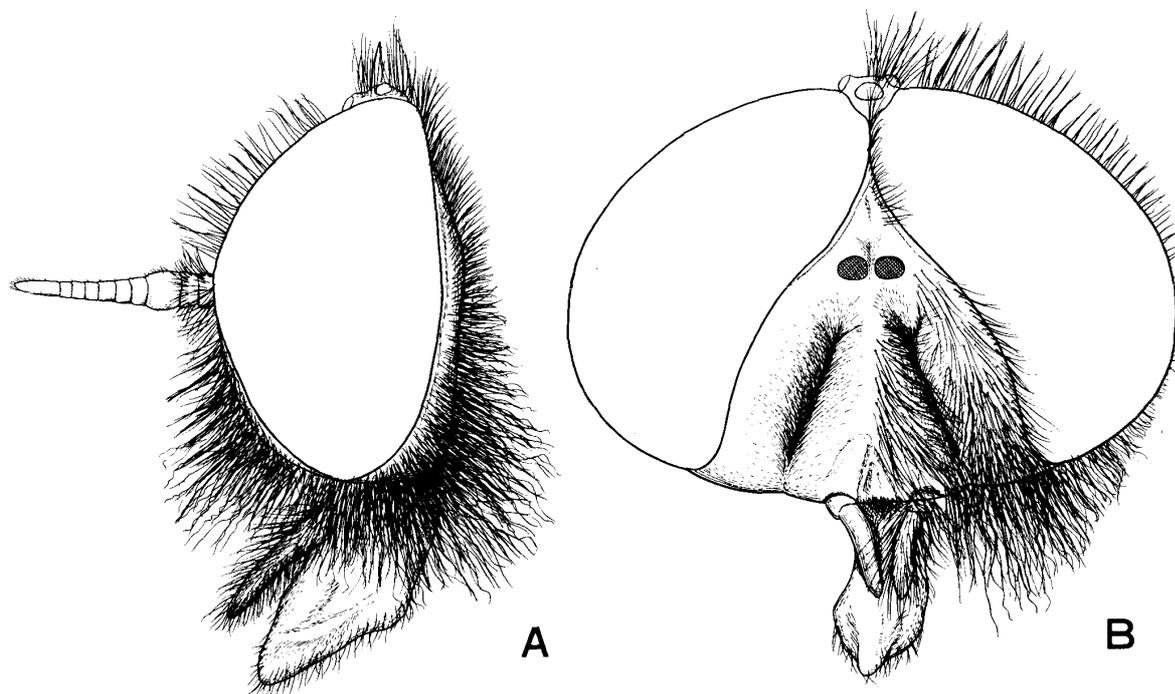


Fig.7. Head of *Pseudoerinna fuscata* Shiraki, ♂ (A: lateral view; B: anterior view)

with short pile which appears to be chiefly pale; areas just above and below antennae bare; eyes and antennal flagellum practically bare (very short and sparse pile is present; apex of flagellum with some short black hairs); eyes contiguous for a space which may be over length of ocellar triangle; total width of head about $3 \times$ distance from antenna to median ocellus ($2.9 \times$) and about $2 \times$ width of face at lowest portion from a direct frontal view ($1.8 \times$); distance from proboscis to antenna somewhat longer than that from antenna to median ocellus ($1.2 \times$); face tapering on upper portion; width of facial swelling somewhat less than its length ($0.8 \times$) and width of face at top portion of facial swelling ($0.8 \times$); facial swelling over $\frac{1}{2}$ as long as face ($0.8 \times$); when measured along inner surface antenna as long as distance from antenna to median ocellus, each of segments 1 and 2 wider than long, and relative length of segments 1+2 and flagellum 100 : 510; palpus shorter than face ($0.8 \times$); space between antennae less than width of ocellar triangle ($0.2 \times$).

Thorax: Dark brownish to blackish, more or less pale gray pollinose; thorax covered with black tomentum; haltere yellowish brown to brownish.

Leg: Yellowish brown to reddish brown, but coxa, trochanter, femur, and apex of tarsal segment 5 dark brownish to blackish; coxa more or less pale gray pollinose; coxa and femur with long black tomentum; relative length of segments of fore leg 194-231-100-33-27-21-34, of mid leg 179-234-85-27-22-16-30, of hind leg 254-322-112-36-30-21-34.

Wing: Membrane tinged with dark brown, but basal portion of wing, costal and subcostal cells, basal part of marginal cell, bases of discal and 1st submarginal cells, and apex of 1st basal cell yellowish brown; stigma darker (posterior margin of wing from 1st posterior cell to axillary often may become paler but is interrupted at apex of anal cell or so); in 1 specimen on hand, vein between discal- and 1st basal cell $1.1 \times$ as long as that between discal- and 2nd basal cell, relative length of distance between base of M_1 and that of M_2 , base of M_2 and that of M_3 , and base of M_3 and that of M_4 77 : 100 : 286, and mouth of anal cell $0.1 \times$ as long as m-cu cross-

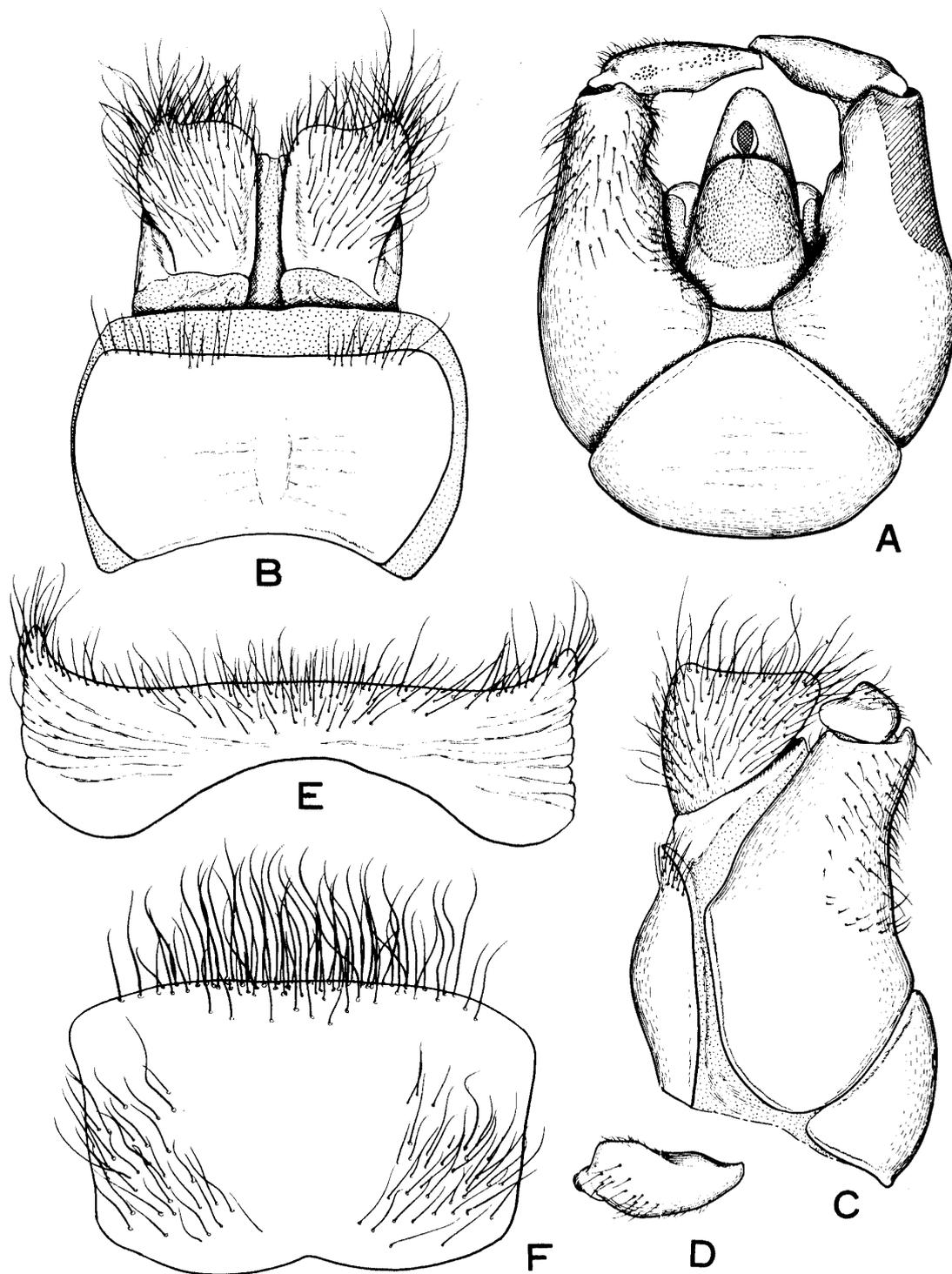


Fig.8. Male genitalia of *Pseudoerinna fuscata* Shiraki (from Mt. Kogane, Tamba) (A: genitalia excluding epandrium and cerci, ventral view; B: epandrium and cerci, dorsal view; C: genitalia including epandrium and cerci, lateral view; D: left dististyle, posterior view; E: Tergum 8; F: Sternum 8)

vein; vein M₄ not directly arising from discal cell.

Abdomen: Dark brownish to blackish, above and below clothed with black pile; dorsum somewhat polished and with a reddish tinge.

Genitalia: Tergum 7 weakly rounded on posterior margin, evenly short haired and with longish posterior marginal hairs; sternum 7 1½ as long as wide, entirely clothed with short black hairs, and furnished with dense long black hairs on posterior margin; tergum 8 much shorter than wide, strongly concave on anterior margin, and with short hairs on posterior marginal portion; sternum 8 slightly shorter than wide, with short hairs on antero-lateral portions, and dense long hairs on posterior margin; genitalia different in structure from those of *Coenomyia*, *Anacanthaspis*, and *Odontosabula*, rather elongate; epandrium shorter than wide, short haired on lateral 1/3 of posterior margin; cercus large and dilated towards almost truncate posterior margin, densely and evenly long haired; hypandrium large and strongly sclerotized, 2/3 × as long as wide, without any desclerotized portion, sharply separated from basistyle by a distinct suture; basistyle long and almost straight, 2 basistyles widely separated from each other by a membranous area at ventro-medial portion; dististyle rather short, narrowing towards tip, with very short hairs on outer margin of basal portion; ventral phallobasal structure bilobed.

Length: Body 15 mm; wing 11; fore basitarsus 1.6.

♀. Judging from the description of Shiraki (1932), it is similar to ♂ except eyes broadly separated and front "nearly parallel sided but very slightly narrowed in the middle."

Distribution: Japan (Honshu).

Type-locality: Mt. Kurama, Yamashiro (Kyoto-Pref.). Type (1 ♀) in "the Entomological Museum of Government Research Institute, Taihoku, Formosa."

Specimen examined: 1 ♂, Mt. Kogane (near Sasayama), Tamba, 26. v. 1952, Y. Yamamoto.

Genus *Glutops* Burgess

Glutops Bur., 1878, Proc. Bost. Soc. Nat. Hist. 19:321.

Tamayura Nagatomi, 1955, Mushi 29:57. New Synonymy.

Body fairly robust; head wider than thorax which is strongly arched; abdomen about as wide as thorax. Eyes practically bare in both sexes, contiguous in ♂ and widely separated in ♀; either facial swelling or side of face (or both of them) especially in ♂ conspicuously produced forward; front in ♀ nearly parallel sided; antennal segments 1 and 2 subequal in size, and longer than wide or subglobose in shape, and flagellum 7 (or so) segmented and acute or bluntly pointed at apex; palpus 2-segmented. Scutellum obtuse-subtriangular in shape and without processes; postscutellum fairly well developed and subscutellum present. Tibial spurs 0 : 2 : 1; hind coxa with a mid-ventral knob-like process which is absent in other genera discussed in this paper. Wing with 5 posterior cells and with anal cell open; apices of R₁₊₂ and R₃ widely separated from each other. Abdomen broadest at segment 1; mid-posterior part of sternum 1 not protuberant and without longer pile.

Type-species: *Glutops singularis* Burgess, 1878.

Glutops itoi (Nagatomi, 1955), type-species of *Tamayura*, is very different from *G. singularis* Burgess, 1878, *G. rossi* Pechuman, 1945, and *G. punctatus* Wirth, 1954 (see Nagatomi, 1958). But Nagatomi had seen several undescribed North American species (in the care of the late Dr. J. G. Chillcott of Canada Department of Agriculture) which are intermediate in structure between *Tamayura* and *Glutops*.

Key to species of *Glutops* known from Japan

1. Side of face more swollen than or as swollen as mid-lower face, and cheeks well developed below eyes; scutellum and posterior portion of abdominal each tergum pale gray pollinose; anal cell narrowly open 2
 Side of face not so swollen as in mid-lower face and cheeks not developed below eyes; posterior portions of abdominal terga 1-4 (or 1-3 in ♀) and scutellum (sometimes except anterior part) without pollen and somewhat velvety; anal cell widely open *itoi*
- 2(1). In ♂, side of face more swollen and facial swelling as wide as side of face on a mid line, distance from proboscis to antenna longer than that from antenna to median ocellus (1.3-1.4 ×), width of one eye on a mid line from a direct frontal view about 1½ distance from antenna to median ocellus (1.4-1.5 ×), and pile on just behind upper margin of each eye longer (♀ unknown) *esakii* n. sp.
 In ♂, side of face less swollen and facial swelling wider than side of face on a mid line (1.4-1.9 ×), distance from proboscis to antenna about as long as that from antenna to median ocellus (1.0-1.1 ×), width of one eye on a mid line from a direct frontal view less than 1½ distance from antenna to median ocellus (1.1-1.2 ×), and pile on just behind upper margin of each eye shorter (♀ unknown) *semiformis* n. sp.

***Glutops esakii* Nagatomi and Saigusa, n. sp.** (Fig. 9, A & B; Fig. 10; Pl. 4, A & B; Pl. 7, C)

This species may be separated from *semiformis* n. sp. as shown in the key.

♂. Head (in specimens on hand antennal flagellum broken off): Dark brownish to blackish, pale gray pollinose; ocellar triangle, vertex, occiput, cheeks, palpus, and side of face with very long black hairs which become pale on cheeks near neck and sometimes basal portion of palpus; antennal segments 1 and 2, facial swelling except upper part and proboscis with black hairs which may be intermixed with pale ones on proboscis; front, central part of face below antenna and occiput except just behind eye bare; longer pile on side of face 1.5-1.7 × (based on 2 individuals) and that on just behind upper margin of each eye 1.9 × (based on 1 specimen) as long as width of ocellar triangle respectively; eyes contiguous for a distance which may be less than length of ocellar triangle (0.7-0.8 ×); width of one eye on a mid line from a direct frontal view about 1½ distance from antenna to median ocellus (1.4-1.5 ×) and narrower than width of face at lowest portion from a direct frontal view (0.7 ×); distance from proboscis to antenna longer than that from antenna to median ocellus (1.3-1.4 ×); face tapering on upper portion; central face swollen in lower portion but flat in upper part; facial swelling as wide as side of face (on a mid line), which is swollen, and cheeks well developed below eyes; antennal segments 1 and 2 subglobose in form and subequal in size; palpus nearly equal in length to face (0.9 ×) and its segment 2 less than 2 × as long as 1 (1.7 ×); space between antennae less than width of ocellar triangle (0.3 ×).

Thorax: Dark brownish to blackish, pale gray pollinose; mesonotum with 3 broad darker stripes of which median one is divided by a thin line and the lateral are interrupted at suture; mesonotum and scutellum clothed with long black hairs; pro-, meso- (except antero-lower part), sterno- (except posterior part), and upper part of hypopleura with black pile which may become chiefly pale on pro- and hypopleura; ptero- and metapleura bare; haltere yellowish brown to brownish.

Leg: Dark brownish to blackish; coxa and femur pale gray pollinose and long black pilose;

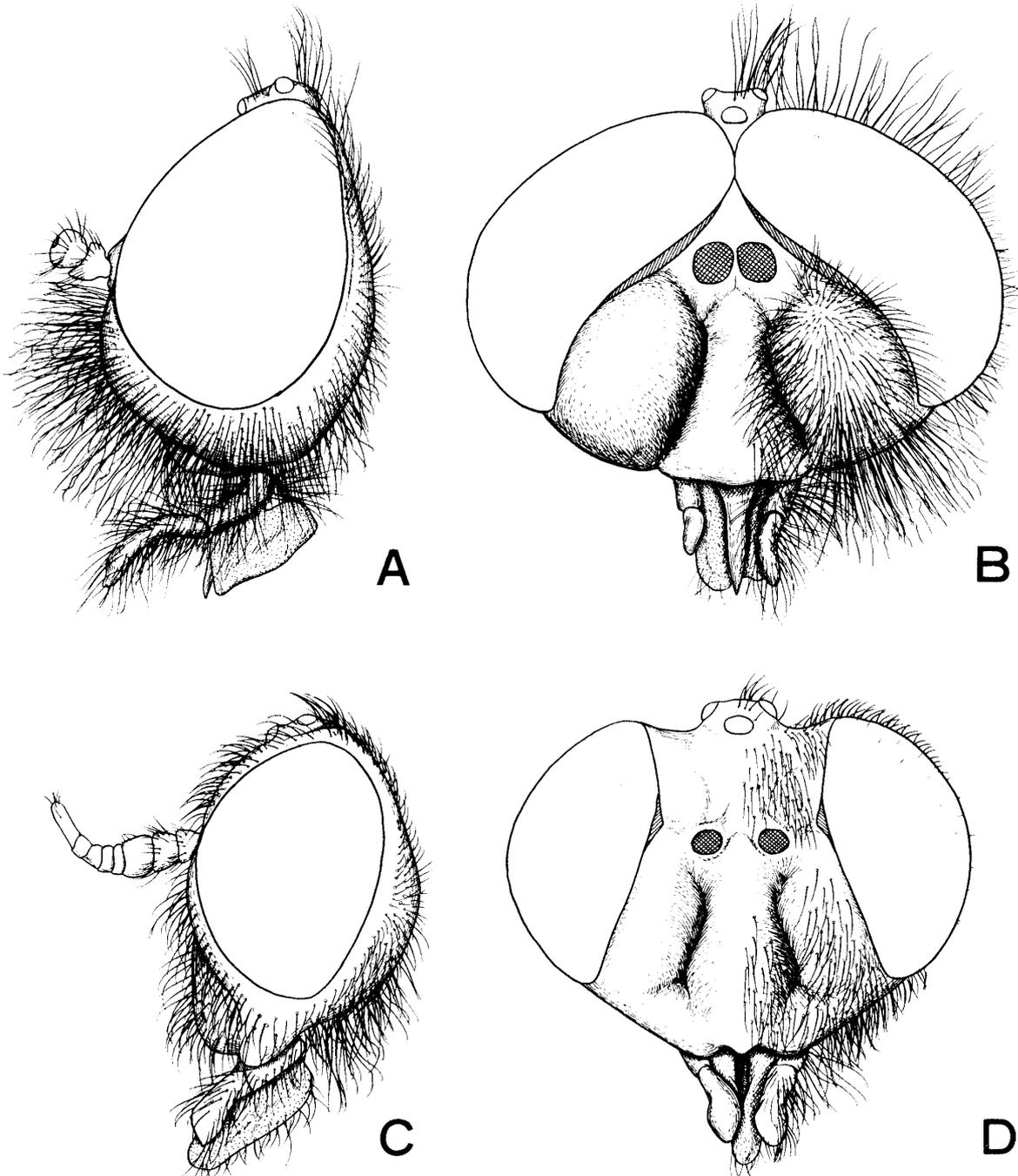


Fig.9. Head of *Glutops* (A & B: *esakii* n. sp., ♂; C & D: *Glutops* sp., ♀; A & C: lateral view; B & D: anterior view)

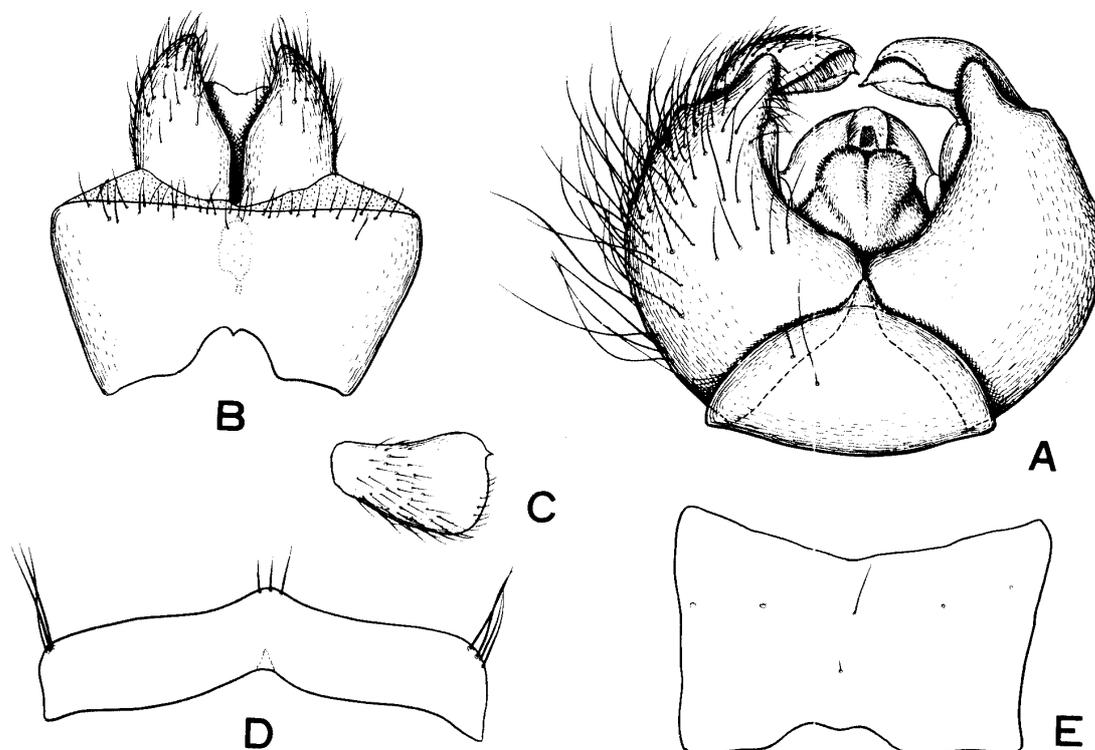


Fig.10. Male genitalia of *Glutops esakii* n. sp. (from Iwanadome, Shinano) (A: genitalia excluding epandrium and cerci, ventral view; B: epandrium and cerci, dorsal view; C: left dististyle, posterior view; D: Tergum 8; E: Sternum 8)

relative length of segments of fore leg 149-198-100-32-27-22-24, of mid leg 154-200-83-29-24-15-27, of hind leg 202-232-105-?-?-?-?, these were based on 1 specimen.

Wing: Membrane brownish fumose; wing base, costal cell, etc., may have a yellowish tinge; stigma yellowish brown to brownish and elongate, but often not so distinctly marked; in 2 specimens on hand, vein between discal- and 1st basal cell less than twice as long as that between discal- and 2nd basal cell ($1.3-1.6 \times$), relative length of distance between (1) base of M_1 and that of M_2 , (2) base of M_2 and that of M_3 , and (3) base of M_3 and that of M_4 55(50-59) : 100: 392 (383-400), and mouth of anal cell less than $\frac{1}{2}$ as long as m-cu crossvein ($0.2 \times$).

Abdomen: Dark brownish to blackish, pale gray pollinose; anterior part of each tergum darker due to faint pollen; above and below clothed with black hairs which are long on dorsum.

Genitalia: Tergum 7 almost as long as wide, clothed with long black hairs on lateral margin and middle portion of posterior margin; sternum 7 slightly longer than wide, black haired on posterior half; tergum 8 much shorter than wide, concave on both anterior and posterior margins, and with a few long hairs on lateral margin; sternum 8 much longer than tergum 8, incised on posterior margin, with a few minute hairs on disc; genitalia broad and rounded; epandrium $\frac{1}{2}$ as long as wide, without any desclerotized portion, with its posterior margin almost straight and short haired; cercus rather large and tapering towards tip, clothed with longish hairs on posterior half; hypandrium moderately large and strongly sclerotized, without any desclerotized portion, sharply separated from basistyle by a distinct suture; basistyle short and broad, more strongly narrowed towards tip than in *Coenomyia*, *Anacanthaspis*, and *Odontosa-*

bula, touching for a short distance at ventro-medial portion; dististyle short, cylindrical, rather clavate and ending in a minute spine-like process, when viewed from behind dististyle weakly bisinuate; basistyle clothed with long black hairs, dististyle with a few short hairs on outer surface.

Length: Body 6 mm; wing 6.5-7; fore basitarsus 0.8-1.0.

Distribution: Japan (Honshu and Kyushu).

♀. Unknown.

Holotype: 1 ♂, Iwanadome (near Tokugôtôge), Shinano, 12. vii. 1963, T. Saigusa (deposited in Kyushu University, Fukuoka).

Paratype: 1 ♂, Naidaizin, Higo, 25. v. 1952, S. Ito (preserved in Kagoshima University, Kagoshima).

This species is named in honor of the late Professor Teiso Esaki who was nicknamed "a great man" and was a world authority on Heteroptera.

Glutops itoi (Nagatomi), new combination (Figs. 11 & 12; Pl. 5; Pl. 7, D)

Tamayura itoi Nagatomi, 1955, *Mushi* 29:57-60.

♂ (Here described for the first time). Head: Dark brownish to blackish, with pale gray pollen which may not be so distinct on occiput, cheeks, antennal flagellum, palpus and proboscis; head covered with very long black hairs, but eyes, front and area above facial swelling bare, antennal flagellum microscopically pubescent and proboscis with short black pile; longer hairs on side of face 2.5-2.9× and those on just behind upper margin of each eye 2.8-3.3× as long as width of ocellar triangle respectively; eyes contiguous for a distance which is more than length of ocellar triangle (1.2-2.0×); width of one eye on a mid line from a direct frontal view somewhat longer than distance from antenna to median ocellus (1.2×) and about equal to width of face at lowest portion from a direct frontal view (1.0-1.1×); distance from proboscis to antenna nearly equal to that from antenna to median ocellus (0.9×); face tapering on upper portion; central part of face gourd-shaped and its lower swelling as wide as long and over ½ as wide as face at top portion of lower swelling (0.7-0.8×); cheeks not developed below eyes; lower swelling over ½ as long as face (0.7×); when measured along inner surface antenna about as long as distance from antenna to median ocellus (1.0-1.1×), its segments 1-2 subglobose in form and subequal in size and relative length of segments 1+2 and flagellum 100 : 316(280-355) (based on 4 specimens); palpus about as long as face (1.0-1.2×) and its segment 2 about 3× as long as 1; space between antennae less than width of ocellar triangle (0.1-0.2×).

Thorax: Dark brownish to blackish, pleura, postscutellum, and side of mesonotum including humeral and posterior calli pale gray pollinose; mesonotum with a pair of narrow, darker or pale gray pollinose stripes reaching to point opposite wing base; transverse suture bordered with pale gray pollen; mesonotum and scutellum very long black haired; (1) pro-, (2) upper- and posterior part of meso-, (3) sterno-, (4) upper part of hypopleura with black pile which is long on (1) and (2); meta- and pteropleura bare; haltere yellowish brown to brownish.

Leg: Dark brownish to blackish; femur and tarsus often somewhat paler; coxa and femur with long black pile and former pale gray pollinose and latter more or less so; relative length of segments of fore leg 163 (158-171) : 216 (208-224) : 100 : 33 (29-34) : 28 (24-30) : 19 (15-21) : 32 (30-34), of mid leg 177 (175-179) : 229 (221-235) : 91 (84-98) : 33 (32-35) : 27 (26-29) : 18 (16-20) : 30 (28-32), of hind leg 261 (253-266) : 310 (292-322) : 130 (124-138) : 47 (45-

The Coenomyiidae of Japan (Diptera)

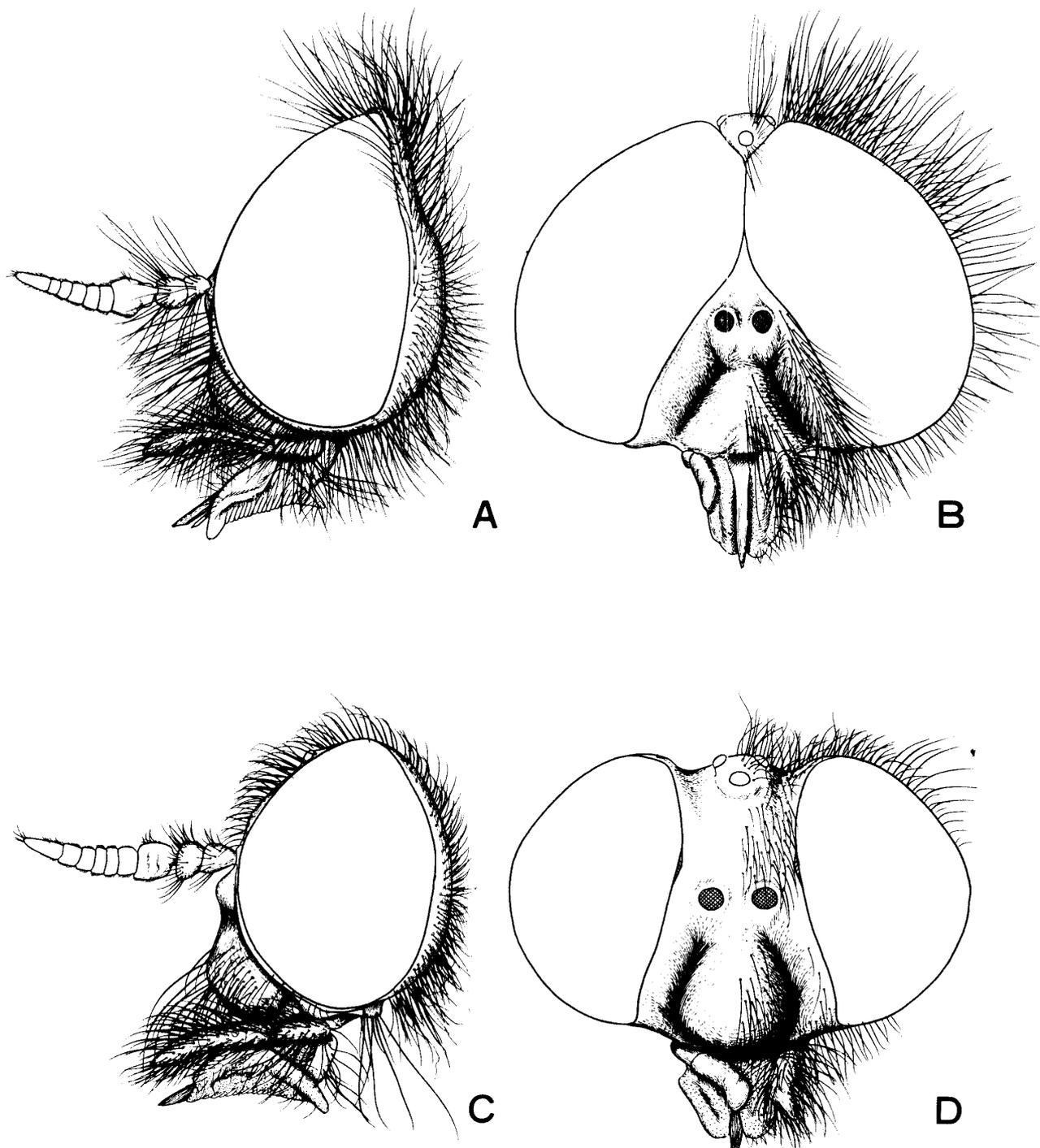


Fig.11. Head of *Glutops itoi* (Nagatomi) (A & B: ♂; C & D: ♀; A & C: lateral view; B & D: anterior view)

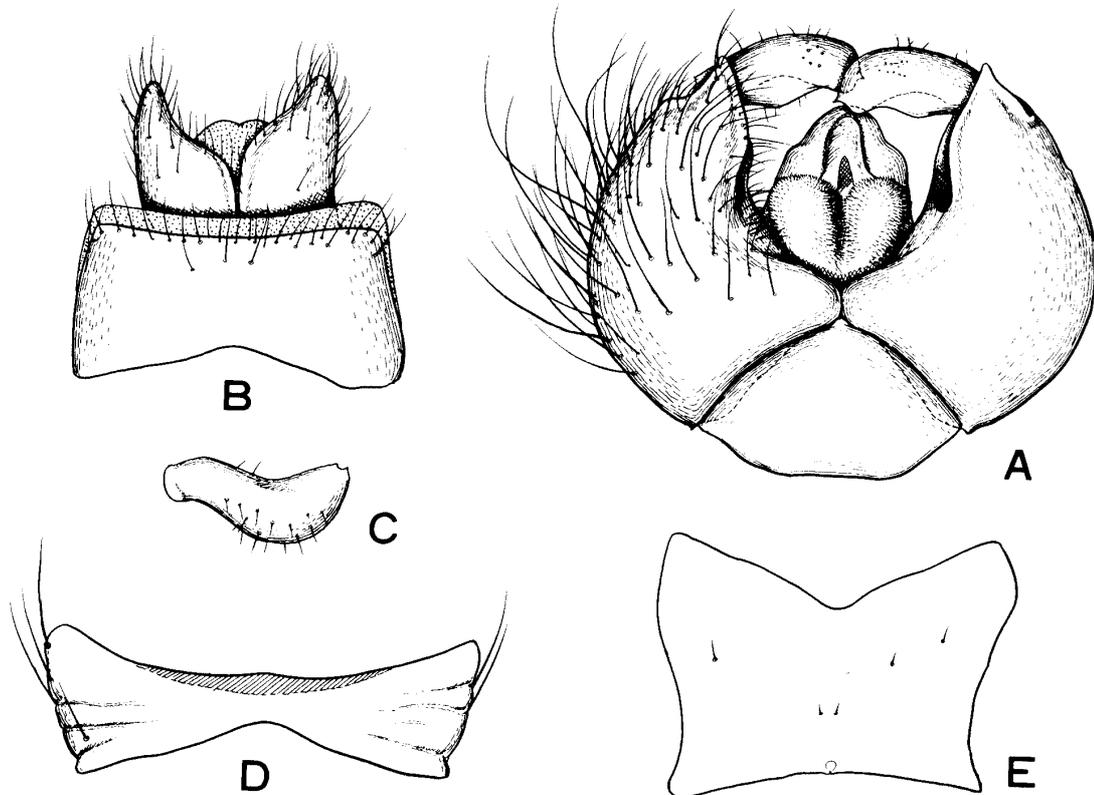


Fig.12. Male genitalia of *Glutops itoi* (Nagatomi) (from Naidaizin, Higo) (A: genitalia excluding epandrium and cerci, ventral view; B: epandrium and cerci, dorsal view; C: left dististyle, posterior view; D: Tergum 8; E: Sternum 8)

brown to brownish, elongate but often not so distinctly marked; vein between discal- and 1st basal cell shorter than that between discal- and 2nd basal cell ($0.6-0.7\times$); relative length of distance between (1) base of M_1 and that of M_2 , (2) base of M_2 and that of M_3 and (3) base of M_3 and that of M_4 27 (0-46) : 100 : 311 (286-330) (based on 4 specimens); mouth of anal cell over $\frac{1}{2}$ as long as m-cu crossvein ($0.6-0.9\times$).

Abdomen: Dark brownish to blackish, pale gray pollinose; dorsum without pollen on almost whole surface of segment 1, on mid-basal part of segment 5, and in each of segments 2-4 except antero-lateral part which becomes larger on segment 4; abdomen clothed with black hairs which are very long on dorsum.

Genitalia: Tergum 7 and sternum 7 similar to those of *esakii*, but entire hind margin of tergum short haired; tergum 8 with posterior margin weakly producing posteriorly, with a few hairs at middle portion and postero-lateral corners; genitalia similar to those of *esakii*, but ventro-distal portion of basistyle broader, dististyle lamellate and broad, clothed with many short hairs on basal half.

Length: Body 7.5-8.5 mm; wing 7-8; fore basitarsus 0.9-1.0.

♀. Similar to ♂ except as follows: Hairs especially on head, antennal segments 1-2, palpus, and mesonotum shorter than in ♂. Head: Pale gray pollen is very distinct on occiput and cheeks, as well as front and face; front (except just above antenna) with black hairs; longer hairs on side of face 1.0 times and those on just behind upper margin of each eye $1.4-1.5\times$ as long as

width of ocellar triangle respectively (based on 2 specimens); hairs on side of face much shorter than those on facial swelling; width of one eye on a mid line from a direct frontal view about $1\frac{1}{2}$ distance from antenna to median ocellus ($1.4-1.5\times$), somewhat narrower than width of face at lowest portion from a direct frontal view ($0.8\times$), and $1\frac{1}{2}$ or so width of front at narrowest point ($1.3-1.5\times$) which is about equal to that at median ocellus ($0.9-1.0\times$) which is $2-3\times$ width of ocellar triangle; distance from proboscis to antenna about $1\frac{1}{2}$ that from antenna to median ocellus; when measured along inner surface antenna nearly twice distance from antenna to median ocellus ($1.8\times$), and relative length of segments 1+2 and flagellum 100 : 302(278-320) (based on 3 specimens); in specimens on hand 2nd segment of palpus $2-3\times$ as long as 1.

Thorax: Mesonotum heavily covered with pale gray pollen which is absent or faint on 3 broad stripes all of which do not extend to posterior margin of mesonotum (lateral stripes are separated from anterior margin of mesonotum or humeral callus and are interrupted at suture by pollen, and median one is divided by a thin line which is darker or pollinose).

Leg: Relative length of segments of fore leg 176 (170-183) : 227 (227-228) : 100 : 34 (32-36) : 28 (27-31) : 22 (20-25) : 36 (35-37), of mid leg 209 (203-213) : 262 (254-272) : 97 (95-100) : 35 (33-36) : 29 (28-30) : 21 (18-22) : 33 (32-33), of hind leg 287 (276-294) : 348 (330-357) : 141 (135-147) : 48 (46-50) : 38 (37-39) : 21 (20-22) : 37 (35-39), these were calculated from 3 specimens.

Wing: In 3 specimens on hand, vein between discal- and 1st basal cell $0.7-1.0\times$ as long as that between discal- and 2nd basal cell, relative length of (1)-(3) mentioned in description of ♂ 24(13-57) : 100 : 347(300-400), and mouth of anal cell $1.1-1.2\times$ as long as m-cu crossvein.

Abdomen: Segment 1 with distinct pale gray pollen on antero-lateral part, as well as segments 2-3; segment 4 except mid-basal part wholly pale gray pollinose; hairs on side of terga 1-3 become longer.

Length: Body (without ovipositor) 5-6 mm; wing 7-8; fore basitarsus 0.7-0.9.

Distribution: Kurile Islands² and Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Type-locality: Ishizuchiyama, Iyo, Shikoku. Type in the University of Osaka Prefecture (formerly Naniwa University), Sakai.

Specimens examined (6 ♂♂, 3 ♀♀): Hokkaido: 1 ♂, Yubaridake, Sorachi, 16. vii. 1967, T. Saigusa; 1 ♂, Yubaridake, 16. vii. 1967, A. Nakanishi. Honshu: 2 ♂♂, Sandankyo, Aki, 4. vi. 1953, S. Ito; 1 ♀, Hirogawara, Yamashiro, 1. vi. 1961, R. Inoue; 1 ♀, Hanase, Yamashiro, 7. vi. 1961, Ito; 1 ♀, Osgidani, Ise, 11. vi. 1952, Ito. Kyushu: 1 ♂, Naidaizin, Higo, 25. v. 1952, Ito; 1 ♂, Kyusukei, Mt. Kuju, Bungo, 19. v. 1963, Saigusa.

Glutops semiformis Nagatomi and Saigusa, n. sp. (Figs. 13 & 14)

This species may be separated from *esakii* n. sp. as shown in the key.

♂. Similar to *esakii* except as follows: Head: Sometimes pile on side of face except lower portion and that on palpus except apical part pale in color (this may be true of *esakii*); longer pile on side of face $1.3-1.5\times$ and that on just behind upper margin of each eye $1.3-1.6\times$ as long as width of ocellar triangle respectively; eyes contiguous for a distance which is more than length of ocellar triangle ($1.2-1.5\times$); width of one eye on a mid line from a direct frontal view

2) After Kuwayama (1967, Insect fauna of the Southern Kurile Islands. Sapporo. p. 111).

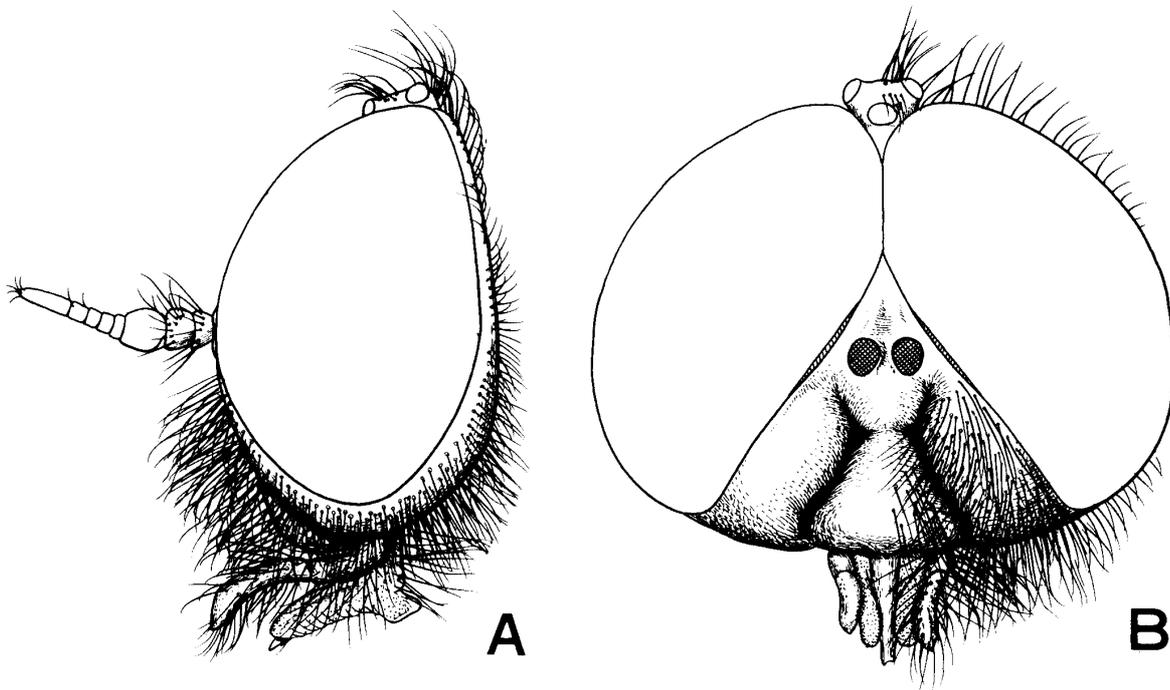


Fig.13. Head of *Glutops semiformis* n. sp. ♂ (A: lateral view; B: anterior view)

less than $1\frac{1}{2}$ distance from antenna to median ocellus ($1.1-1.2\times$); distance from proboscis to antenna about equal to that from antenna to median ocellus ($1.0-1.1\times$); facial swelling broader than side of face (on a mid line) ($1.4-1.9\times$); in 8 specimens measured, width of one eye on a mid line from a direct frontal view $0.8-0.9\times$ width of face at lowest portion from a direct frontal view, when measured along inner surface antenna $0.7-0.8\times$ as long as distance from antenna to median ocellus and relative length of segments 1+2 and flagellum 100 : 310(263-383); palpus $0.7-0.8\times$ as long as face and its segment 2, $1.4-1.8\times$ as long as 1, space between antennae $0.2-0.3\times$ width of ocellar triangle.

Thorax: Sometimes pile on pleura wholly pale in color (this may be true of *esakii*).

Leg: In 8 specimens measured, relative length of segments of fore leg 177 (167-188) : 217 (203-232) : 100 : 38 (36-41) : 32 (30-34) : 25 (24-26) : 36 (33-39), of mid leg 181 (170-194) : 224 (209-235) : 82 (79-87) : 32 (29-35) : 25 (22-27) : 16 (15-19) : 32 (29-35), of hind leg 229 (212-248) : 269 (255-290) : 107 (100-110) : 41 (36-44) : 29 (27-31) : 18 (15-19) : 34 (32-35).

Wing: In 8 specimens measured, vein between discal- and 1st basal cell $1.2-1.9\times$ as long as that between discal- and 2nd basal cell, relative length of (1)-(3) mentioned in description of *esakii* 38 (25-55) : 100 : 412 (375-440), and mouth of anal cell $0.3-0.45\times$ as long as m-cu cross-vein.

Genitalia: Very much resembling those of *esakii*, but hairs of basistyle shorter and sparser and keel-like edge of ventro-proximal portion of flexor surface of dististyle weaker.

Length: Body 5.5-6 mm; wing 6-7; fore basitarsus 0.8-0.85.

♀. Unknown.

Distribution: Japan (Honshu).

Holotype: 1 ♂, Shinhodaka, Hida, 13. vii. 1969, A. Nagatomi (deposited in Kyushu University, Fukuoka).

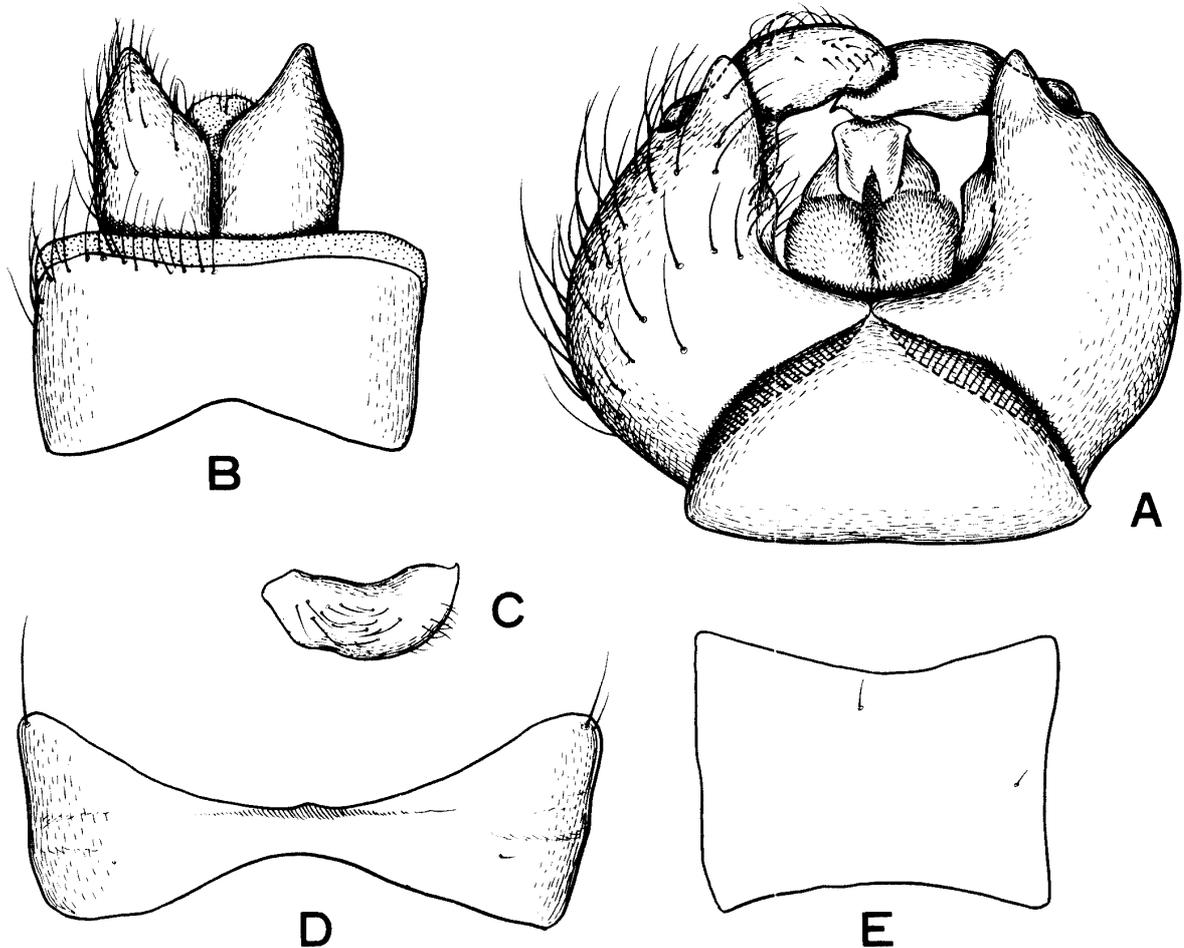


Fig.14. Male genitalia of *Glutops semiformis* n. sp. (from Shinhodaka, Shinano) (A: genitalia excluding epandrium and cerci, ventral view; B: epandrium and cerci, dorsal view; C: left dististyle, posterior view; D: Tergum 8; E: Sternum 8)

Paratypes: 11 ♂♂, same data as holotype (preserved in Kyushu University and Kagoshima University, Kagoshima).

The specimens (♂♂) mentioned above were collected under the branch and leaves of an isolated white birch between 1 and 2 p. m. The flies consisting of several individuals flew slowly in a horizontal position, turning back with short steps, and shortly after the start of this activity they disappeared from sight (probably they took a rest on twig or leaf).

***Glutops* sp.** (Fig. 9, C & D; Pl. 4, C & D)

It is certain that the specimens (♀♀) described below belong to *esakii* or *semiformis*.

♀. Similar to *esakii* (♂) except as follows: Hairs on head, thorax, coxa, femur, and abdomen shorter than in *esakii* (♂) and those on cheeks, palpus, proboscis, pleura, fore and hind coxae, abdominal venter and side of abdominal dorsum pale yellowish in color; hairs on side of face 0.7 × and those on just behind upper margin of each eye 0.6 × as long as width of ocellar triangle respectively in 1 specimen (from Mt. Hayachine) measured; hairs on upper occiput more extensive in area than in *esakii* (♂) and those on side of face either chiefly black or pale; front with black hairs; femur intermixed with black and pale hairs. Head: Width of one eye on

a mid line from a direct frontal view $\frac{1}{2}$ width of face at lowest portion from a direct frontal view and in specimens on hand $1.3\times$ distance from antenna to median ocellus, and nearly equal to width of front at narrowest point ($0.9\times$) which is about equal to that at median ocellus ($0.9-1.0\times$) which is about $2\frac{1}{2}-3\times$ width of ocellar triangle; distance from proboscis to antenna about twice that from antenna to median ocellus ($1.9-2.0\times$); facial swelling wider than side of face (on a mid line) ($1.3\times$) which is not so swollen as in *esakii* (δ); when measured along inner surface antenna longer than distance from antenna to median ocellus ($1.8-2.0\times$) and relative length of antennal segments 1+2 and flagellum 100 : 250 (244-255) (based on 2 specimens); palpus shorter than length of face ($0.8\times$) and its segment 2 somewhat longer than 1 ($1.2\times$); in specimens on hand space between antennae $0.4-0.5\times$ width of ocellar triangle.

Leg: Relative length of segments of fore leg 166 (161-170) : 214 (212-216) : 100 : 36 (35-36) : 31 (30-32) : 25 (23-27) : 36 (32-39), of mid leg 183 (177-188) : 228 (223-233) : 83 (77-88) : 30 (29-30) : 24 (23-24) : 17 (16-18) : 31 (29-33), of hind leg 230 (226-233) : 274 (265-282) : 117 (113-121) : 44 (42-45) : 30 (29-30) : 20 (19-21) : 36 (32-39), these were calculated from 2 specimens.

Wing: In 1 specimen (from Mt. Hayachine) on hand, relative length of (1)-(3) mentioned in description of *esakii* (σ) 33 : 100 : 375, and mouth of anal cell $0.4\times$ as long as m-cu crossvein.

Length: Body (without ovipositor) 4.5-5 mm; wing 6.5-7; fore basitarsus 0.75-0.8.

Distribution: Japan (Honshu).

Specimens examined: 1 ♀, Mt. Hayachine, Iwate-Pref., 29. vii. 1965, A. Nakanishi; 1 ♀, Iwanadome (near Tokugotôge), Shinano, 12. vii. 1963, T. Saigusa.

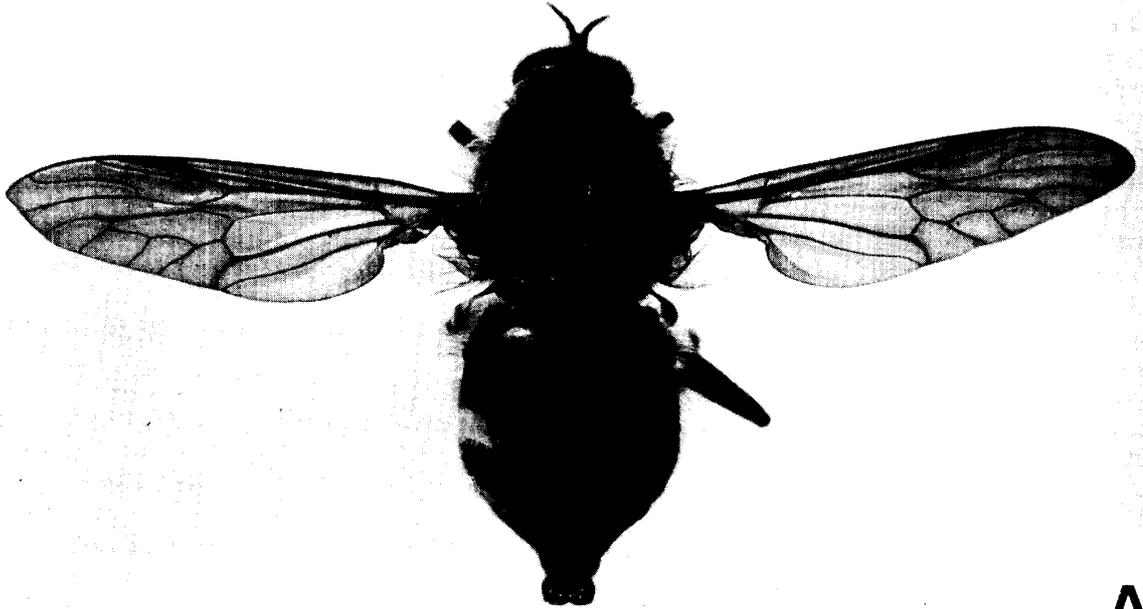
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Explanation of plates

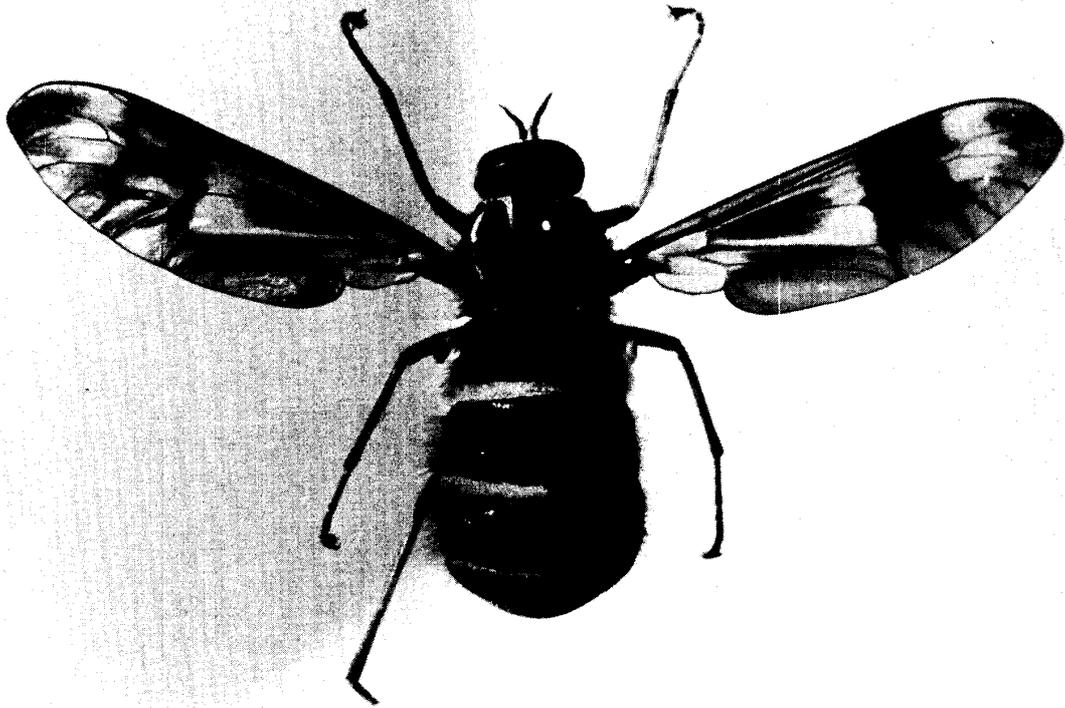
- Pl. 1. *Coenomyia basalis* Matsumura (from Sasayama, Tamba). A: ♂; B: ♀.
- Pl. 2. A: *Anacanthaspis bifasciata japonica* Shiraki, ♂ (from Kanayama, Kai); B: *Pseudoerinna fuscata* Shiraki, ♂ (from Mt. Kogane, Tamba).
- Pl. 3. *Odontosabula gloriosa* Matsumura (from Mt. Kirishima, Satsuma). A: ♂; B: ♀.
- Pl. 4. A & B: *Glutops esakii* n. sp., ♂ (from Naidaizin, Higo); C & D: *Glutops* sp., ♀; C: from Iwanadome, Shinano; D: from Mt. Hayachine, Iwate-Pref.
- Pl. 5. *Glutops itoi* (Nagatomi). A & B: ♂, from Sandankyo, Aki; C & D: ♀, from Osugidani, Ise.
- Pl. 6. Wing of Coenomyiidae. A & B: *Coenomyia basalis* Matsumura (A: from Sasayama, Tamba; B: from Mt. Wakasugi, Chikuzen); C & D: *Anacanthaspis bifasciata japonica* Shiraki (in each of discal- and basal portion of 1st submarginal cell of figure C, there is a paler spot which is abnormal and usually absent); A & C: ♂; B & D: ♀.
- Pl. 7. Wing of Coenomyiidae. A: *Odontosabula gloriosa* Matsumura., ♂ (from Mt. Kirishima, Satsuma); B: *Pseudoerinna fuscata* Shiraki, ♂ (from Mt. Kogane, Tamba); C: *Glutops esakii* n. sp., ♂ (from Iwanadome, Shinano); D: *Glutops itoi* (Nagatomi), ♂ (from Naidaizin, Higo).



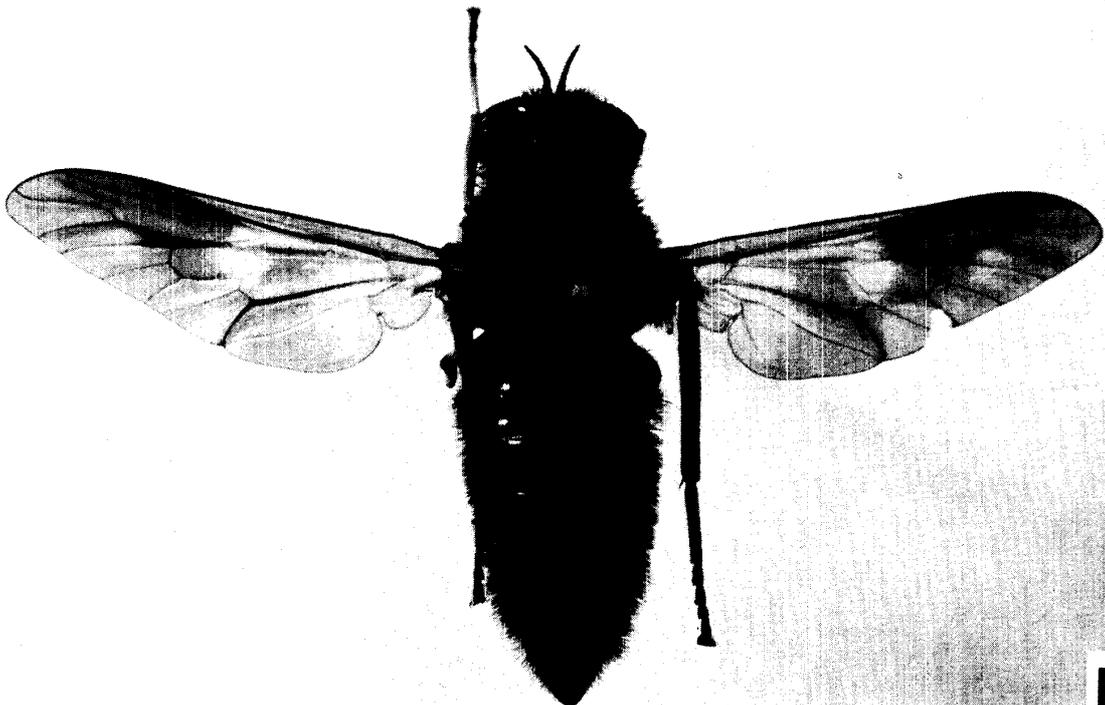
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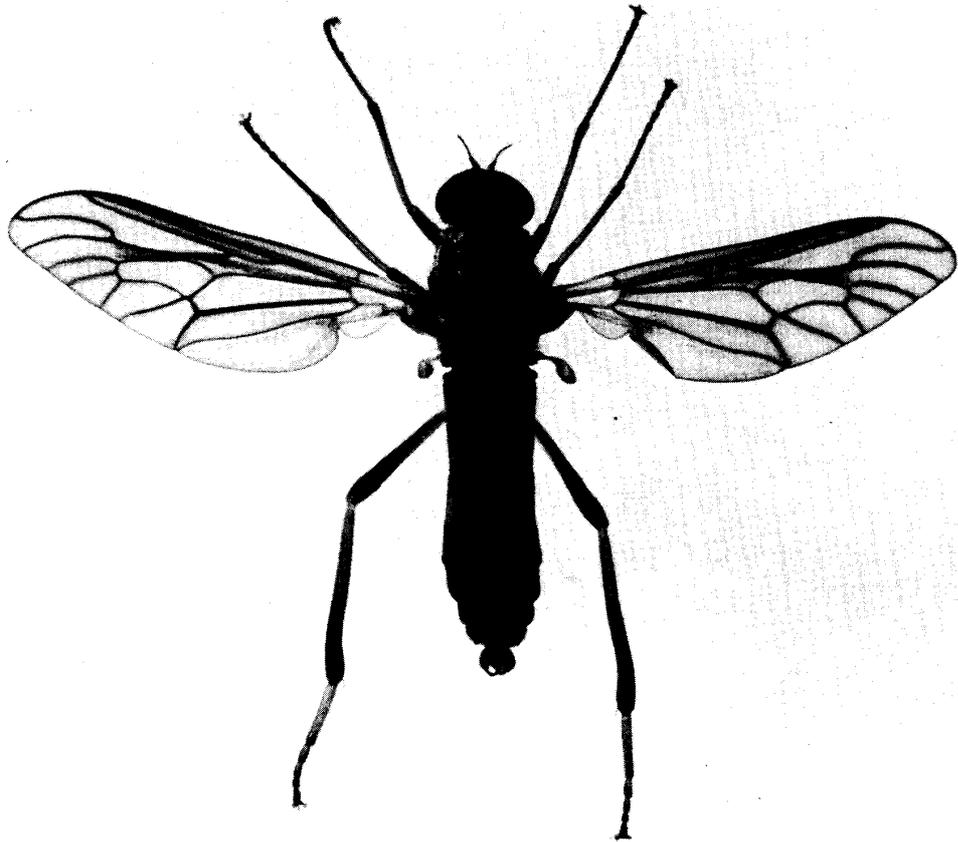
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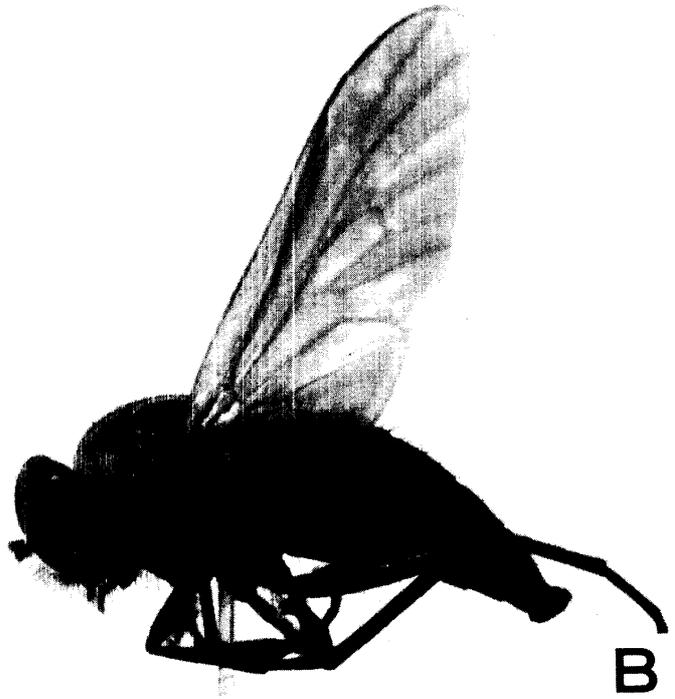
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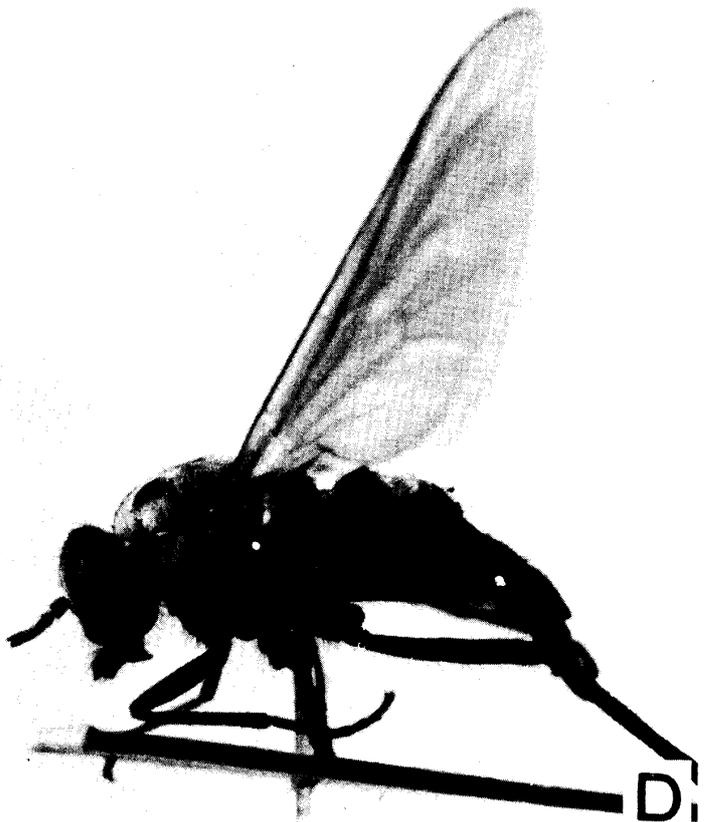
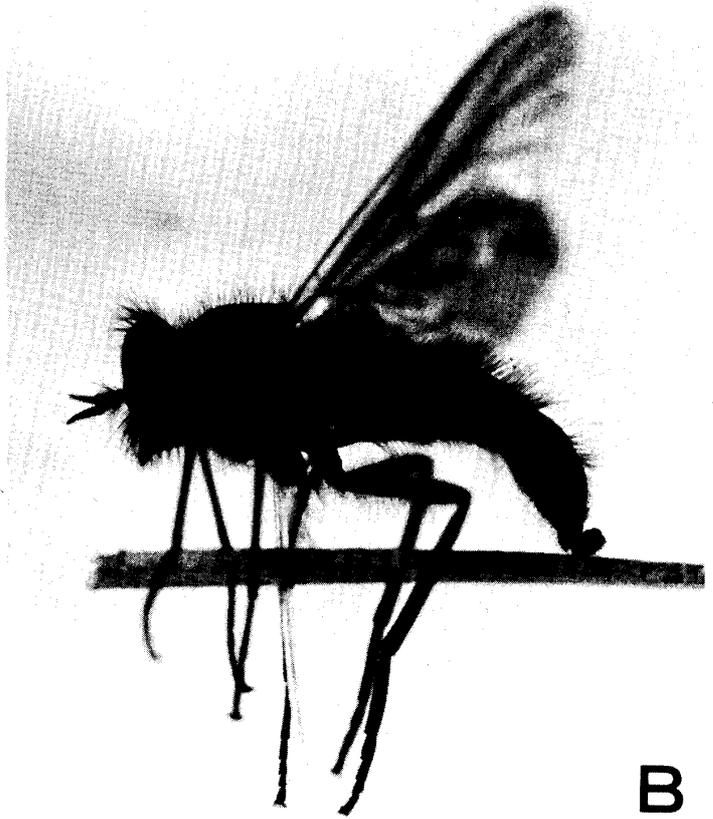


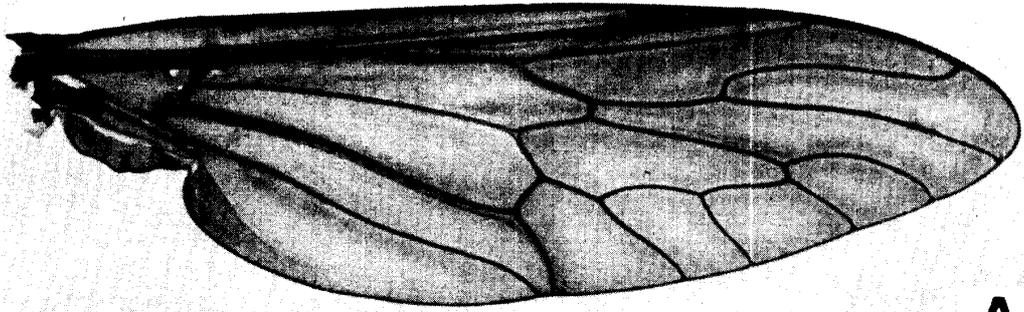
A



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A



B



C



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