

PHILIPPINE DROSOPHILIDAE (DIPTERA). I. THE SUBGENUS
Sophophora Sturtevant OF THE GENUS *Drosophila*
WITH DESCRIPTIONS OF NEW SPECIES

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ABSTRACT

Five new species of the subgenus *Sophophora*, viz. *D. gapudi*, *D. velascoi*, *D. sierrae*, *D. ocampoae* and *D. majtoi* are described, along with collection records of 20 known species of which 2 are new to the Philippines.

Key words: Philippines, *Drosophila melanogaster* species-group, Subgenus *Sophophora*, species-subgroups, species complexes

Abbreviations: MJT: reference collection of Dr. Masanori J. Toda of the Institute of Low Temperature Sciences, Hokkaido University, Sapporo, Japan; MVL: collections from the research project of Marc van der Linde of Leiden University, Netherlands; ECRF: personal collection of Elaida C. Ruiz-Fiegalan.

INTRODUCTION

The subgenus *Sophophora* belongs to the genus *Drosophila* Fallen, the latter being represented in the Philippines by three other subgenera: *Drosophila*, *Dudaica* and an unknown subgenus (Wheeler 1981). Previously, Baltazar (1991) listed six (6) subgenera in the Inventory of Philippine Insects, namely: *Drosophila*, *Dudaica*, *Hirtodrosophila*, *Scaptodrosophila*, *Sophophora* and an uncertain subgenus. Grimaldi's (1990) revised classification of world genera of Drosophilidae raised the subgenera *Hirtodrosophila* and *Scaptodrosophila* to genus level.

The groupings under the genus *Drosophila* are shown in Table 1, including all the species known to occur in the Philippines. The subgenus *Sophophora* contains the *Drosophila melanogaster* species-group represented by twenty-five (25) species which are distributed into ten (10) species-subgroups, namely: (i) *melanogaster* (*D. melanogaster*), (ii) *takahashii* by *D. takahashii* and *D. gapudi* n. sp. (iii) *suzukii* by *D. mimetica*, (iv) *elegans* by *D. elegans*, (v) *eugracilis* by *D. eugracilis*, (vi) *ficuspshila* by *D. ficuspshila*, (vii) *ananassae* by seven (7) species further grouped into two (2) complexes, (viii) *denticulata* by *D. denticulata* and *D. velascoi* (the latter, a new species), (ix) *montium* by eight (8) species, wherein two (2) are new species and another two (2) belong to the *kikkawai* complex, and (x) an unknown species-subgroup represented by *D. majtoi*, a new species.

Members of the subgenus *Sophophora* are characterized as follows: eggs with two blunt filaments, ventral receptacle not coiled or kinky; anterior spiracle short, not over one-fifth length of puparium; second to fifth abdominal tergites with posterior dark bands not broken in middorsal line, and cheeks relatively narrow (Patterson and Stone 1952).

KEY TO THE SPECIES² OF SUBGENUS *SOPHOPHORA* STURTEVANT

- 1. Sex-comb present; upper and lower postpronotal setae equal in length 2
 - Sex-comb absent; lower postpronotal setae longer than upper
 *D. majtoi*, **new species**
- 2. Forefemur distinctly enlarged (unusually plump), ventrally with dense minute setulae; fore first tarsomere with claw-like teeth at distal border 3
 - Forefemur not enlarged, normally slender without minute setulae ventrally; fore first tarsomere without claw-like teeth at distal border 4
- 3. Claw-like teeth at distal border of fore first tarsomere, 2; aedeagus finely serrate laterally; gonopods slightly hooked subapically *D. denticulata* Bock and Wheeler
 - Claw-like teeth at distal border of fore first tarsomere, 3; aedeagus not serrate laterally; gonopods not hooked subapically *D. velascoi*, **new species**
- 4. Abdomen slender, long, slightly pointed caudally; wing upper half dusky
 *D. eugracilis* Bock and Wheeler
 - Abdomen not slender, round caudally; wings clear or hyaline 5
- 5. Wings with black patch apically *D. elegans* Bock and Wheeler
 - Wings clear 6
- 6. Sex-comb arranged in short, transverse oblique rows along fore first tarsomere 7
 - Sex-comb arranged longitudinally along fore tarsomere 17
- 7. Sex-comb in three proximal tarsomeres 8
 - Sex-comb on first or two proximal tarsomeres 9
- 8. Gonopods largely divergent, rounded apically; third tarsomere with two rows of stout black bristles (sex-comb) *D. varians* Bock and Wheeler

² Species of the subgenus that were not available for examination were not included

	Gonopods parallel, pointed inwards apically, surrounding aedeagus; third tarsomere with 1 stout, black bristle	<i>D. ananassae</i> Doleschall
9.	Ventral cercal lobe not differentiated	10
	Ventral cercal lobe differentiated	13
10.	Sex-comb arranged in oblique row at distal first tarsomere	<i>D. melanogaster</i> Meigen
	Sex-comb arranged in transverse rows at two proximal tarsomeres	11
11.	Surstylus with 4 sets of distinctly different setae	<i>D. mimetica</i> Bock and Wheeler
	Surstylus with 2 sets of distinctly different setae	12
12.	Basal branch of gonopod bifurcated; aedeagus serrated ventrally	<i>D. gapudi</i> , new species
	Basal branch of gonopod not bifurcated; aedeagus smooth ventrally	<i>D. takahashii</i> Sturtevant
13.	Aedeagal apodeme as long as aedeagus	<i>D. atripex</i> Bock and Wheeler
	Aedeagal apodeme twice as long as aedeagus	14
14.	Fore first tarsomere sex-comb consisting of 2 slanting rows of stout black bristles	15
	Fore first tarsomere sex-comb consisting of 1 or 2 short, transverse rows of stout, black bristles	16
15.	Abdomen pale brown	<i>D. bipectinata</i> Duda
	Abdomen black posteriorly	<i>D. parabipectinata</i> Bock
16.	Prensisetae of surstylus in 2 rows, teeth tightly set	<i>D. malerkotliana pallens</i> Bock and Wheeler
	Prensisetae of surstylus in 1 row; teeth loose	<i>D. pseudoananassae pseudoananassae</i> Bock
17.	Longitudinal sex-combs interspersed with sparsely spaced set of longer, apically pointed teeth; aedeagus bilobed apically	<i>D. ficusphila</i> Kikkawa and Peng

	Longitudinal sex-combs without interspersed teeth; aedeagus not bilobed apically	18
18.	Longitudinal sex-combs not covering entire length of 2 proximal tarsomeres	<i>D. ocampoae</i> , new species
	Longitudinal sex-combs covering entire length of 2 proximal tarsomeres	19
19.	Ventral cercal lobe distinctly differentiated, with 1 large, black, curved tooth	<i>D. kanapiae</i> Bock and Wheeler
	Ventral cercal lobe not or partially differentiated, with 2 or more black, curved teeth	20
20.	Gonopods ensheathing aedeagus up to basal two-thirds	<i>D. sierrae</i> , new species
	Gonopods not ensheathing aedeagus	21
21.	Cercus black	<i>D. barbarae</i> Bock and Wheeler
	Cercus brownish yellow or paler	22
22.	Ventral cercal lobe with 3 teeth; aedeagus pointed apically	<i>D. bicornuta</i> Bock and Wheeler
	Ventral cercal lobe with 2 unequal teeth; aedeagus rounded apically	23
23.	Paramedian spines long, almost near tip of aedeagus	<i>D. kikkawai</i> Burla
	Paramedian spines short	<i>D. watanabei</i> Gupta and Gupta

DROSOPHILA MELANOGASTER SPECIES-GROUP STURTEVANT

Drosophila melanogaster species-group Sturtevant

Sex-combs present in all species except *D. majtoi*, a new species whose subgroup remains undetermined; epandrium posteriorly with process covering base of surstylus; surstylus with 2 sets of teeth; medial or ventromedial row or cluster of pointed teeth, lateral row more blunt, darker teeth.

DROSOPHILA MELANOGASTER SPECIES-SUBGROUP, HSU

Drosophila melanogaster species-group: Hsu, 1949. Univ. Texas Publ. 4920:121

1. DROSOPHILA (SOPHOPHORA) MELANOGASTER MEIGEN

- Drosophila melanogaster* Meigen. 1830. Syst. Besch. Bek. Europ. Zweifl. Inst. 6:85.
Drosophila fasciata Meigen. 1830. Syst. Besch. Bek. Europ. Zweifl. Inst. 6:84.
Drosophila cameraria Haliday. 1833.
Drosophila nigriventris Macquart. 1843. Mem. Soc. Sci. Arts, Lille (1982):416.
Drosophila approximata Zetterstedt. 1847. Dipt. Scand., Diposita et descripta 6:2557.
Drosophila ampelophila Loew. 1862. Berliner Ent. Zeit. 6:231.
Drosophila uvarum Rondani. 1875. Bull. Ent. Ital. 8:86.
Drosophila balteata Bergroth. 1894. Stettiiner Ent. Zeit. 55:75.
Drosophila pilosula Becker. 1908. Mitt. Zool. Mus. 4:1-206.
Drosophila emulata Ray-Chaudhuri and Mukherjee. 1941. Indian J. Ent. 3:215.
Drosophila (Sophophora) melanogaster Sturtevant. 1942. Univ. Texas Publ. 4213:29.

DIAGNOSIS. Sex comb consisting of ca. 9 teeth arranged in short, oblique row distally on first tarsomere (Fig. 1a); epandrium with process expanded caudoventrally, covering base of surstylus (Fig. 1b); gonopods forming an enclosure surrounding aedeagus laterally and dorsally (Fig. 1c).

SPECIMENS EXAMINED. 15♂♂, Bagong Sikat, Muñoz, Nueva Ecija, 10.ii.1998, E.C. Ruiz, ex *Musa paradisica* fruits (ECRF); 2♂♂, Matnog, Sorsogon, 30.xi.1993, E.C. Ruiz (ECRF); 3♂♂, Yapang, Sablayan, Occidental Mindoro, 6.i.1995, E.L. Ruiz (ECRF); 2♂♂, Tagum, Davao, 22.xi.1993, E.C. Ruiz, ex *Artocarpus heterophylla* fruits (ECRF).

DISTRIBUTION. Cosmopolitan: Afghanistan, Australia (East and Southwest), Borneo (Sabah), Burma, China, Guam, Hainan Island, Hawaii, India, Japan, Korea, Malaysia, Manchuria, Marquesas Island, Micronesia, Mongolia, Nepal, New Guinea, New Zealand, Quelpert Island, Philippines, Russia (Far East), Samoa, Seychelles, Singapore, Sri Lanka, Sumatra, Taiwan and Vietnam.

REMARKS. *D. melanogaster* is not as common as previously believed. Only 22 males were collected for this study. However, the development duration is short (average of 8 to 14 days). This species was found in small numbers in forested areas and where vegetation is lush. In Nueva Ecija, it was commonly associated with human dwellings and it also contaminated most of the pure cultured flies in the laboratory.

According to Bock and Wheeler (1972), *D. melanogaster* and *D. simulans* are coextensive in distribution throughout the Nearctic, Palearctic and Australian regions, and both are found across a wide range of climates although most frequently associated with human habitations. *D. simulans* is known to be more abundant in warmer climates while *D. melanogaster* is generally more common in cold environments. The most striking distribution feature is their rarity or absence in the Southeast Asian region where the bulk of *melanogaster* species occur. Based on this, *D. simulans* should occur in the country, but no such species was collected. Barrion *et al.* (1991) reported its occurrence in Los Baños, Laguna. However, numerous efforts to retrieve it from many sites in Los Baños during the study were not successful. Although both species have identical sex-combs, they differ distinctly in aedeagus, shape of ventral phragma and posterior paramere, and setae of anterior paramere.

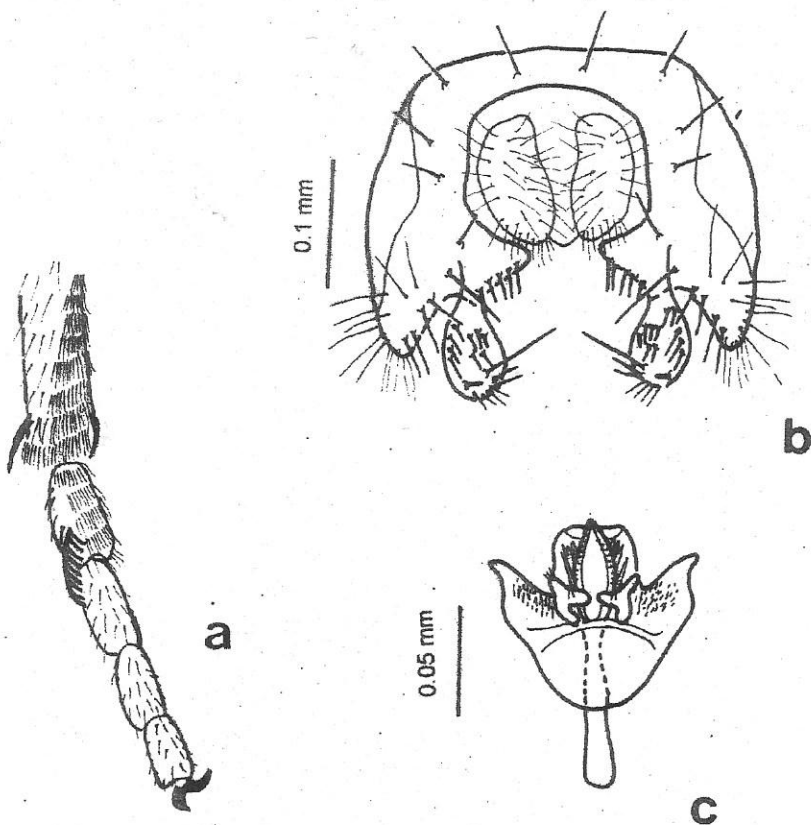


Figure 1. *Drosophila (Sophophora) melanogaster* Meigen. a. foretarsomeres, b. periphallallic (caudal), and c. phallic organs (ventral).

***DROSOPHILA TAKAHASHII* SPECIES-SUBGROUP**

Drosophila takahashii species-subgroup: Hsu. 1949. Univ. Texas Publ. 4920:122.

Palpus apically with 1 prominent bristle; sex-combs arranged in short transverse rows on 2 proximal tarsal segments of fore leg; epandrium narrow dorsally, broad laterally, lobe elongate somewhat like a finger ventrally; surstylus with comb of primary teeth ventrolaterally, row of

secondary teeth dorsolaterally and several medial bristles; ventral cercal lobe not differentiated; aedeagus non-bifid, bare, slender; apodeme longer than aedeagus; paramere large, long, black and pointed apically; gonopod large, with larger or smaller basal branch; hypandrium with 1 pair of long or moderate paramedian spines relatively close to each other on caudal margin (Toda 1991).

2. *DROSOPHILA (SOPHOPHORA) TAKAHASHII* STURTEVANT

Drosophila takahashii Sturtevant. 1927. Phil. J. Sci. 32:371.

Drosophila (Sophophora) takahashii Sturtevant. 1942. Univ. Texas Publ. 4213:29.

DIAGNOSIS. Sex-combs arranged in 2 short, transverse rows (upper = 3, lower = 5) on first tarsomere and 2 short, transverse rows (upper = 1, lower = 4 or 5) on second tarsomere (Fig. 2a); surstylus with 7 long setae situated on outer margin of prenisetae (Fig. 2b); basal branch of gonopod smaller, pointed apically, black distally (Fig. 2c).

SPECIMENS EXAMINED. 5♂♂, Hortorium, UPLB, **Laguna**, 22.ix.1993, E.C. Ruiz (ECRF); 5♂♂, culture strains from Shwebo, **Myanmar**, vi.1997, M.J. Toda (MJT).

DISTRIBUTION. Burma, Borneo (Brunei, Sabah), China, India, Japan, Java, Korea, Malaysia, Manchuria, Micronesia, Nepal, Philippines, Ryukyu Island, Sri Lanka, Taiwan, and Thailand.

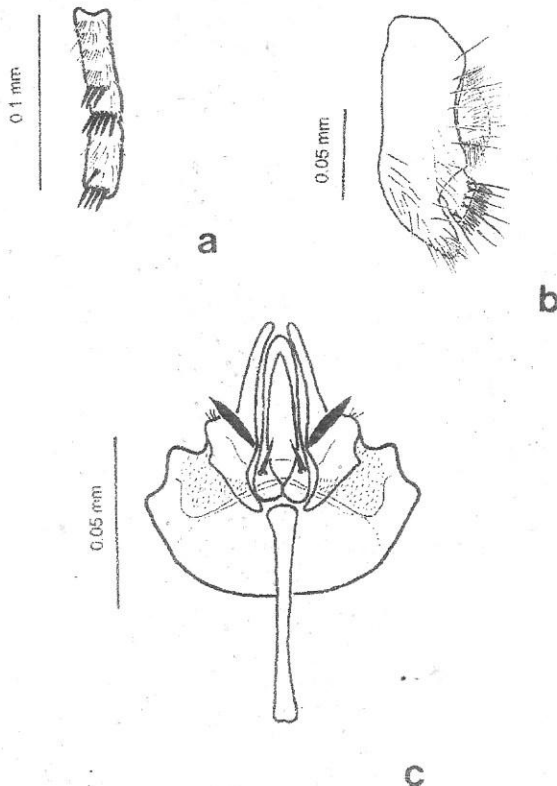


Figure 2. *Drosophila (Sophophora) takahashii* Sturtevant. a. foretarsomeres, b. perphallic organs (lateral), and c. phallic organs (ventral).

3. *DROSOPHILA (SOPHOPHORA) GAPUDI*, NEW SPECIES

HEAD. Eye orange-red; ocellar triangle yellow, slightly brownish on inner margins of ocelli, with 1 pair of long setae and sparse setulae; fronto-orbital plate pale brown; face yellow; carina low, very narrow; clypeus brownish yellow; gena and occiput pale brown; pedicel brown, with 2 distinctly long and a few short setae; first flagellomere twice as long as pedicel, distinctly angulated anteriorly, grayish white covered with fine gray hairs; terminal bifurcation of arista moderate; palpus pale brown, with 2 very long setae apically and laterally.

THORAX. Scutum, scutellum and mesopleuron yellow; postpronotal lobe yellow with 2 equally strong setae; acrostichal setulae in 8 rows; basal scutellar setae convergent; apical scutellar setae cross each other.

Wings with dusky cloud on distal one-third, r-m and dm-cu crossveins not clouded; R_{2+3} vein straight; R_{4+5} and M_1 veins parallel; C_1 setae 2.

Legs yellow; male fore leg (Fig. 3a) with sex-combs in 2 transverse rows on first tarsomere (1st row composed of 2 teeth, 2nd row of 3 teeth) and in 3 transverse rows on second tarsomere (1st row of 1 tooth, 2nd row of 3 teeth and 3rd row of 2 teeth); preapical dorsal setae on all tibiae; apical setae on fore and mid tibiae; fore first tarsomere slightly shorter than 3 succeeding tarsomeres together; mid and hind first tarsomeres each as long as the rest together.

Abdominal tergites generally yellowish; tIII and tIV each with narrow, blackish brown, caudal band; tV and tVI each with black dorsal patch; setulae on tII to tIV caudally more distinct, dorsally profuse, laterally sparse.

MALE TERMINALIA. Epandrium with lateral and caudoventral setae, narrow dorsally, broad laterally, narrowing ventrally into toe-like projection (Fig. 3b); surstylus with only 1 comb of about 8 prenisetae and 3 apically recurved setae at tip (Fig. 3c); cercus setigerous with tuft of peg-like ventral hairs (Fig. 3d); aedeagus pale brown, slightly serrated ventrally; aedeagal apodeme as long as aedeagus; gonopods not fused to each other; basal branch of gonopod bifurcated (Fig. 3e).

MEASUREMENTS. BL = 1.97 mm; ThL = 0.78 mm; WL = 1.61 mm; WW = 0.73 mm.

INDICES. arb = 4/3; FW/HW = 0.44 (0.37 - 0.57); ch/o = 0.10 (0.09 - 0.16); prorb = 0.98 (0.87 - 1.07); rcorb = 0.45 (0.37 - 0.46); vb = 0.78 (0.75 - 0.87); dcl = 0.62 (0.56 - 0.69); sctl = 0.91 (0.80 - 1.07); sterno = 0.67 (0.58 - 0.81); orbito = 0.60 (0.50 - 0.72); dcp = 0.43 (0.41 - 0.50); sctlp = 0.44 (0.35 - 0.50); C = 2.20 (2.10 - 2.29); 4c = 1.20 (1.13 - 1.26); 4v = 2.19 (2.13 - 2.26); 5x = 2.29 (2.18 - 2.50); ac = 2.84 (2.71 - 3.16); M = 0.77 (0.73 - 0.80); C3F = 0.41 (0.36 - 0.47).

SPECIMENS EXAMINED. HOLOTYPE ♂, Mt. Makiling, **Laguna**, 21.x.1993, E. C. Ruiz (ECRF); PARATYPES, 6♂♂, same data as holotype (ECRF).

ETYMOLOGY. Patronym, in honor of the author's adviser and chairman of advisory committee, Dr. Victor P. Gapud.

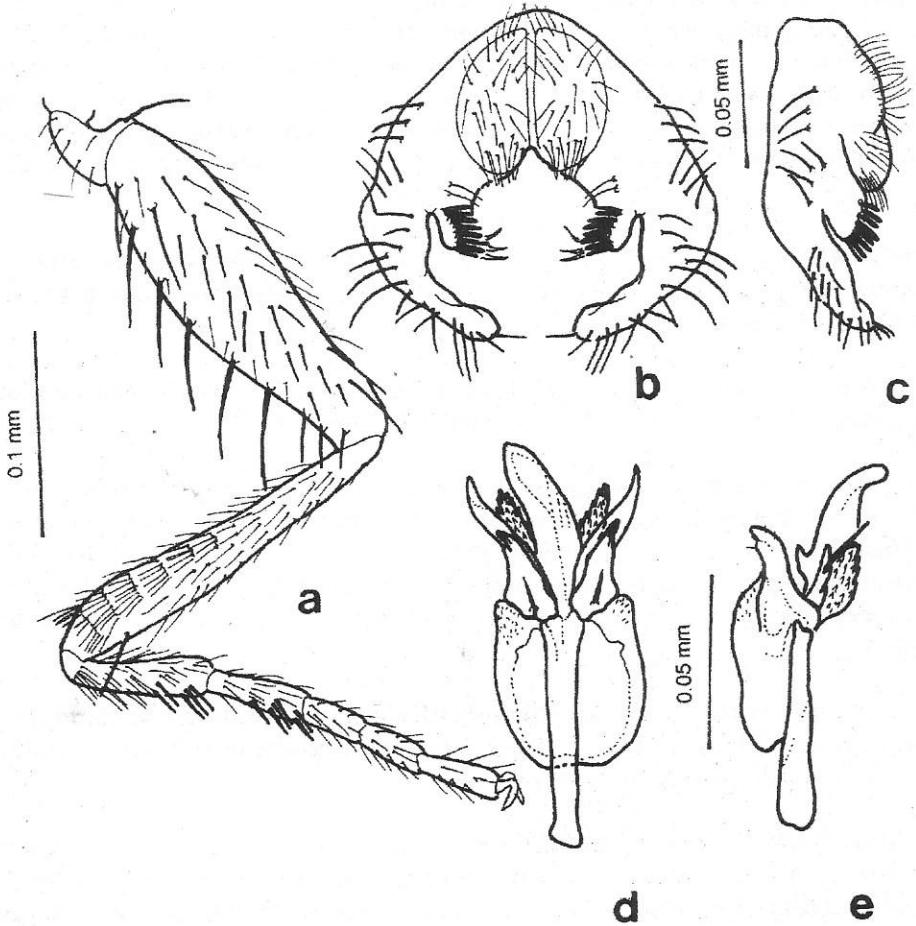


Figure 3. *Drosophila (Sophophora) gapudi*, new species. a. foreleg, b. periphallic organs (caudal), c. periphallic organs (lateral), d. phallic organs (ventral), and e. phallic organs (lateral)

***DROSOPHILA SUZUKII* SPECIES-SUBGROUP**

Drosophila suzukii species-subgroup: Hsu, 1949. Univ. Texas Publ. 4920:122.

Surstylus with several sets of distinctly different teeth; ventral cercal lobe not differentiated; cercus with lower bristles differentiated to a larger or smaller extent in length and/or thickness from upper bristles; gonopod large, without basal branch.

This species group is more or less miscellaneous, varying considerably in the morphology of sex-comb, aedeagus, paramere and so on (Toda 1991).

4. *DROSOPHILA (SOPHOPHORA) MIMETICA* BOCK AND WHEELER

Drosophila (Sophophora) mimetica Bock and Wheeler, 1972. Univ. Texas Publ. 7213:25.

DIAGNOSIS. Sex-comb in three rows on first and second tarsomeres (Fig. 4a); ventral cercal lobe not differentiated (Fig. 4b); cercus bearing 1 large tooth ventromedially; gonopod broad basally, parameres smaller, extended laterally and pointed apically (Fig. 4c).

SPECIMEN EXAMINED. 1♂, Tranca, Bay, Laguna, 28.ix.1993, E. C. Ruiz, ex *Cocos nucifera* (ECRF).

DISTRIBUTION. Burma, Malaysia, Philippines (new record) and Singapore.

REMARKS. The only specimen available for this species was verified and confirmed by Dr. M. J. Toda.

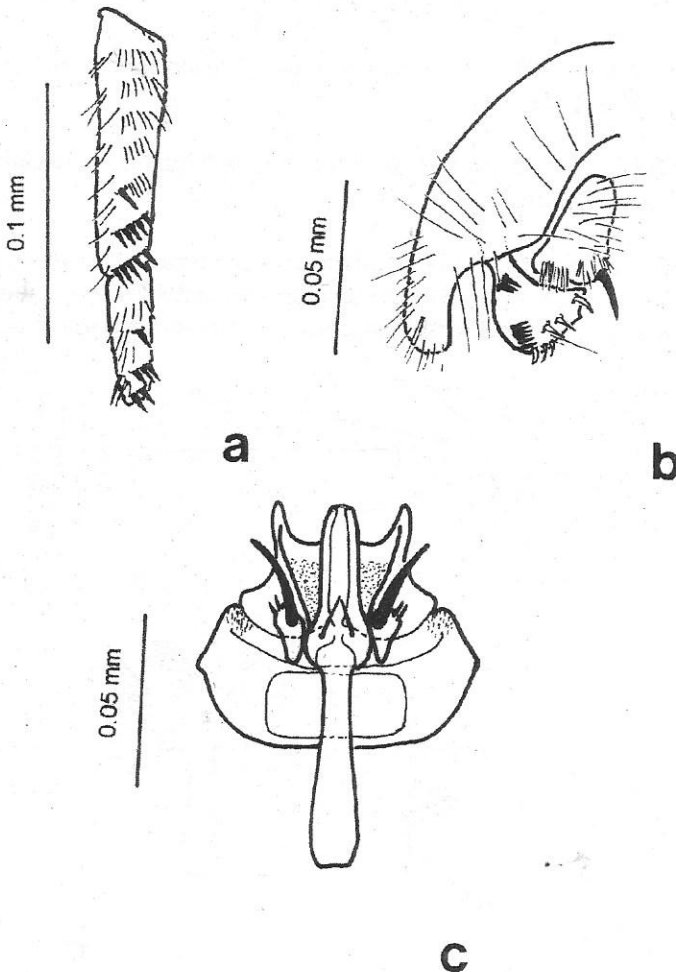


Figure 4. *Drosophila (Sophophora) mimetica* Bock and Wheeler. a. foretarsomeres, b. peripheral organs (caudal), and c. phallic organs (ventral)

***DROSOPHILA ELEGANS* SPECIES-SUBGROUP**

Drosophila elegans species-subgroup: Bock and Wheeler, 1972. Univ. Texas Publ. 7213:27.

Sex-combs arranged in short transverse rows on 3 proximal tarsal segments of fore leg; male wing with black apical patch; paramere exceptionally long and slender, pointed apically, recurved basally; gonopods large with numerous small finger-like branches (Toda 1991).

5. *DROSOPHILA (SOPHOPHORA) ELEGANS* BOCK AND WHEELER

Drosophila (Sophophora) elegans Bock and Wheeler, 1972. Univ. Texas Publ. 7213:28.

DIAGNOSIS. Tergites brownish yellow; wing with black apical patch (Fig. 5a); sex-combs in short transverse rows on 3 proximal tarsomeres of fore leg (Fig. 5b); ventral cercal lobe not differentiated; cercus with long black tooth caudomedially (Fig. 5c); aedeagus expanded apically, truncate and hirsute (Fig. 5d).

SPECIMENS EXAMINED. 12♂♂, **Sumatra:** Sukarani, culture strain from Hokkaido University, Japan, vi.1997, M. J. Toda (MJT).

DISTRIBUTION. China (Southwest and South), India, Myanmar, New Guinea, Philippines, Ryukyu Island and Taiwan.

REMARKS. The local distribution of this species and type locality is Baguio, Philippines (Bock and Wheeler 1972). However, the same species exists in other countries with darker coloration (abdomen and thorax subshining black). The apical wing patch and male terminalia are the same.

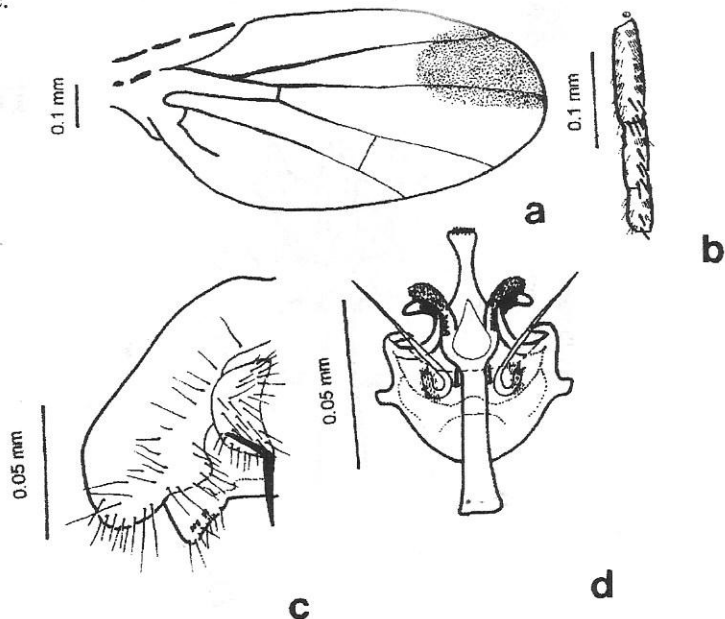


Figure 5. *Drosophila (Sophophora) elegans* Bock and Wheeler. a. wing, b. foretarsomeres, c. periphallallic organs (caudal), and d. phallic organs (ventral)

DROSOPHILA EUGRACILIS SPECIES-SUBGROUP BOCK AND WHEELER

Drosophila eugracilis species-subgroup: Bock and Wheeler, 1972. Univ. Texas Publ. 7213:31.

Sex-comb consisting only of 2 large bristles on distal portion of 1st tarsomere or metatarsus; sexual dimorphism strong in shape of abdomen; male abdomen black apically, sharply truncate, without protruding genitalia; ventral cercal lobe not differentiated; aedeagus large, highly ornate (Toda 1991).

6. DROSOPHILA (SOPHOPHORA) EUGRACILIS BOCK AND WHEELER

Drosophila (Sophophora) eugracilis Bock and Wheeler, 1972. Univ. Texas Publ 7213:31.

Tanygastrella gracilis Duda, 1924. Arch. Naturg. 90A(3):253 (Préocc.).

Drosophila (Tanygastrella) gracilis: Duda, 1926. Supp. Ent. 14:99.

nec *Drosophila gracilis* Walker, 1953. Ins. Brit. Dipt. 2:239.

DIAGNOSIS. Only 2 rows of sex-combs, each consisting of 1 tooth (Fig. 6a); many sets of prensisetae on surstylus (Fig. 6b); highly ornate aedeagus (Fig. 6c); upper half of wing dusky.

SPECIMENS EXAMINED. 2♂♂, Bagong Sikat, Muñoz, Nueva Ecija, 28.viii.1993, E. C. Ruiz, ex *Pouteria campechiana* (ECRF); 3♂♂, Hortorium, UPLB, Laguna, 3.ix.1993, E. C. Ruiz, ex *Pouteria campechiana* (ECRF); 2♂♂, Hortorium, UPLB, Laguna, 1.x.1993, E. C. Ruiz (ECRF); 4♂♂, Hortorium, UPLB, Laguna, 17.viii.1993, E. C. Ruiz, ex *Caryota maxima* nuts (ECRF); 1♂♂, Hortorium, UPLB, Laguna, 7.ix.1993, E. C. Ruiz (ECRF); 1♂, Hortorium, UPLB, Laguna, 31.viii.1993, E. C. Ruiz (ECRF); 1♂, Mt. Makiling, Laguna, 21.x.1993, E. C. Ruiz, ex *Ammona muricata* (ECRF); 5♂♂, Forestry, UPLB, Laguna, 24.viii.1993, E. C. Ruiz, ex *Diospyros blancoi* (ECRF); 37♂♂, Mt. Mayon, Albay, 15 to 18.i.1992, V. P. Gapud (ECRF); 4♂♂, Malagos, Calinan, Davao, 23.xi.1993, E. C. Ruiz (ECRF); 8♂♂, U.S.A., University of Texas Stock, 14.vii.1994, handcarried by M. V. Linde (MVL).

DISTRIBUTION. Australia, Andaman Island, Borneo (Brunei, Sabah, Sarawak), Burma, Cambodia, Celebes, China (South and Southwest), India, Java, Malaysia, Moluccas, Myanmar, New Guinea, Philippines, Singapore, Sri Lanka, Sumatra, Taiwan and Thailand.

REMARKS. The establishment of *Tanygastrella* by Duda (1924) was based on two species from Southeast Asia, *gracilis* and *hypopygialis*, also described by Duda. Two years after, he examined a series of collections all belonging to the *melanogaster* group, and he did not find any distinct difference with the females, thus *Tanygastrella* was retained under *Drosophila* as a subgenus. In 1964, Okada suggested that *gracilis* be included in the *melanogaster* group.

Unquestionably, *Drosophila (Tanygastrella) gracilis* of Duda resembles most members of the *melanogaster* group. Bock and Wheeler (1972) then included this species under the subgenus *Sophophora*, sinking *Tanygastrella* as a synonym of *Sophophora*. The change from *gracilis* to *eugracilis* was necessary because the former was preoccupied already in the genus *Drosophila*.

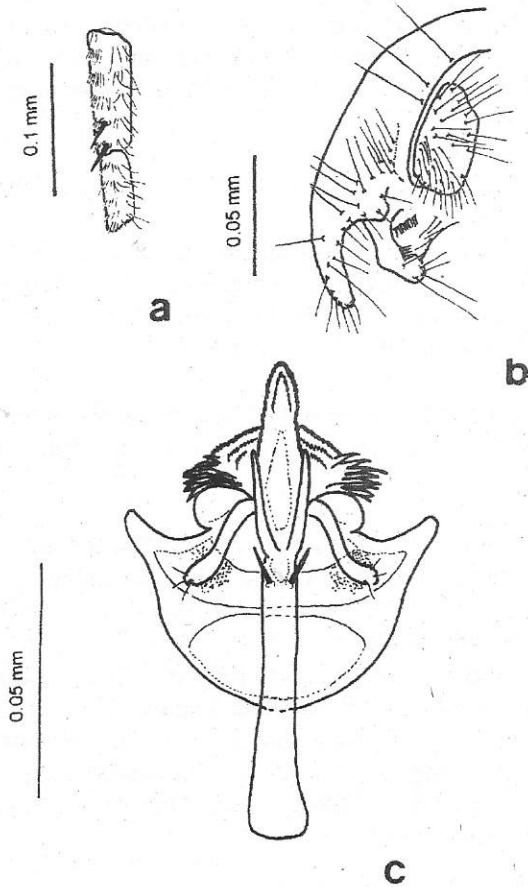


Figure 6. *Drosophila (Sophophora) eugracilis* Bock and Wheeler. a. foretarsomeres, b. peripheral organs (caudal), and c. phallic organs (ventral)

***DROSOPHILA FICUSPHILA* SPECIES-SUBGROUP**

Drosophila ficusphila species-subgroup: Okada, 1954, Kontyu, Tokyo 22:43.

Sex-combs longitudinal along entire length of 2 proximal tarsal segments of fore leg, consisting of superficial set of shorter, apically blunt teeth spaced compactly, and deeper set of longer, apically pointed teeth spaced sparsely, 2nd tarsal segment produced apically into prominent protruberance (Fig. 7a); epandrium setigerous only on lower portion, ventral lobe elongate, narrow; ventral cercal lobe not differentiated; circus elongate, narrow, more or less constricted in middle or lower part; aedeagal apodeme longer than aedeagus; basal branch of gonopod very broad and long (Toda 1991)

7. *DROSOPHILA (SOPHOPHORA) FICUSPHILA* KIKKAWA AND PENG

Drosophila ficusphila Kikkawa and Peng, 1938. Jpn. J. Zool. 7:531.

Drosophila (Sophophora) ficusphila: Sturtevant, 1942. Univ. Texas Publ. 4213:29.

DIAGNOSIS. Male T5 nearly entirely black or anteromedially slightly yellowish; surstylus slender with 2 sets of prensisetae (Fig. 7b); basal process of gonopods shorter than aedeagus (Fig. 7c).

SPECIMENS EXAMINED. 5♂♂, culture strain from Hokkaido University, Japan, vi. 1997, M. J. Toda (MJT).

DISTRIBUTION. Andaman Island, Australia, Burma, China (Southwest and South), India (East) Japan, Java, Korea, Philippines, Ryukyu Island and Taiwan.

REMARKS. The unique characteristic of the longitudinal sex-combs easily distinguishes this species from other species with longitudinal sex-combs.

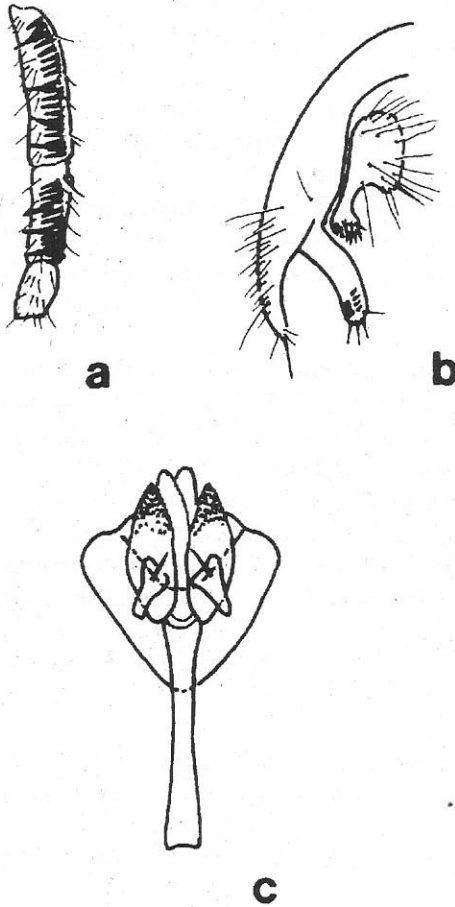


Figure 7. *Drosophila (Sophophora) ficusphila* Kikkawa and Peng. a. foretarsomeres, b. periphallallic organs (caudal), c. phallic organs (ventral)

***DROSOPHILA ANANASSAE* SPECIES-SUBGROUP**

Drosophila ananassae species-subgroup: Hsu, 1949. Univ. Texas Publ. 4920:122.

Sex-comb(s) absent or in transverse, oblique or longitudinal row(s); ventral cercal lobe differentiated (except *D. varians* Bock and Wheeler, 1972); surstylus with 2 sets of teeth.

***DROSOPHILA ANANASSAE* SPECIES-COMPLEX**

Drosophila ananassae species-complex Bock, 1971. Univ. Texas Publ. 7103:273.

Aedeagus not bifid, apically hirsute (Bock, 1971).

8. *DROSOPHILA (SOPHOPHORA) ANANASSAE* DOLESCHALL

Drosophila ananassae Doleschall, 1858. Nat. Tijdschr. Ned. Ind. 17:128.

Drosophila imparata Walker, 1859. J. Proc. Linn. Soc. (Zool.) 3:126.

Drosophila similes Lamb, 1914. Trans. Linn. Soc. London, Ser. 2 (Zool.) 16:347 (preocc.).

Drosophila similes williston, 1896. Trans. Ent. Soc. London 1896:415.

Drosophila caribea Sturtevant, 1916. Ann. Ent. Soc. Amer. 9:335.

Drosophila errans Malloch, 1933. Bull. Bishop Mus. 114:21.

Drosophila (Sophophora) ananassae Sturtevant, 1942. Univ. Texas Publ. 4213:29.

DIAGNOSIS. Transverse sex-combs on 3 proximal tarsomeres (Fig. 8a); ventral cercal lobe with single, large, black tooth; prensisetae on surstylus in 2 sets, lower set with 6 to 7 teeth, upper with 2 to 3 (Fig. 8b); parameres divergent, not black; gonopods parallel, pointed inwards apically (Fig. 8c).

SPECIMENS EXAMINED. 12♂♂, ISU, Cabagan, **Isabela**, 1.x.1994, M. V. Linde (MVL); 22♂♂, BPI, **Baguio**, 19.vii.1993, E. C. Ruiz (ECRF); 2♂♂, UPLB Compound, **Laguna**, 17.vi.1993, E. C. Ruiz, *ex Spondias purpurea* (ECRF); 8♂♂, UPLB Compound, **Laguna**, 17.vi.1993, E. C. Ruiz (ECRF); 1♂, UPLB Compound, **Laguna**, 17.vi.1993, E. C. Ruiz, *ex Mangifera indica* (ECRF); 4♂♂, Forestry, UPLB, **Laguna**, 24.viii.1993, E. C. Ruiz, *ex Diospyros blancoi* (ECRF); 16♂♂, Tranca, Bay, **Laguna**, 28.ix.1993, E. C. Ruiz, *ex Artocarpus heterophylla* (ECRF); 195♂♂, Brgy. Paulog, Ligao, **Albay**, 30.xi.1993, E. C. Ruiz, *ex Cocos nucifera* (ECRF); 1♂, Mt. Mayon, **Albay**, 15 to 18.i.1992, V. P. Gapud, *ex Ananas comosus* (ECRF); 20♂♂, Liloan, **Leyte**, 28.xi.1993, E. C. Ruiz, swept along seashore (ECRF); 5♂♂, VISCA Compound, **Leyte**, 18.xi.1993, E. C. Ruiz, *ex Psidium guajava* (ECRF); 1♂, VISCA Compound, **Leyte**, 28.xi.1993, E. C. Ruiz, *ex fallen nuts of Terminalia catappa* (ECRF).

DISTRIBUTION. Amboina (Tropical and Subtropical), Australia (East), Borneo, Brazil, China, Costa Rica, Cuba, Fiji, Guam, Hawaii, Honduras, India, Indonesia, Japan, Java, Marquesas Island, Melanesia, Micronesia, Myanmar, New Guinea, Panama, Philippines, Polynesia, Ryukyu Island, Samoa, Seychelles, Sumatra and Taiwan.

REMARKS. *Drosophila ananassae* was one of the most commonly encountered species. According to Bock and Wheeler (1972), it has light and dark forms. The latter form could be mistaken for *D. varians* in body color. Even the sex-combs due to their similarity could be misleading. Thus detailed examination of genitalic characters is imperative.

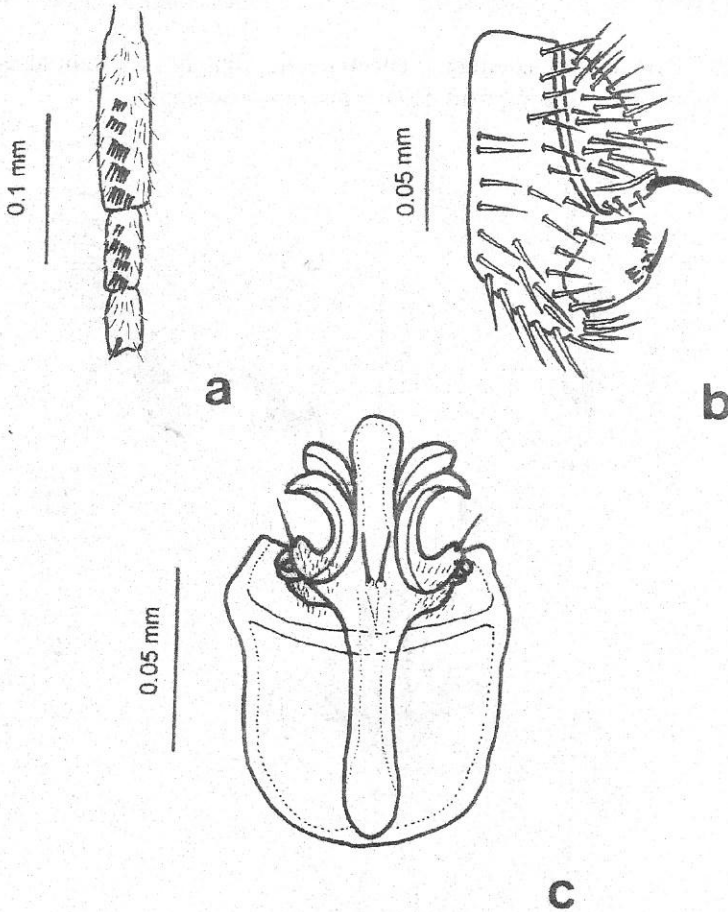


Figure 8. *Drosophila (Sophophora) ananassae* Doleschall. a. foretarsomeres, b. periphallal organs (caudal), and c. phallic organs (ventral).

9. *DROSOPHILA (SOPHOPHORA) ATRIPEX* BOCK AND WHEELER

Drosophila (Sophophora) atripex Bock and Wheeler, 1972. Univ. Texas Publ. 7213:42.
Drosophila sp. 2 Kaneshiro and Wheeler, 1970. Dros. Inf. Serv. 45:143.

DIAGNOSIS. Transverse sex-combs on 2 proximal foretarsomeres (Fig. 9a); ventral cercal lobe with single, curved, black tooth; prenisetae on a surstylus in two sets with equal number of bigger teeth, inner margin with long setulae (Fig. 9b); paramedian spines close to each other on caudal margin of hypandrium; gonopods extending past tip of aedeagus; parameres with dorsal (with 3 minute sensillae) and ventral lobes articulated to aedeagus (Fig. 9c).

SPECIMENS EXAMINED. 4♂, ISU Compound, Cabagan, **Isabela**, 1.x.1994, M. V. Linde (MVL); 1♂, Taal Lake shore, **Batangas**, 6.vii.1993, E. C. Ruiz (ECRF); 13GG, VISCA Compound, Leyte, 19.xi.1993, E. C. Ruiz, *ex Cocos nucifera* (ECRF).

DISTRIBUTION. Borneo, Celebes, Myanmar, Philippines, Singapore, and Thailand.

REMARKS. This was not commonly encountered, although substantial samples were collected in forested areas using fruit baits or just plain sweeping.

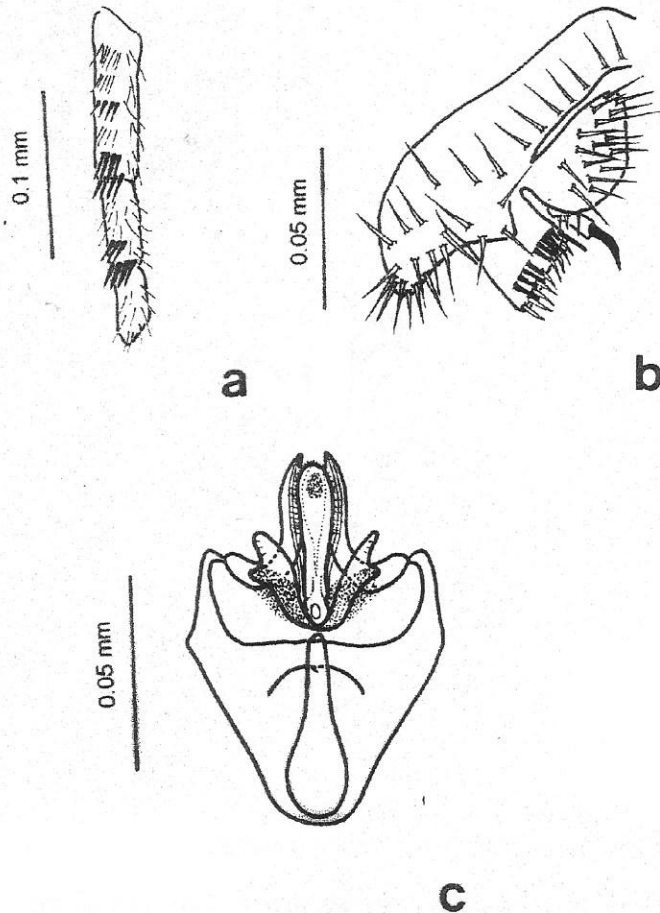


Figure 9. *Drosophila (Sophophora) atripex* Bock and Wheeler. a. foretarsomeres, b. peripheral phallic organs (caudal), and c. phallic organs (ventral)

10. *DROSOPHILA (SOPHOPHORA) VARIANS* BOCK AND WHEELER

Drosophila (Sophophora) varians Bock and Wheeler, 1972. Univ. Texas Publ. 7213:43.

Drosophila sp. 4 Kaneshiro and Wheeler, 1970. Dros. Inf. Serv. 45:143.

DIAGNOSIS. Transverse sex-combs on 3 proximal tarsomeres (Fig. 10a); prenisetae on surstylus in one row, lowermost tooth longer (Fig. 10b); aedeagus hirsute and truncate apically (Fig. 10c).

SPECIMENS EXAMINED. 15♂♂, ISU Compound, Cabagan, **Isabela**, 1.x.1994, M. V. Linde (MVL); 12♂♂, Hortorium, UPLB, **Laguna**, 1.x.1993, E. C. Ruiz, *ex Annona muricata* (ECRF); 3♂♂, Tuaca, Basud, **Camarines Norte**, 30.xi.1993, E. C. Ruiz, *ex Ananas comosus* (ECRF); 2♂♂, Cabidanan, Nabunturan, **Davao**, 25.xi.1993, E. C. Ruiz (ECRF).

DISTRIBUTION. Philippines.

REMARKS. This species was included in the *ananassae* species-subgroup on the basis of chromosomal homology, i. e. it has the same polytene chromosome complement and the free ends of chromosomes in this species are identical to others in the group (Bock and Wheeler 1972).

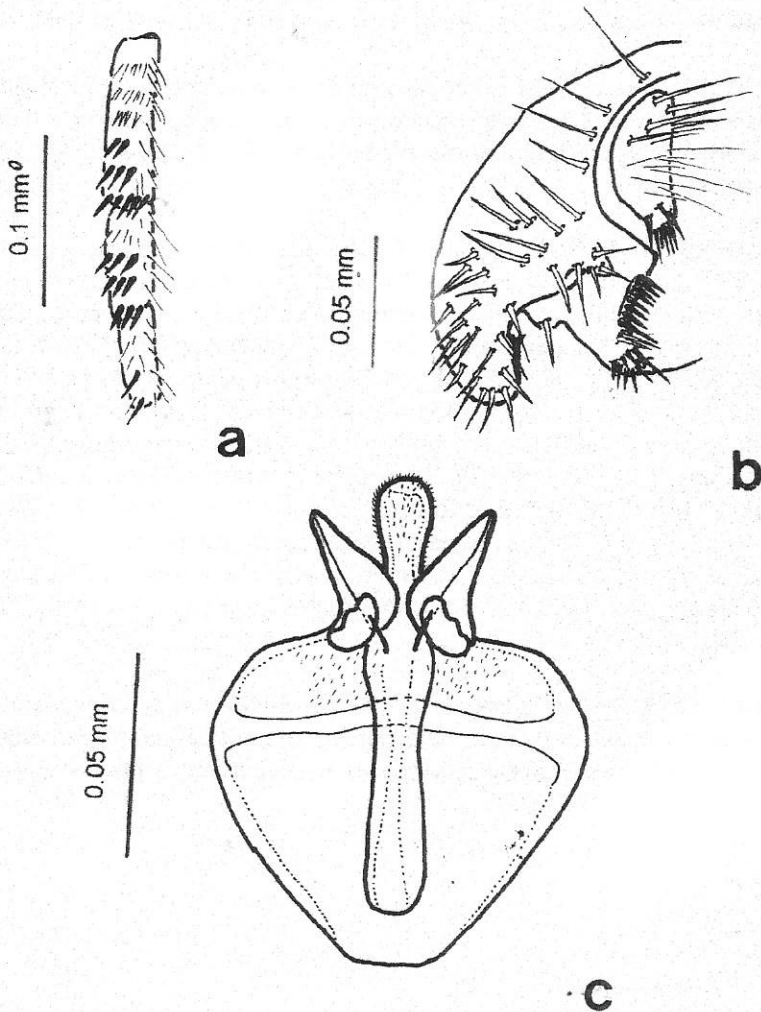


Figure 10. *Drosophila (Sophophora) varians* Bock and Wheeler. a. foretarsomeres, b. peripheral phallic organs (caudal), and c. phallic organs (ventral)

***DROSOPHILA BIPECTINATA* SPECIES-COMPLEX**

Drosophila bipectinata species-complex: Bock, 1971. Univ. Texas Publ. 7103:273.

Aedeagus bifid, bare, hooked apically (Bock, 1971).

11. *DROSOPHILA (SOPHOPHORA) BIPECTINATA* DUDA

Drosophila bipectinata Duda, 1923. Ann. Hist.-nat. Mus. Nat. Hung. 20:52.

Drosophila szentivanii Mather and Dobzhansky, 1962. Pacif. Ins. 4:247.

Drosophila sp. 6 Kaneshiro and Wheeler, 1970. Dros. Inf. Serv. 45:143.

Drosophila (Sophophora) bipectinata: Sturtevant, 1942. Univ. Texas Publ. 4213:29.

DIAGNOSIS. Sex-combs in 2 slant rows on fore first tarsomeres, with an additional tooth on 2nd tarsomere (Fig. 11a); base of gonopods broad reaching more than half of aedeagus; paramedian spines not close, parameres small, bilobed (Fig. 11c); extending flap of epandrium with 1 seta (Fig. 11b).

SPECIMENS EXAMINED. 12♂♂, ISU Compound, Cabagan, **Isabela**, 1.x.1994, M. V. Linde (MVL); 6♂♂, Forestry, UPLB, **Laguna**, 1.ix.1993, E. C. Ruiz, *ex Diospyros blancoi* (ECRF); 1G, Mt. Makiling (800 m elevation), **Laguna**, 21.x.1993, E. C. Ruiz, *ex Dillenia* sp. (ECRF); 202♂♂, Hortorium, UPLB, **Laguna**, 17.viii to 1.x.1993, E. C. Ruiz (ECRF); 3♂♂, Talaga, Tanauan, **Batangas**, 6.vii.1993, E. C. Ruiz (ECRF); 1♂, Guinobatan, **Albay**, 30.xi.1993, E. C. Ruiz (ECRF); 4♂♂, Brgy. Paulog, Ligao, **Albay**, 30.xi.1993, E. C. Ruiz, *ex Pouteria campechiana* (ECRF); 39♂♂, Mt. Mayon, **Albay**, 15 to 18.i.1992, V. P. Gapud, *ex Carica papaya* (ECRF); 8♂♂, Mt. Mayon, **Albay**, 15 to 18.i.1992, V. P. Gapud, *ex Ananas comosus* (ECRF); 3♂♂, VISCA Compound, **Leyte**, 29.xi.1993, E. C. Ruiz, *ex Cocos nucifera* (ECRF); 5♂♂, VISCA Compound, **Leyte**, 28.xi.1993, E. C. Ruiz, *ex fallen nuts of Terminalia catappa* (ECRF); 87♂♂, Pangutosan, Nabunturan, **Davao**, 25.xi.1993, E. C. Ruiz, *ex Musa paradisiaca* (ECRF); 14♂♂, Malagos, Calinan, **Davao**, 23.xi.1993, E. C. Ruiz (ECRF); 2♂♂, Surigao, 27.xi.1993, E. C. Ruiz, swept along seashore (ECRF).

DISTRIBUTION. Australia, Borneo (Brunei, Sabah, Sarawak), Burma, Cambodia, Celebes, China (Central and South), Fiji, India, Japan, Java, Malaysia, Micronesia, Nepal, New Caledonia, New Guinea, Pakistan, Philippines, Ryukyu Island, Samoa, Singapore, Sri Lanka, Sumatra, Taiwan and Thailand.

REMARKS. The sex-combs of this species are the same as those of *D. parabipectinata*. It can be segregated from the latter by the black coloration of posterior abdomen of the latter. Its aedeagus is similar to that of *D. malerkotliana*.

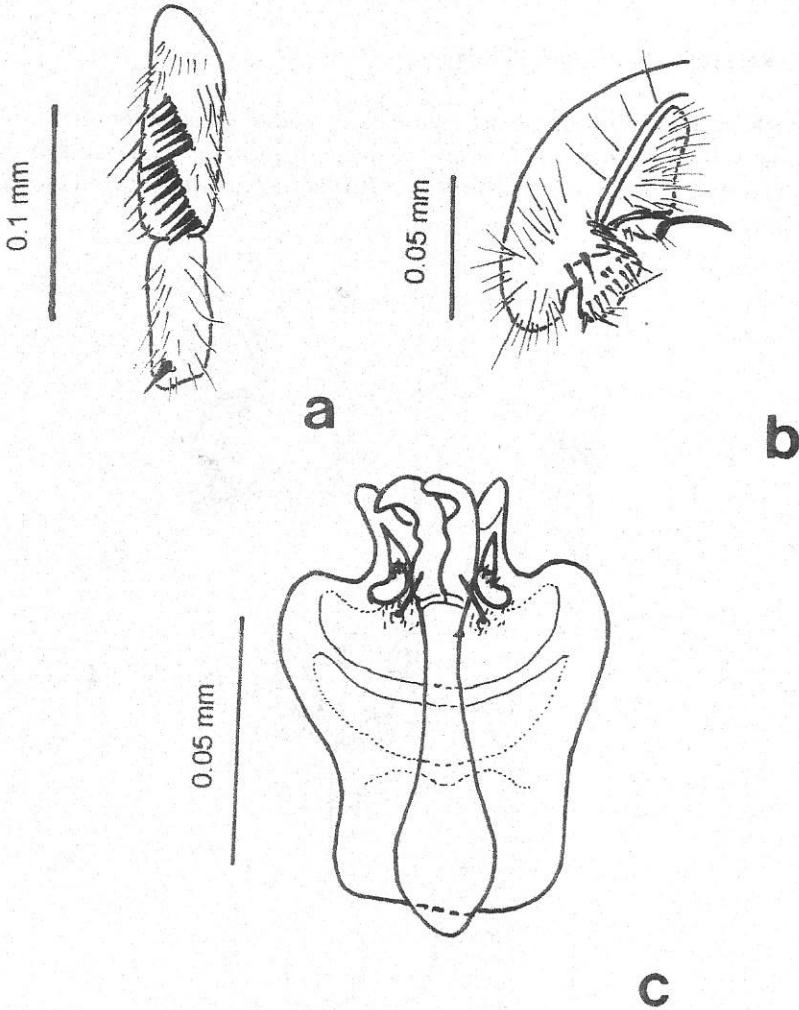


Figure 11. *Drosophila (Sophophora) bipectinata* Duda. a. foretarsomeres, b. periphallal organs (caudal), and c. phallic organs (ventral)

12. *DROSOPHILA (SOPHOPHORA) MALERKOTLIANA PALLENS* BOCK AND WHEELER

Drosophila (Sophophora) malerkotliana pallens Bock and Wheeler, 1972. Univ. Texas Publ. 7213:48.

Drosophila (Sophophora) malerkotliana pallida Bock, 1971. Univ. Texas Publ. 7103:274.

DIAGNOSIS. Sex-combs in 1 transverse row on first foretarsomere and 2 rows on 2nd foretarsomere (Fig. 12a); gonopods slightly divergent, longer than aedeagus (Fig. 12 c).

SPECIMENS EXAMINED. 4♂♂, Hortorium, UPLB, **Laguna**, 17.viii.1993, E. C. Ruiz, *ex Caryota maxima* nuts (ECRF); 1♂, Taal Lake shore, **Batangas**, 6.vii. 1993, E. C. Ruiz (ECRF); 1♂, **Northern Leyte**, 29.xi.1993, E. C. Ruiz (ECRF); 5♂♂, **U.S.A.**, Panama Culture strain from University of Texas, 14.vii.1994, M. V. Linde (MVL).

DISTRIBUTION. Borneo and Philippines.

REMARKS. Two subspecies exist on the basis of abdominal coloration in males. The Philippine subspecies has a pale brown abdomen, while the Malayan subspecies has a black abdomen. Kaneshiro and Wheeler (1970) also noted differences in the karyotypes of these forms.

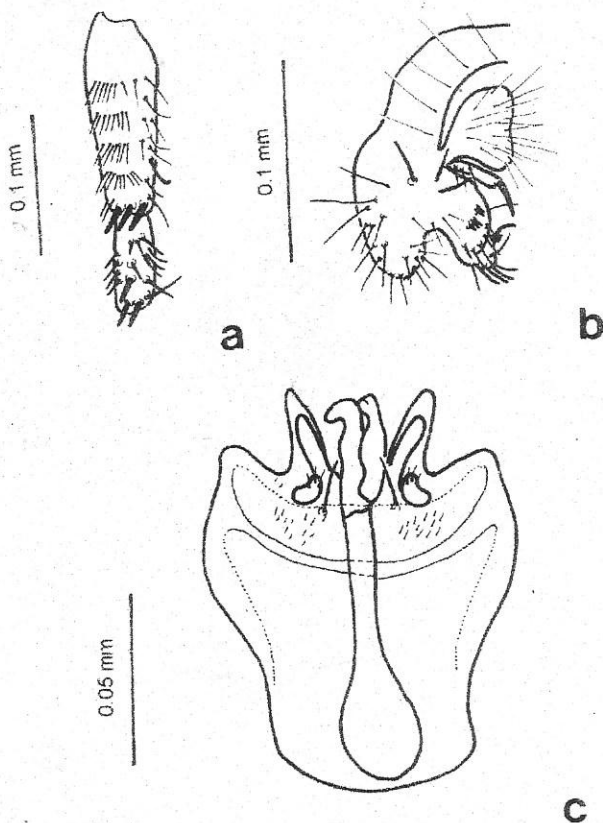


Figure 12. *Drosophila (Sophophora) malerkotliana pallens* Bock and Wheeler. a. foretarsomeres, b. peripheral phallic organs (caudal), and c. phallic organs (ventral)

13. *DROSOPHILA (SOPHOPHORA) PARABIPECTINATA* BOCK

Drosophila (sophophora) parabipectinata Bock, 1971. Univ. Texas Publ. 7103:277.
Drosophila sp. 7 Kaneshiro and Wheeler, 1970. Dros. Inf. Serv. 45:143.

DIAGNOSIS. Sex-combs as in *D. bipectinata* (Fig. 13a); epandrium with a distinct lobe covering base of surstylus (Fig. 13b); paramedian spines each surrounded by a patch of minute hairs (Fig. 13c).

SPECIMENS EXAMINED. 10♂♂, ISU Compound, Cabagan, **Isabela**, 1.x.1994, M. V. Linde (MVL); 281♂♂, LUZON IS.: Bagong Sikat, Muñoz, **Nueva Ecija**, 4.ix.1993, E. C. Ruiz, ex *Pouteria campechiana* (ECRF); 142♂♂, Hortorium, UPLB, **Laguna**, 4.viii to 1.x.1993, E. C. Ruiz (ECRF); 37GG, Forestry, UPLB, **Laguna**, 1.x.1993, E. C. Ruiz, ex *Diospyros blancoi* (ECRF); 14♂♂, Tranca, Bay, **Laguna**, 28.ix.1993, E. C. Ruiz, ex *Artocarpus heterophylla* (ECRF); 73♂♂, UPLB Compound, **Laguna**, 17.vi.1993, E. C. Ruiz (ECRF); 2♂♂, Taal Lake shore, **Cavite**, 6.vii.1993, E. C. Ruiz (ECRF); 1♂, Mt. Mayon, **Albay**, 15 to 18.i.1992, V. P. Gapud, ex *Ananas comosus* (ECRF); 1♂, Paulog, Ligao, **Albay**, 30.ix.1993, E. C. Ruiz (ECRF); 2♂♂, Liloan, **Leyte**, 19.xi.1993, E. C. Ruiz, ex *Psidium guajava* (ECRF); 2♂♂, Malagos, Calinan, **Davao**, 25.xi.1993, E. C. Ruiz (ECRF); 1♂, Matina, **Davao City**, 22.xi.1993, E. C. Ruiz (ECRF); 1♂, Pangutosan, Nabunturan, **Davao**, 25.xi.1993, E. C. Ruiz, ex *Musa paradisiaca* (ECRF); 35♂♂, **Surigao**, 27.xi.1993, E. C. Ruiz (ECRF).

DISTRIBUTION. Borneo (Sabah, Sarawak), Cambodia, Celebes, China (South and Southwest), India (South), Mauritius, Myanmar, Philippines, Reunion Island and Thailand.

REMARKS. According to Bock (1971), this species is restricted to the Oriental biogeographic zone (Borneo, Philippines, Cambodia and Thailand). It was collected near vegetation and forested areas and is well represented in the collection throughout the localities or sites collected from.

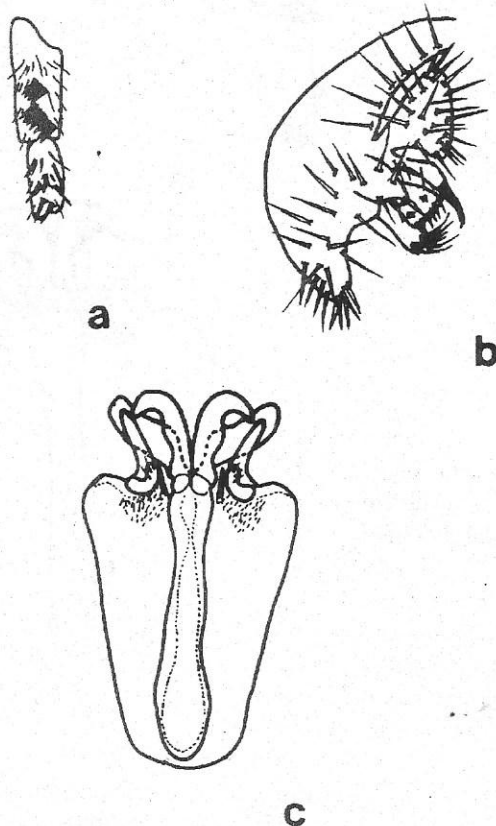


Figure 13. *Drosophila (Sophophora) parabiptinata* Bock. a. foretarsomeres, b. periphallal organs (caudal), and c. phallic organs (ventral)

14. *DROSOPHILA (SOPHOPHORA) PSEUDOANANASSAE PSEUDOANANASSAE* BOCK

Drosophila (Sophophora) pseudoananassae Bock, 1971. Univ. Texas Publ. 7103:274.

Drosophila ananassae Mather, 1955. Aust. J. Zool. 3:569.

Drosophila sp. 8 and sp.9 Kaneshiro and Wheeler, 1970. Dros. Inf. Serv. 45:143.

DIAGNOSIS. Transverse rows of sex-combs 2 on first foretarsomere, 1 on 2nd foretarsomere (Fig. 14a); prenisetae on surstylus in one row sparsely spaced with a row of setulae along apical border (Fig. 14b); gonopods shorter than aedeagus (Fig. 14c).

SPECIMENS EXAMINED. 5♂♂, ISU Compound, Cabagan, **Isabela**, 1.x.1994, M. V. Linde (MVL); 2♂♂, Hortorium, UPLB, **Laguna**, 3.ix.1993, E. C. Ruiz, ex *Pouteria campechiana* (ECRF); 1♂, Hortorium, UPLB, **Laguna**, 3.ix.1993, E. C. Ruiz, ex *Averrhoa carambola* (ECRF); 5♂♂, Forestry, UPLB, **Laguna**, 24.viii.1993, E. C. Ruiz, ex *Diospyros blancoi* (ECRF); 22♂♂, Taal Lake shore, Tagaytay, **Cavite**, 6.vii.1993, E. C. Ruiz (ECRF); 10♂♂, Mt. Mayon, **Albay**, 15 to 18.i.1992, V. P. Gapud, ex *Annona sativa* (ECRF); 1♂, VISCA Compound, **Leyte**, 19.xi.1993, E. C. Ruiz, ex *Cocos nucifera* (ECRF); 1♂, VISCA Compound, **Leyte**, 19.xi.1993, E. C. Ruiz, ex *Psidium guajava* (ECRF); 4♂♂, Liloan, **Leyte**, 28.xi.1993, E. C. Ruiz (ECRF).

DISTRIBUTION. Australia, Celebes, New Guinea and Philippines.

REMARKS. Two subspecies exist, *D. pseudoananassae nigra* from Borneo and Malaya wherein the distal portion of the abdomen is shiny black and *D. pseudoananassae pseudoananassae* from the Philippines, Northern Australia and New Guinea which has a plain brown abdomen (Bock 1971).

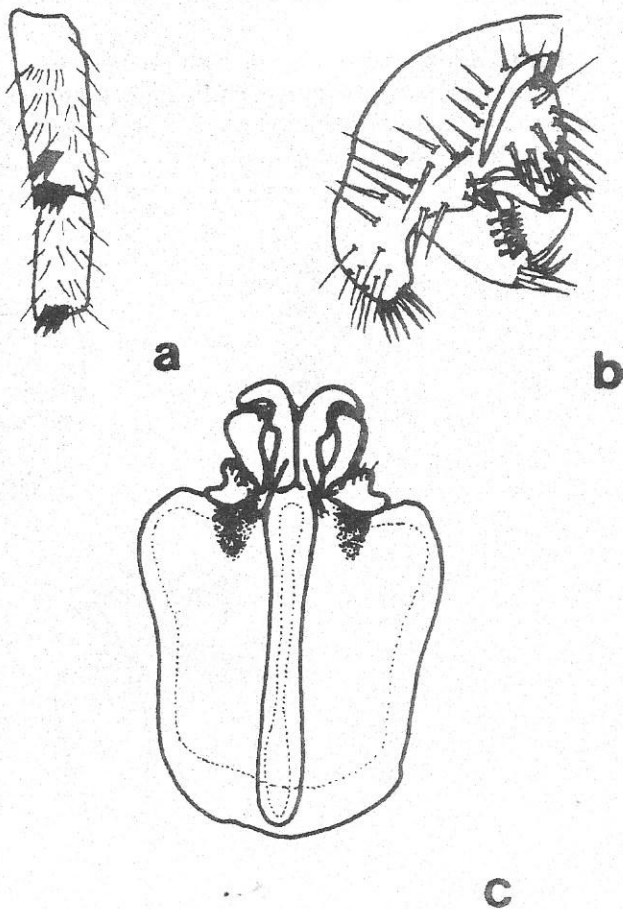


Figure 14. *Drosophila (Sophophora) pseudoananassae pseudoananassae* Bock. a. foretarsomeres, b. periphallic organs (caudal), and c. phallic organs (ventral)

DROSOPHILA DENTICULATA SPECIES-SUBGROUP BOCK AND WHEELER

Drosophila denticulata species-subgroup Bock and Wheeler, 1972. Univ. Texas Publ. 7213:29.

Males are distinguished by the unique sex-combs consisting of 2 or 3 very large claw-like teeth on the distal border of the tarsomere, unusually plump femur and also by the structure of the periphallalic organs, especially the circus which possesses several different sets of teeth including a cluster of 3 to 4 bristles in small lateral conical projection; phallic organs unique with very lightly sclerotized parameres and long heavily sclerotized gonopods (Bock and Wheeler 1972).

15. DROSOPHILA (SOPHOPHORA) DENTICULATA BOCK AND WHEELER

Drosophila (Sophophora) denticulata Bock and Wheeler, 1972. Univ. Texas Publ. 7213:29.

DIAGNOSIS. Foretarsomeres with 2 distal claw-like teeth (Fig. 15a); cercus with 3 sets of setae, short, thick, ventral teeth, dorsal thin setae and small lateral conical projections (Fig. 15b); aedeagus finely serrate laterally (Fig. 15c).

SPECIMENS EXAMINED. 3♂♂, Mt. Makiling, Laguna, 21.x.1993, E. C. Ruiz (ECRF).

DISTRIBUTION. Australia, New Guinea and Philippines.

REMARKS. The *denticulata* species-subgroup was established by Bock and Wheeler (1972) solely for this species based on its unique sex-combs. A second species new to science and described below has distinctive aedeagus and gonopods. It remains doubtful whether a difference in the number of teeth of the sex-combs can be sufficient to distinguish the species.

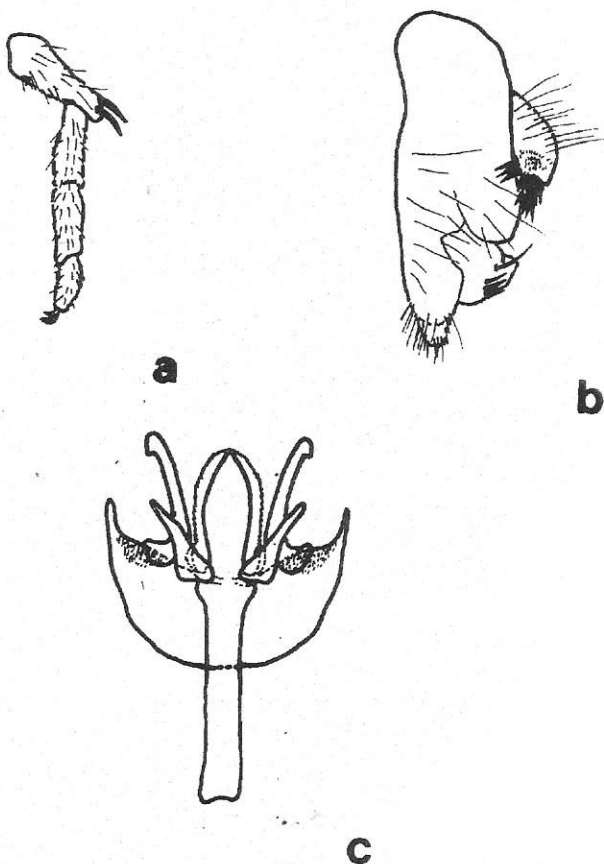


Figure 15. *Drosophila (Sophophora) denticulata* Bock and Wheeler. a. foretarsomeres, b. periphallalic organs (caudal), and c. phallic organs (ventral)

16. *DROSOPHILA (SOPHOPHORA) VELASCOI*, NEW SPECIES

HEAD. Eye orange-red; ocellar triangle yellow, with 1 pair of long setae and about 7 setulae; ocelli yellow; frontal vitta tannish brown; fronto-orbital plate pale brown with about 5 setulae aligned with anterior reclinate orbital seta on dorsal margin of eye; face yellow; carina low, narrow spearing like a slit between first flagellomeres; clypeus dark yellow; gena yellow, narrow with about 9 setulae including vibrissa and subvibrissa; occiput pale brown; pedicel yellow with 3 long setae and minute setulae; first flagellomere pale yellow; terminal bifurcation of arista moderate; palpus pale brown with 3 setae, 1 apical and 2 lateral.

THORAX. Scutum, scutellum and mesopleuron yellow; pospronotal lobe yellow with 2 long subequal setae; acrostichal setulae in 8 rows; basal scutellar setae convergent; apical scutellars crossed each other; haltere pale yellow.

Wings hyaline; veins brown; r-m and dm-cu crossveins not clouded; R2+3 vein straight; R₄₊₅ and M₁ veins parallel; C₁ setae 2.

Legs pale brown; male fore femur large (Fig. 16f), ventrally with dense minute setulae; male fore 1st tarsomere with 3 claw-like teeth at distal border (Fig. 16a); 2nd tarsomere attached to 1st tarsomere subapically; preapical dorsal setae present on all tibiae; apicals on fore and mid tibiae; fore first tarsomere shorter than 3 succeeding tarsomeres together; mid and hind 1st tarsomeres each as long as 3 succeeding tarsomeres together.

Abdominal tergites without distinctive markings; setae longer caudally; laterocaudal setae reaching half of succeeding tergite.

MALE TERMINALIA. Epandrium broad laterally, tapering caudoventrally into a toe-like projection with about 12 setae, with about 8 thin lateral setae; surstylus with 2 sets of prenisetae, laterally about 3 spine-like and caudoventrally about 3 peg-like ones (Fig. 16b); cercus oval, setigerous with tuft of short, stout caudoventral setulae (Fig. 16c); aedeagus transparent, bifid apically (Fig. 16d); aedeagal apodeme twice as long as aedeagus; paramere narrow apically; gonopods shorter than aedeagus and parameres pointed apically, not hooked subapically, bilobed basally; hypandrium quadrate without distinct projections (Fig. 16e).

MEASUREMENTS. BL = 2.25 mm; ThL = 0.76 mm; WL = 1.65 mm; WW = 0.67 mm.

INDICES. arb = 4/3; FW/HW = 0.38 (0.37 - 0.40); ch/o = 0.05 (0.05 - 0.05); prorrb = 0.87 (0.87 - 0.87); rcorb = 0.31 (0.31 - 0.31); vb = 0.70 (0.70 - 0.70); dcl = lost; sctl = lost; sterno = 0.66 (0.62 - 0.70); orbito = 0.50 (0.40 - 0.60); dcp = 0.42 (0.40 - 0.45); sctlp = 0.99 (0.91 - 1.08); C = 2.16 (2.16 - 2.16); 4c = 1.26 (1.24 - 1.28); 4v = 2.31 (2.27 - 2.35); 5x = 2.48 (2.30 - 2.67); ac = 3.00 (3.00 - 3.00); M = 0.82 (0.79 - 0.85); C3F = 0.55 (0.55 - 0.55).

SPECIMENS EXAMINED. HOLOTYPE ♂, Mt. Makiling, Laguna, 21.x.1993, E. C. Ruiz (ECRF); PARATYPES, 2♂♂, same data as holotype (ECRF).

DISTRIBUTION. Philippines.

ETYMOLOGY. Patronym, in honor of the author's adviser and member of the advisory committee, Dr. Luis Rey I. Velasco.

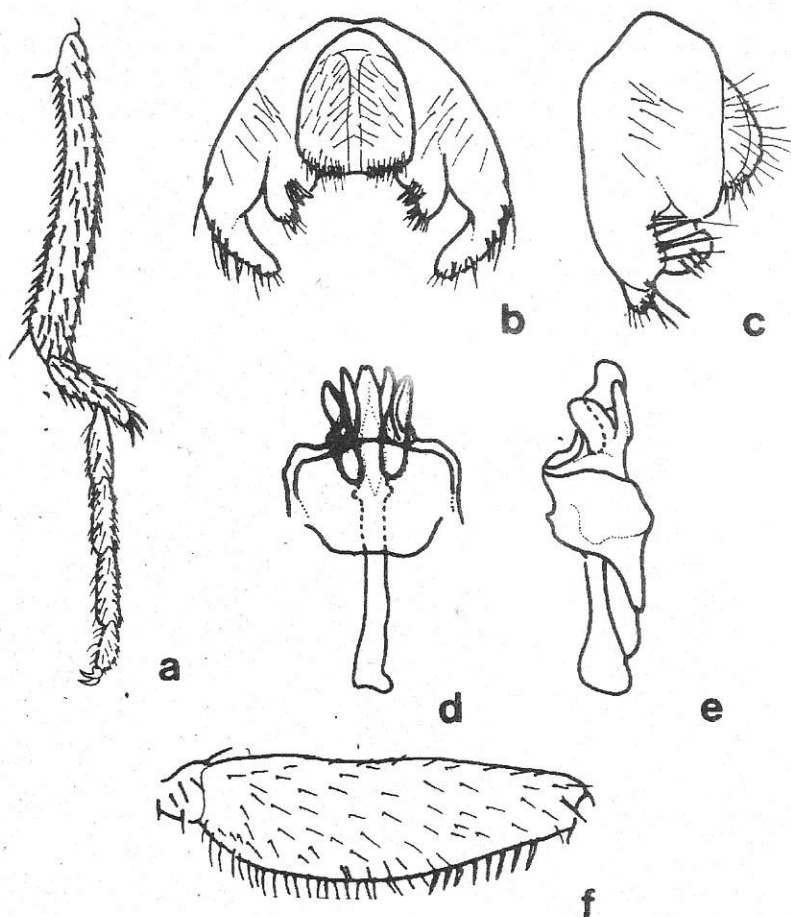


Figure 16. *Drosophila (Sophophora) velascoi*, new species. a. foretibia and foretarsomeres, b. peripheral organs (caudal), c. peripheral organs (lateral), d. phallic organs (ventral), e. phallic organs (lateral), and f. forefemur

***DROSOPHILA MONTIUM* SPECIES-SUBGROUP**

Drosophila montium species-subgroup: Hsu,

Sex-combs along entire lengths of 1st and 2nd tarsomeres; epandrium not constricted dorsally; circus small with long setae, few and in some species short and thicker caudoventrally; setigerous surstylus present; ventral cercal lobe setigerous, fused to circus or free with 1 or more very large, curved black medial teeth and a few small hairs; aedeagus bare or hirsute, not bifid or branched apically; parameres generally large, broad in most species, not elongate, black or pointed (modified from Bock and Wheeler 1972).

17. *DROSOPHILA (SOPHOPHORA) BICORNUTA* BOCK AND WHEELER

Drosophila (Sophophora) bicornuta Bock and Wheeler, 1972. Univ. Texas Publ. 7213:67.

DIAGNOSIS. Longitudinal sex-combs on 1st tarsomere consisting of 27 teeth, lower 3 displaced; 20 teeth uniform and contiguous on 2nd tarsomere (Fig. 17a); cercus with long setulae and a few thickened caudoventrally; ventral cercal lobe not completely differentiated, with 2 very large, curved, black medial teeth above and 1 smaller similar tooth below (Fig. 17b); caudal margin of hypandrium with elongate median truncate process, bearing 2 short spines apically (Fig. 17c).

SPECIMENS EXAMINED. 5♂♂, ISU Compound, Cabagan, **Isabela**, 1.x.1994, M. V. Linde (MVL); 1♂, LUZON IS.: Mt. Makiling (highest elevation), **Laguna**, 21.x.1993, E. C. Ruiz (ECRF).

DISTRIBUTION. Borneo, Java, Malaysia, Philippines, Singapore, Sumatra and Thailand.

REMARKS. This species was not common in the collections.

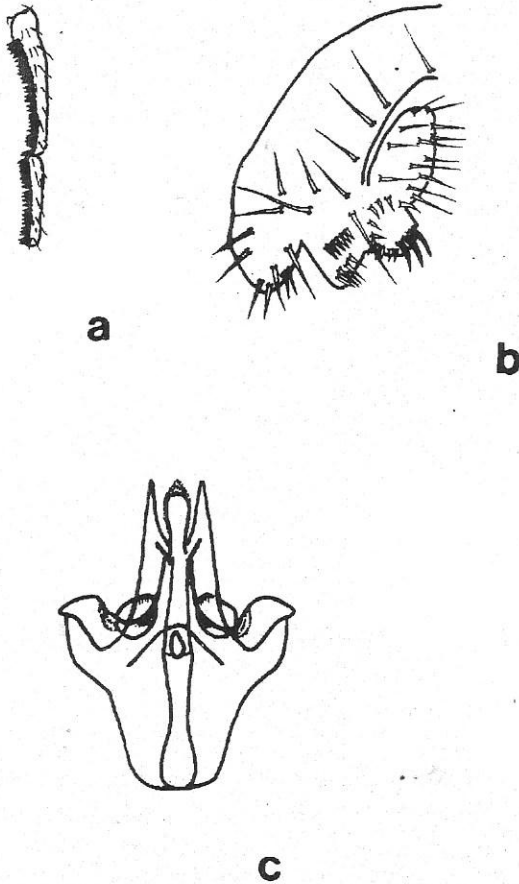


Figure 17. *Drosophila (Sophophora) bicornuta* Bock and Wheeler. a foretarsomeres, b. periphallallic organs (caudal), and c. phallic organs (ventral)

18. *DROSOPHILA (SOPHOPHORA) KANAPIAE* BOCK AND WHEELER

Drosophila (Sophophora) kanapiae
Bock and Wheeler, 1972. Univ.
Texas Publ. 7213.74.

DIAGNOSIS. First tarsomere longitudinal sex-comb consisting of ca. 29 teeth, smaller, finer and contiguous above, lowermost 2 not displaced; sex-comb on 2nd tarsomere with ca. 23 fine teeth, lightly crammed except for lowermost 3 or 4 (Fig. 18a); ventral cercal lobe distinctly differentiated with one very large, curved, black medial tooth (Fig. 18b); gonopods fused medially, articulated to aedeagus (Fig. 18c).

SPECIMENS EXAMINED. 5♂♂, ISU Compound, Cabagan, Isabela, I.x.1994, M. V. Linde (MVL).

DISTRIBUTION. Philippines.

REMARKS. Not common.

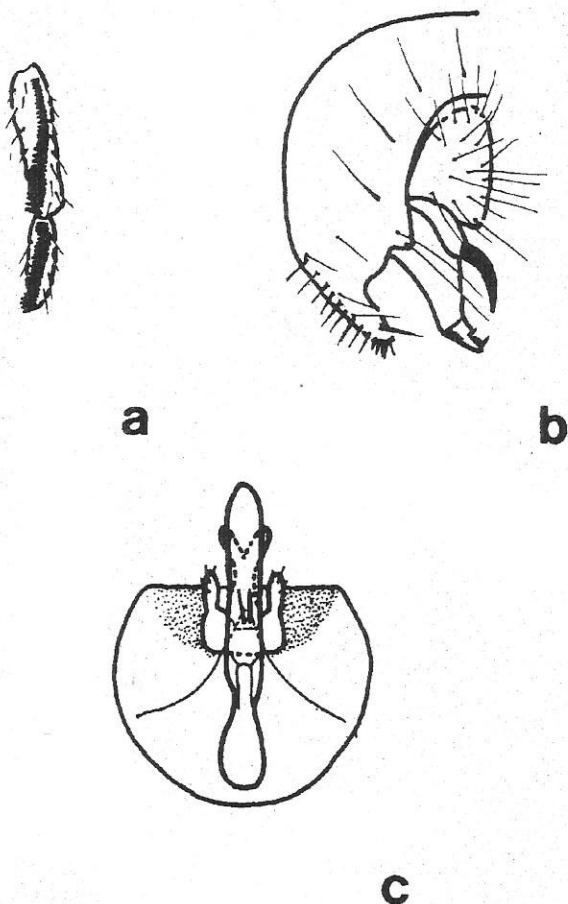


Figure 18. *Drosophila (Sophophora) kanapiae* Bock and Wheeler. a. foretarsomeres, b. peripheral organs (caudal), and c. phallic organs (ventral)

19. *DROSOPHILA (SOPHOPHORA) TRUNCATA* OKADA

Drosophila (Sophophora) truncata Okada, 1964. Nat. Life SEAsia 3:455.

DIAGNOSIS. Longitudinal sex-combs consisting of 18 teeth, lowermost displaced and, 13 uniform teeth on 1st and 2nd tarsomeres (Bock and Wheeler 1972).

DISTRIBUTION. Andaman Island, Borneo, India, Philippines and Sri Lanka.

REMARKS. This species was not examined. However, it is very similar to *D. barbarae*, differing only in the coloration of the cercus (pale yellow in *truncata*; black in *barbarae*) and in the margins of aedeagus and gonopods (serrate in *truncata*, not in *barbarae*)

20. *DROSOPHILA (SOPHOPHORA) WATANABEI* GUPTA AND GUPTA

Drosophila (Sophophora) watanabei Gupta and Gupta, 1992. Orient. Ins. 26:201.
Drosophila (Sophophora) punjabiensis-like Watanabe et al., 1982. Jpn. J. Genet. 57:661.

DIAGNOSIS. Longitudinal sex-combs on male foreleg along entire lengths of 1st and 2nd tarsomeres consisting of 26 teeth, lower 2 displaced, and 19 uniform teeth respectively (Fig. 19a); ventral cercal lobe less differentiated with 2 large, unequal black teeth (Fig. 19b); aedeagus large, pubescent apically (Fig. 19c).

SPECIMENS EXAMINED. 10♂♂, ISU Compound, Cabagan, Isabela, 1.x.1994, M. V. Linde (MVL).

DISTRIBUTION. Cambodia, Thailand and Philippines (new record).

REMARKS. New Philippine record.

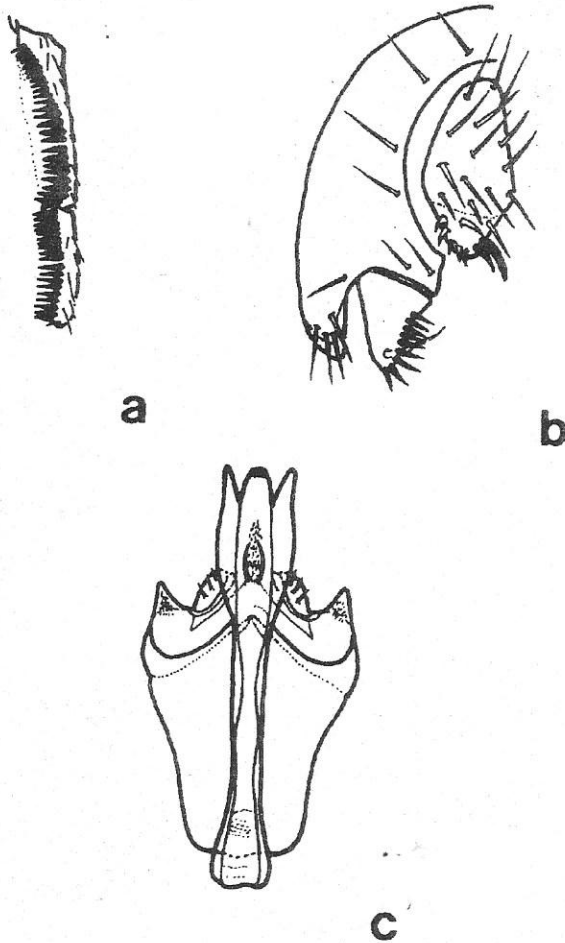


Figure 19. *Drosophila (Sophophora) watanabei* Gupta and Gupta. a. foretarsomeres, b. peripheral organs (caudal), and c. phallic organs (ventral)

21. *DROSOPHILA (SOPHOPHORA) SIERRAE*, NEW SPECIES

HEAD. Eye orange-red; ocellar triangle yellow, with 1 pair of long setae and sparse setulae; ocelli yellow; frontal vitta yellow, with about 10 interfrontal setulae; fronto-orbital plate yellow; occiput brownish yellow; pedicel yellow, with 3 long setae and few setulae; 1st flagellomere yellow; terminal bifurcation of arista small; palpus yellow, with apical prominent and lateral shorter setae.

THORAX. Scutum, scutellum and mesopleuron yellow; postpronotal lobe yellow with 2 setae equal in length; acrostichal setulae in 6 rows; basal scutellar setae divergent; apical scutellars crossed each other.

Wings hyaline, veins brown; r-m and dm-cu crossveins not clouded; R₂₊₃ vein straight; R₄₊₅ and M₁ veins parallel; C₁ setae 2; haltere pale yellow.

Legs yellow; fore coxae with numerous long ventral setae; preapical dorsal setae on all tibiae; apicals on fore and mid tibiae; fore 1st tarsomeres as long as 3 succeeding tarsomeres together (mid 1st tarsomeres as long as 3 succeeding tarsomeres together); hind 1st tarsomere as long as the rest together; male foreleg with 2 sex-combs longitudinal along length of 1st and 2nd tarsomeres; 1st sex-comb consisting of about 17 teeth with terminal one, seta-like far removed from the others; 2nd consisting about 12 teeth (Fig 20a).

Abdominal tergites without marking, each with strong caudal setae and sparse subcaudal setulae.

MALE TERMINALIA. Epandrium bare, with about 18 thick anterolateral to subcaudal setae, about 3 long submedial setae, and about 5 thin, long caudoventral setae (Fig. 20b); surstylus differentiated from epandrium, with 2 sets of prensisetae (about 10 teeth on ventral-distal margin and about 13 arranged in sinuated row on mesal surface); cercus bilobed, upper lobe large, oval setigerous, lower lobe small with 3 stout caudal spines and 3 thin ventral setae (Fig. 20c); aedeagus pointed dorso-apically, with dense submedial hairs and distal spinules (Fig. 20d); aedeagal apodeme ca. ½ as long as aedeagus gently curved outwards at tip; hypandrium wider than long, with V-shaped apodeme (Fig. 20e).

MEASUREMENTS. BL = 1.90 mm; ThL = 0.71 mm; WL = 1.51 mm; WW = 0.62 mm.

INDICES. arb = 4/2; FW/HW = 0.39; ch/0 = 0.06; pror = 0.83; rcorb = 0.33; vb = 1.50; dcl = 0.63; sctl = 0.92; sterno = 0.41; orbito = 0.60; dcp = 0.40; sctlp = 0.83; C = 1.97; 4c = 1.30; 4v = 2.38; 5x = 3.00; ac = 2.83; M = 0.92; C3F = 0.52.

SPECIMEN EXAMINED. HOLOTYPE ♂, Cabagan, *Isabela*, 14.vii.1994, M. V. Linde (ECRF).

DISTRIBUTION. Philippines.

ETYMOLOGY. Patronym, in honor of the author's adviser and advisory committee member, Dr. Zenaida N. Sierra.

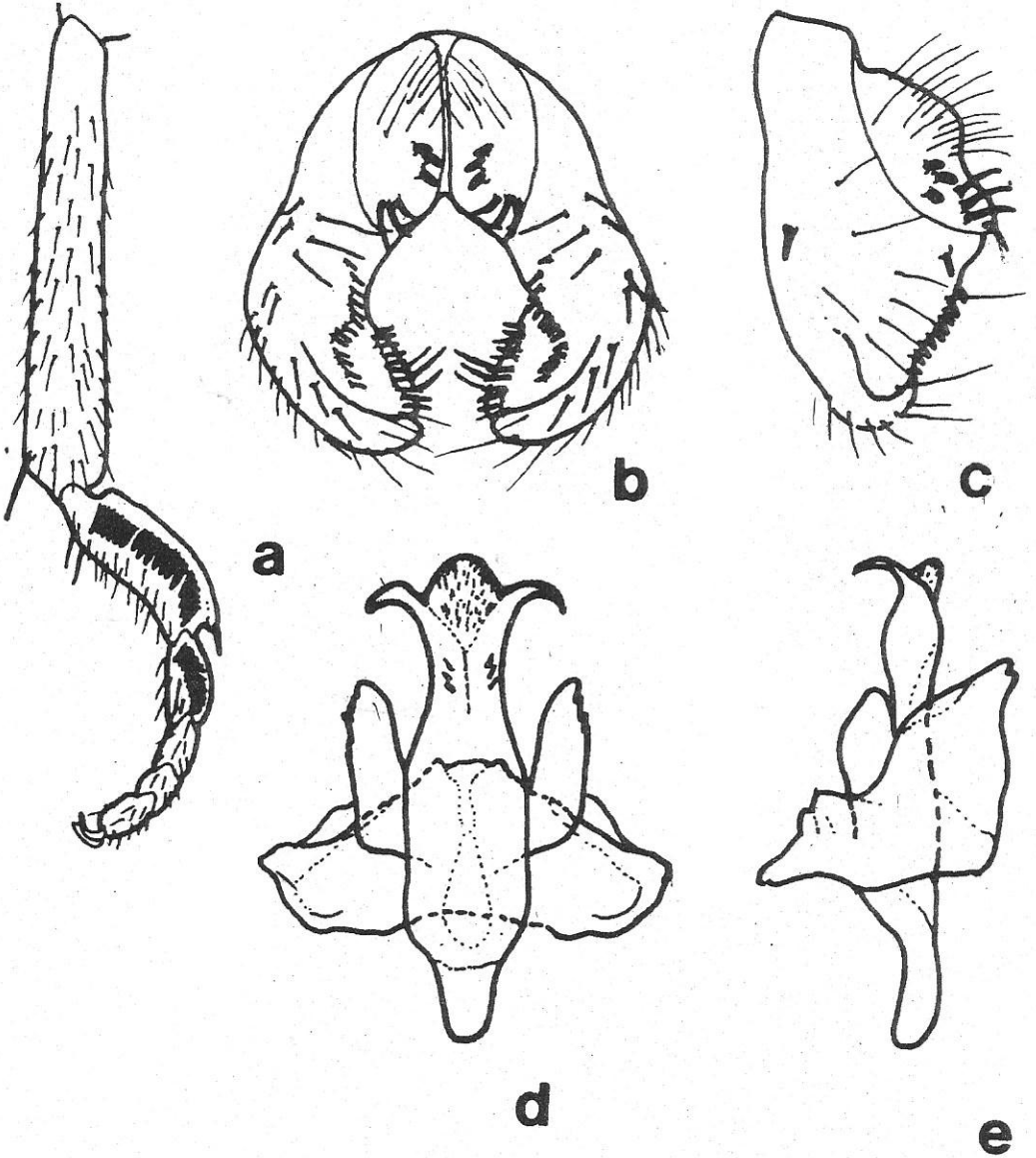


Figure 20. *Drosophila (Sophophora) sierrae*, new species. a. foreleg, b. periphallallic organs (caudal), c. periphallallic organs (lateral), d. phallic organs (ventral), and e. phallic organs (lateral)

22. *DROSOPHILA (SOPHOPHORA) OCAMPOAE*, NEW SPECIES

HEAD. Eye orange-red; ocellar triangle brownish yellow, with 1 pair of setae as long as proclinate orbital seta and sparse setulae; ocelli yellow; frontal vitta brownish yellow, with a few interfrontal setulae; fronto-orbital plate yellow; face brownish orange; carina narrow, broad in lower part; clypeus pale brown; gena yellow; post occiput pale brown; pedicel pale brown with 2 distinctly strong setae and sparse setulae; first flagellomere ca. 1.5 times longer than pedicel, yellow, with fine setulae; terminal bifurcation of arista moderate; palpus pale brown, with 2 apical and lateral setae.

THORAX. Scutum and scutellum yellow; mesopleuron brownish yellow; postpronotal lobe yellow with 2 long setae equal in length; acrostichal setulae regularly arranged in 6 rows; basal scutellar setae convergent; apical scutellars crossed each other.

Wings slightly dusky; veins pale brown; r-m and dm-cu crossveins not clouded; R_{2+3} vein straight, slightly curved to costa at tip; R_{4+5} and M_1 veins parallel; C_1 setae 2.

Legs brownish yellow; male foreleg (Fig. 21a) with 2 sets of sex-combs longitudinal along subapical portions of 1st and 2nd tarsomeres (1st sex-comb consisting of 5 teeth, 2nd of 8 teeth); preapical dorsal setae on all tibiae; apical on fore and mid tibiae; all 1st tarsomeres each shorter than 2 succeeding tarsomeres together.

Abdominal tergites (tIII - tVI) each with dark brown, caudal bands and strong setae interspersed with smaller subcaudal setulae.

MALE TERMINALIA. Epandrium narrow dorsally to laterally; tapering ventrally with long lateral and caudoventral setae (Fig. 21b); surstylus fused to epandrium with 1 row of about 9 prenisetae; cercus with long setae profuse anterodorsally to submedial border with 3 distinctly long setae (Fig. 21c); aedeagus surrounded by gonopods, appearing bifid apically (Fig. 21d); paramere large, articulating with aedeagus; hypandrium triangular, concave medially (Fig. 21e).

MEASUREMENTS. BL = 1.82 mm; ThL = 0.69 mm; WL = 1.53 mm; WW = 0.67 mm.

INDICES. arb = 4/3; FW/HW = 0.40 (0.38 - 0.46); ch/o = 0.09 (0.07 - 0.12); prorb = 0.85 (0.85 - 0.87); rcrob = 0.37 (0.28 - 0.42); vb = 0.67 (0.55 - 0.81); dcl = 0.64 (0.60 - 0.71); sctl = 0.92 (0.86 - 1.07); sterno = 0.48 (0.45 - 0.50); orbito = 0.49 (0.40 - 0.55); dcp = 0.46 (0.41 - 0.55); setlp = 1.02 (0.88 - 1.11); C = 1.95 (1.71 - 2.15); 4c = 1.55 (1.45 - 1.75); 4v = 2.96 (2.61 - 3.83); 5x = 2.50 (1.80 - 3.00); ac = 2.96 (2.71 - 3.23); M = 0.93 (0.81 - 1.00); C3F = 0.53 (0.43 - 0.57).

SPECIMEN EXAMINED. HOLOTYPE ♂, Mt. Makiling, Laguna, 21.x.1993, E. C. Ruiz (ECRF).

DISTRIBUTION. Philippines.

ETYMOLOGY. Patronym, in honor of the author's adviser and advisory committee member, Dr. Virginia R. Ocampo.

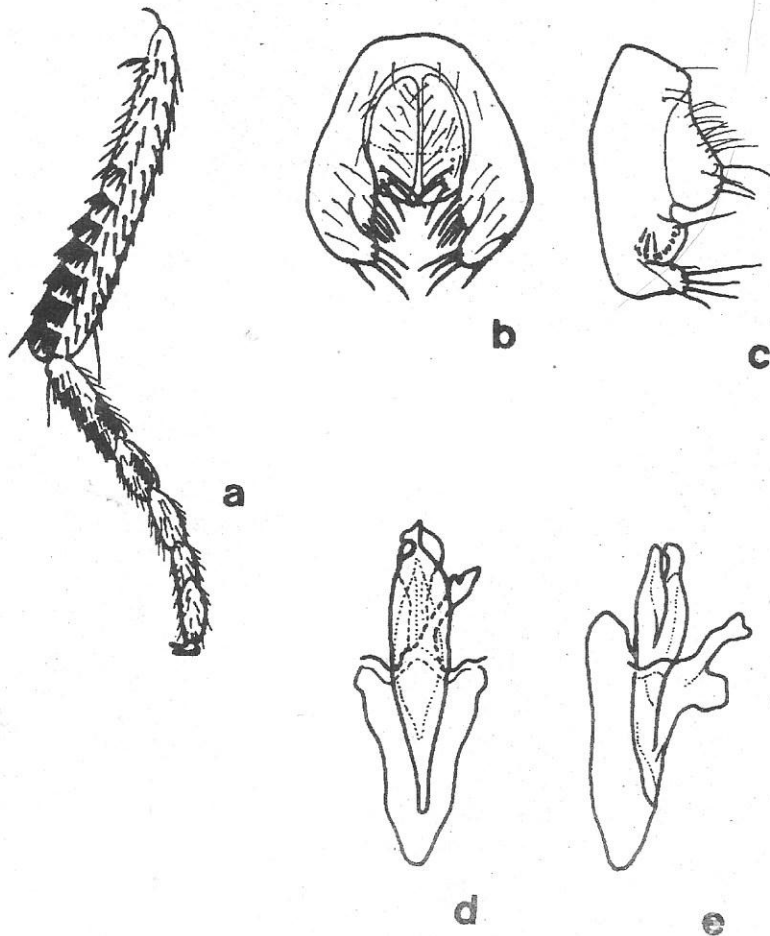


Figure 21. *Drosophila (Sophophora) ocampoae*, new species. a. foretibia and foretarsomeres, b. peripheral organs (caudal), c. peripheral organs (lateral), d. phallic organs (ventral), and e. phallic organs (lateral)

***DROSOPHILA KIKKAWAI* SPECIES-COMPLEX**

Aedeagus slender, bare, recurved apically; large and broad parameres.

23. *DROSOPHILA (SOPHOPHORA) BARBARAE* BOCK AND WHEELER

Drosophila (Sophophora) barbarae Bock and Wheeler, 1972. Univ. Texas Publ. 7213:62.

DIAGNOSIS. Sex-combs similar to that of *D. truncata* (Fig. 22a); cercus black; ventral cercal lobe not differentiated with 2 very large, equal, curved black medial teeth (Fig. 22b); caudal margin of hypandrium with a pair of short close paramedian spines (Fig. 22c).

SPECIMENS EXAMINED. 12♂♂, Bagong Sikat, Muñoz, **Nueva Ecija**, 28.viii.1993, E. C. Ruiz (ECRF); 6♂♂, Bagong Sikat, Muñoz, **Nueva Ecija**, 28.viii.1993, E. C. Ruiz, *ex Pouteria campechiana* (ECRF); 1♂, Mt. Makiling, **Laguna**, 21.x.1993, E. C. Ruiz (ECRF); 4♂♂, Forestry, UPLB, **Laguna**, 24.vii.1993, E. C. Ruiz, *ex Diospyros blancoi* (ECRF); 10♂♂, Hortorium, UPLB, **Laguna**, 17.viii to 21.xi.1993, E. C. Ruiz (ECRF); 12♂♂, Pagsangahan, Basud (Km. 353), **Camarines Norte**, 17.xi.1993, E. C. Ruiz (ECRF); 1♂, Sipocot, **Camarines Sur**; 30.11.1993, E. C. Ruiz (ECRF); 1♂, Mt. Mayon, **Albay**, 15 to 18.i.1992, V. P. Gapud, *ex Ananas comosus* (ECRF); 7♂♂, Mt. Mayon, **Albay**, 15 to 18.i.1992, V. P. Gapud, *ex Carica papaya* (ECRF); 6♂♂, Paulog, Ligao, **Albay**, 30.xi.1993, E. C. Ruiz, *ex Cocos nucifera* (ECRF); 3♂♂, VISCA Compound, **Leyte**, 19.xi.1993, E. C. Ruiz, *ex Pouteria campechiana* (ECRF); 1♂, Antequera, Nabunturan, **Davao**, 25.xi.1993, E. C. Ruiz, *ex Musa paradisiaca* (ECRF); 12♂♂, Malagos, Calinan, **Davao**, 23.xi.1993, E. C. Ruiz (ECRF); 11♂♂, U.S.A., University of Texas Stock (culture strain), 14.vii.1994, handcarried by M. V. Linde (ECRF); 6♂♂, **Surigao**, 27.xi.1993, E. C. Ruiz (ECRF).

DISTRIBUTION. Borneo (Brunei, Sabah), China (Southwest), India, Malaysia, Philippines, Sri Lanka and Thailand.

REMARKS. This is the most common among species with longitudinal sex-combs and is also easily distinguished by the color of the cercus.

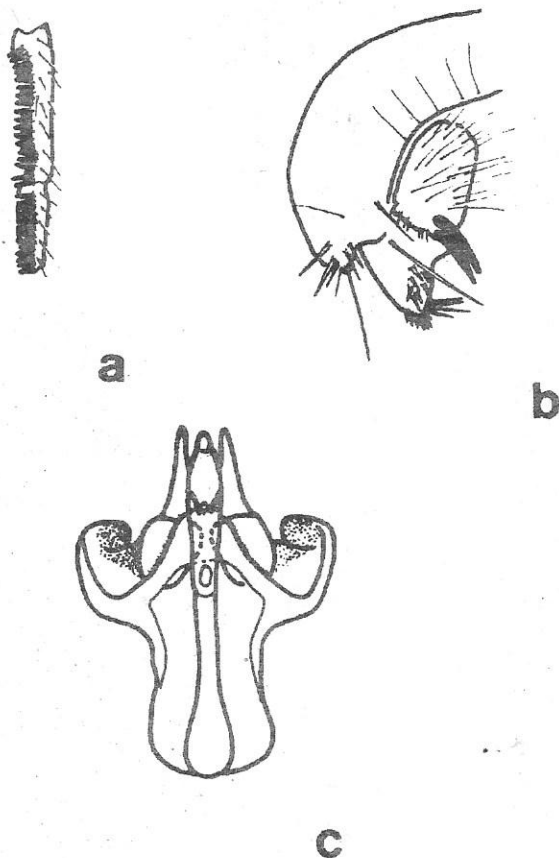


Figure 22. *Drosophila (Sophophora) barbarae* Bock and Wheeler. a. foretarsomeres, b. peripheral palpal organs (caudal), and c. phallic organs (ventral)

24. *DROSOPHILA (SOPHOPHORA) KIKKAWAI* BURLA

Drosophila (Sophophora) kikkawai Burla, 1954. Rev. Brasil. Biol. 14:47.

Drosophila montium Duda, 1923. Ann. Mus Nat. Hung. 20:53; nec *Drosophila montium* de Meijere, 1917; nec *DrosoPhila montium* Duda, 1940. Ann. Mus. Nat. Hung. 33:19-53.

Drosophila (Sophophora) montium: Sturtevant, 1942. Univ. Texas Publ. 4213:29.

DIAGNOSIS. Longitudinal sex-combs consist ca. 24 teeth on fore 1st tarsomere, lower 2 displaced, and ca. 20 teeth on 2nd foretarsomere (Fig. 23a); ventral cercal lobe not totally differentiated, with a very large, curved, black tooth below and 1 above (sometimes 2) smaller, similar tooth (Fig. 23b); paramedian spines long (as long as aedeagus) and close to each other (Fig. 23c).

SPECIMENS EXAMINED.

7♂♂, Hortorium, UPLB, Laguna, 21.x.1993, E. C. Ruiz (ECRF).

DISTRIBUTION.

Circumtropical, sometimes subtropical: Borneo (Brunei, Sabah, Sarawak), Brazil, Burma, Colombia, China (North- Northwest-Central- Southwest- South-), Fiji, Japan, Java, Korea, Hawaii, Hongkong, India, Ivory Coast, Malaysia, Micronesia, Mauritius, Nepal, New Guinea, Philippines, Ryukyu Island, Samoa, Sri Lanka, Sumatra, Taiwan, Thailand and Vietnam.

REMARKS. This species is distinct in having long paramedian spines on the caudal end of the hypandrium.

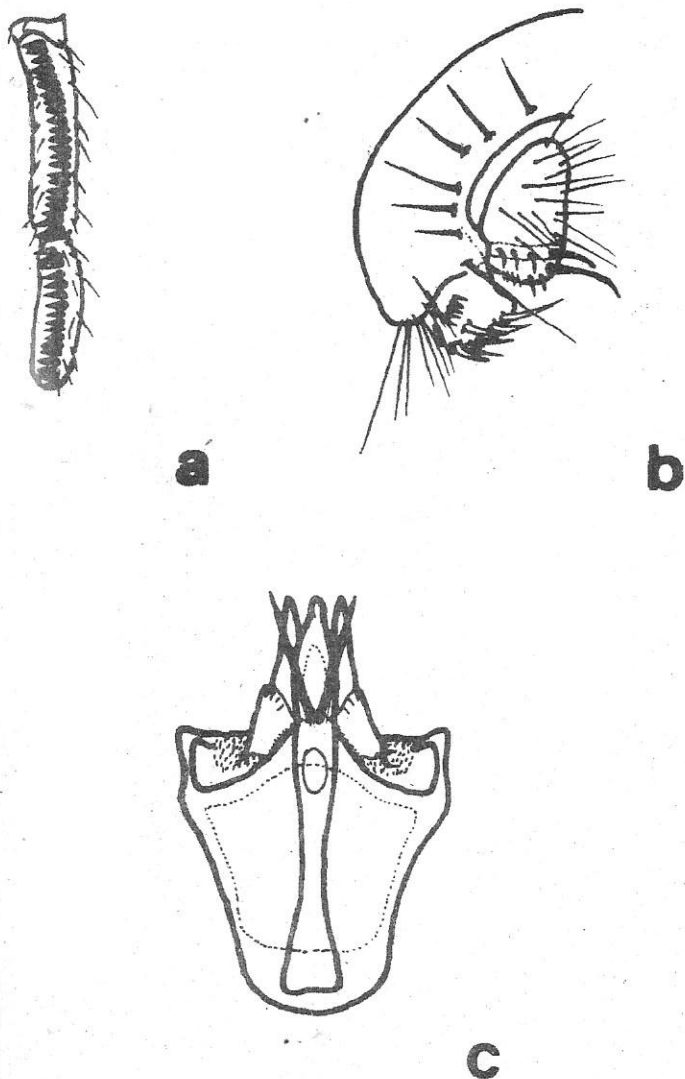


Figure 23. *Drosophila (Sophophora) kikkawai* Burla. a. foretarsomeres, b. periphallallic organs (caudal), and c. phallic organs (ventral)

UNKNOWN SPECIES-SUBGROUP

This grouping was established for species without the characteristic sex-combs but similar in other features as that of the *melanogaster* species-group (epandrium posteriorly with process covering base of surstylus with 2 sets of teeth; medial or ventromedial row or cluster of pointed teeth, lateral row more blunt, darker teeth).

25. *DROSOPHILA (SOPHOPHORA) MAJTOI*, NEW SPECIES

HEAD. Eye orange-red; ocellar triangle yellowish brown, ocelli yellow, ocellar seta long, vertex narrowed laterally, anterior margin of eye appearing straight vertically rather than convex; frontal vitta grayish yellow with sparse setulae on anterior margin fronto-orbital plate pale brown; face yellow, carina wide; clypeus brownish yellow; first flagellomere ca. 1.5 times as long as pedicel, pale grayish yellow, with minute hairs; terminal bifurcation of arista moderate; palpus yellow with 1 prominent apical seta and sometimes another relatively long seta.

THORAX. Scutum, scutellum, mesopleuron and postpronotal lobe brownish yellow; lower postpronotal setae longer than upper; acrostichal setulae in 6 rows; basal scutellar setae nearly parallel; apical scutellar setae convergent and crossed.

Wings slightly dusky; veins pale brown; r-m and dm-cu crossveins not clouded; R_{2+3} vein nearly straight but slightly curved to costa at tip; R_{4+5} and M1 veins parallel; C_1 setae 2, long (costal break with 2 long setae); haltere pale yellow.

Legs yellow; fore 1st tarsomere slightly longer than 3 succeeding tarsomeres together; mid and hind 1st tarsomere shorter than 2 succeeding tarsomeres together; preapicals on all tibiae; apical on fore and mid tibiae; male fore tarsi without recurved hairs along anterior margin (Fig. 24a).

Abdominal tergites (tII - tVI) yellow, each with medially uninterrupted, dark brown caudal band; tVI medially largely dark brown.

MALE TERMINALIA. Epandrium pubescent laterally with about 10 lateral and subcaudal setae, dorsally very narrow, slightly pointed at caudoventral corner, slightly expanded on lower caudal margin; surstylus narrowly connected to epandrium at dorsal corner with about 4 long setae on distal margin and about 3 setulae on upper mesal surface; cercus constricted subventrally, entirely not pubescent, with about 18 setae on dorsal lobe and about 10 downward-curved short setae on ventral lobe (Fig. 24b); hypandrium broader than long (Fig. 24c), pubescent on inner lateral portions, with 1 pair of minute paramedian setulae on mediocaudal margin; paramere club-shaped, apically with several small sensilla; gonopods very large, broad, separated from each other; aedeagal guide absent; aedeagal apodeme laterally flat, very broad vertically, as long as aedeagus (Fig. 24d); aedeagus articulating with aedeagal apodeme, gently curved ventrad, basoventrally with 1 pair of horn-like processes, submedially expanded ventrad, apicoventrally expanded rectangularly, with small, tentacle-like process on apicodorsal margin (Fig. 24e).

MEASUREMENTS. BL = 1.7 mm; ThL = 0.62 mm; WL = 1.27 mm; WW = 0.58 mm.

INDICES. arb = 4/3; FW/HW = 0.45 (0.43 - 0.50); ch/o = 0.15 (0.14 - 0.16); prorrb = 0.54 (0.50 - 0.60); rcorrb = 0.19 (0.16 - 0.25); vb = 0.69 (0.66 - 0.75); dcl = 0.71 (0.68 - 0.77); sctl = 0.69 (0.58 - 0.75); sterno = 0.36 (0.36 - 0.36); orbito = 0.26 (0.20 - 0.37); dcp = 0.61 (0.55 - 0.68); sctlp = 0.89 (0.80 - 1.00); C = 1.14 (1.04 - 1.20); 4c = 2.22 (1.81 - 2.44); 4v = 2.85 (2.36 - 3.22); 5x = 2.47 (2.37 - 2.50); ac = 3.94 (3.50 - 4.40); M = 1.05 (0.90 - 1.11); C3F = 0.53 (0.52 - 0.55).

SPECIMENS EXAMINED. HOLOTYPE ♂, Mt. Makiling, **Laguna**, 21.x.1993, E. C. Ruiz (ECRF); PARATYPES, 4♂♂, same data as holotype (ECRF). Other materials examined given to Dr. Masanori J. Toda.

DISTRIBUTION. Philippines (Luzon).

ETYMOLOGY. Patronym, in honor of Dr. Masanori J. Toda, for confirming and verifying the author's collections.

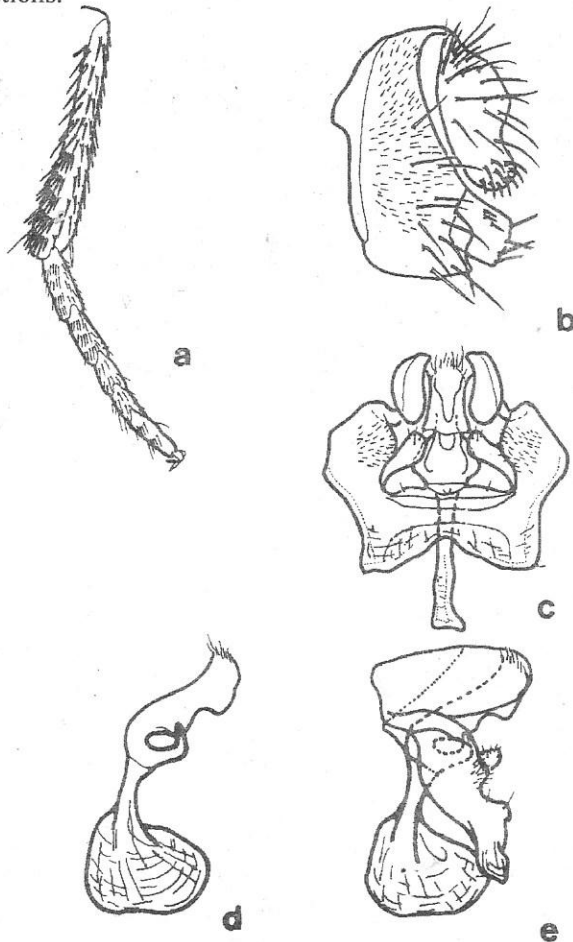


Figure 24. *Drosophila (Sophophora) majtoi*, new species. a. foretibia and foretarsomeres, b. periphallallic organs (caudal), c. periphallallic organs (lateral), d. phallic organs (ventral), and e. phallic organs (lateral)

ACKNOWLEDGMENT

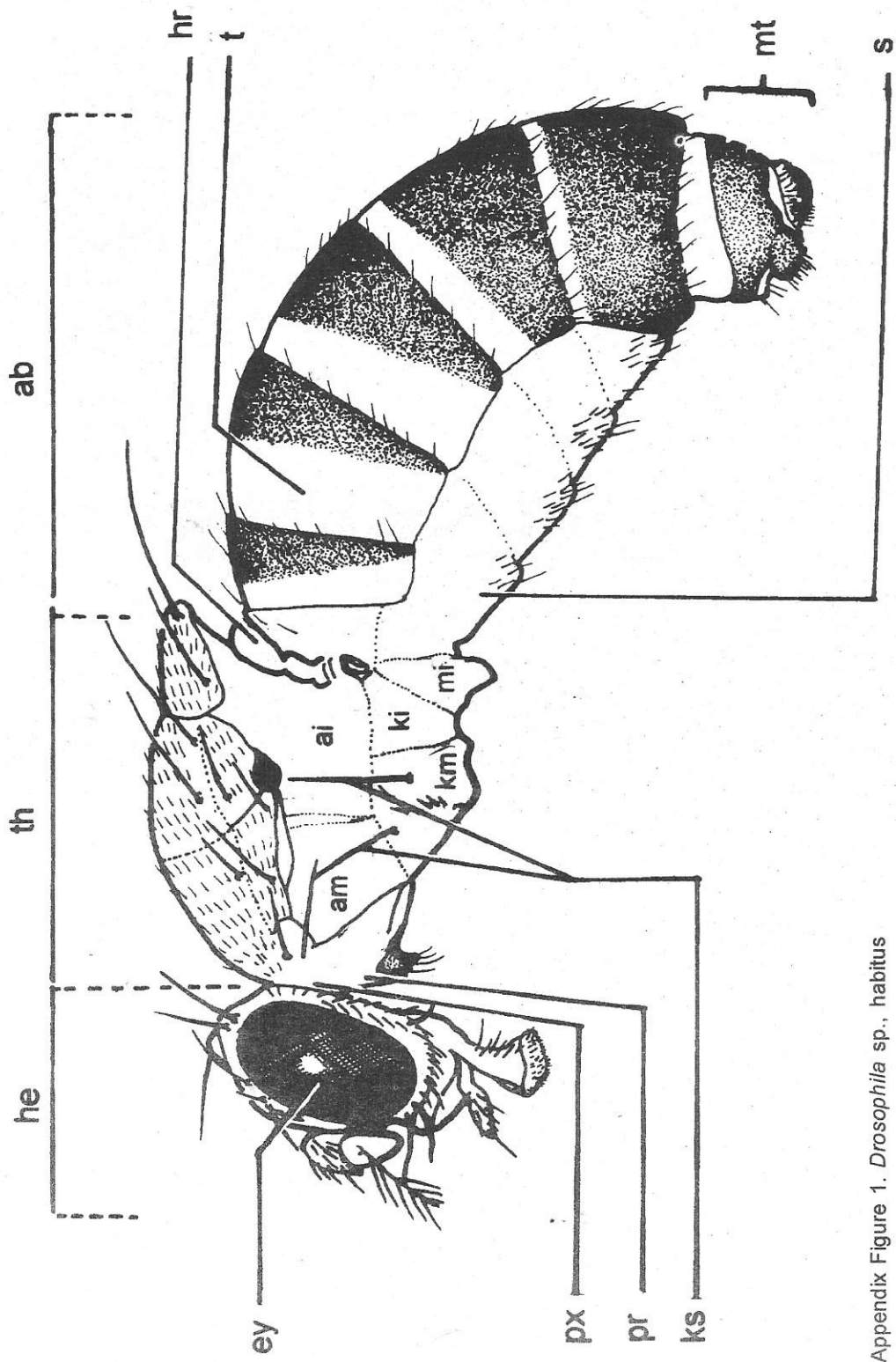
I thank the following persons who have contributed to this research: Dr. Masanori J. Toda for the species verification; Mr. Marc van der Linde for handcarrying the specimens to Japan and back; Mrs. Jessamyn R. Adorada for the illustrations; Dr. Ireneo L. Lit, Jr. for editing this paper and loaning to me Grimaldi's publication on Drosophilidae; Dr. and Mrs. Eliseo L. Ruiz for financing the research, the members of my advisory committee during the conduct of this research, namely: Dr. Virginia R. Ocampo, Dr. Luis Rey I. Velasco and Dr. Zenaida N. Sierra, for without their concerted effort, I could not have sifted through the vast information gained from this research and also throughout my coursework in pursuing my Ph. D.; and my adviser, Dr. Victor P. Gapud, for his untiring support and encouragement, for nurturing and equipping me with tools fundamental to taxonomic work.

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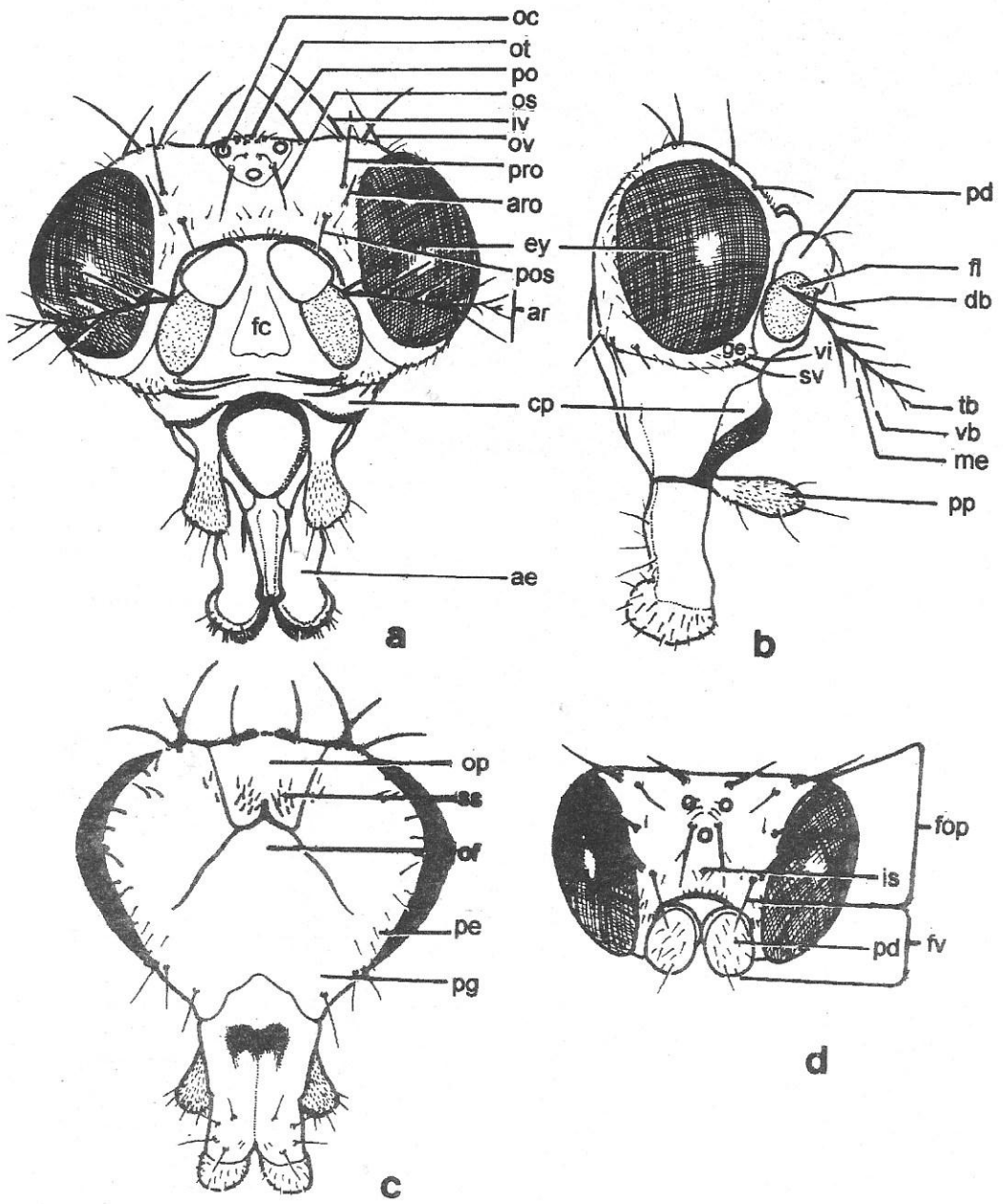
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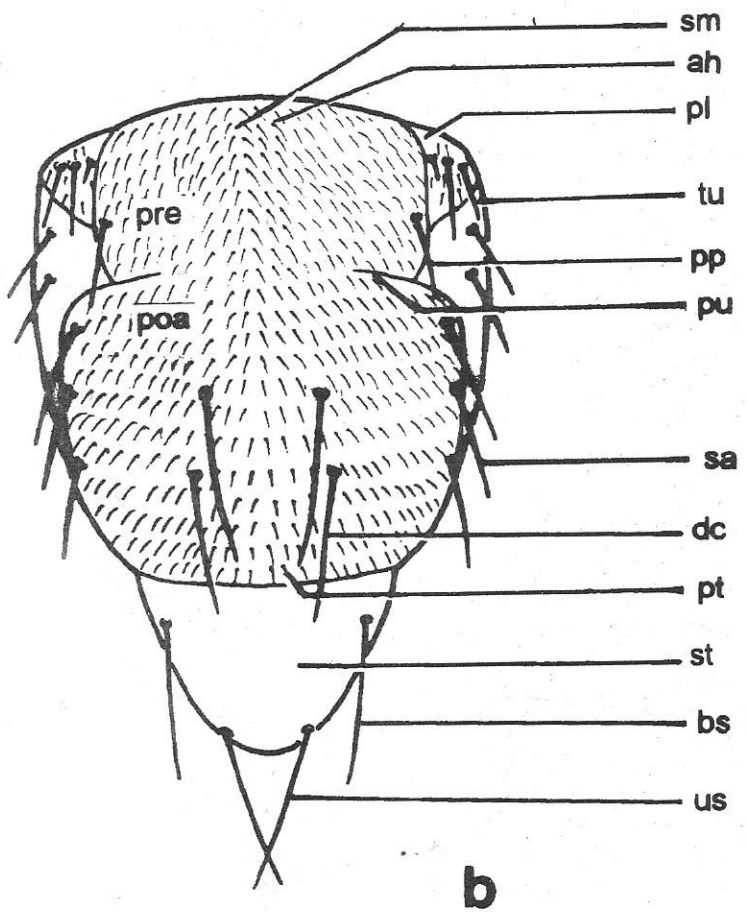
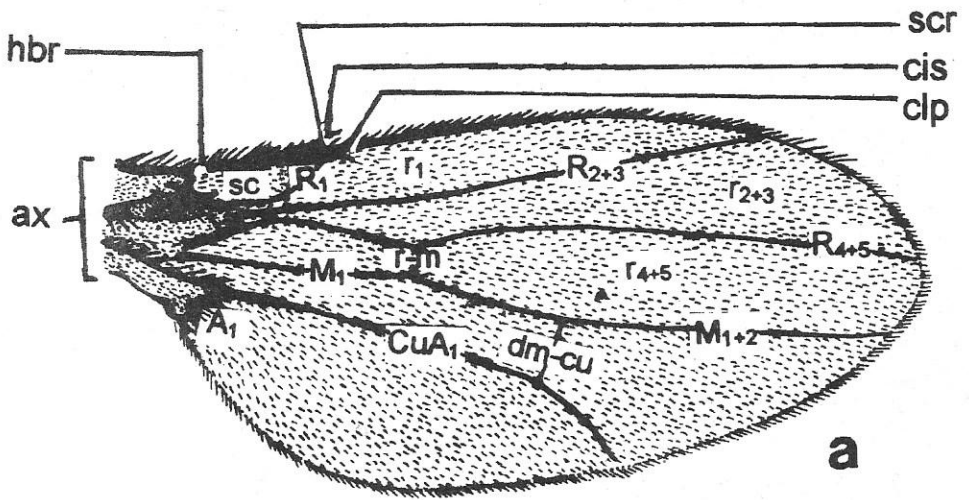
APPENDICES



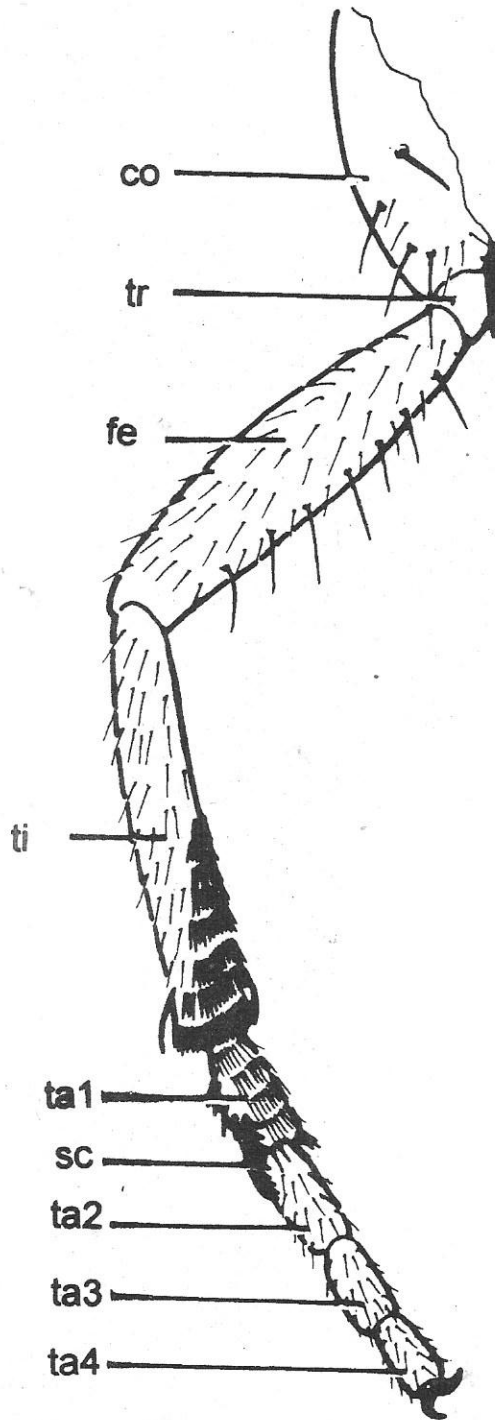
Appendix Figure 1. *Drosophila* sp., habitus



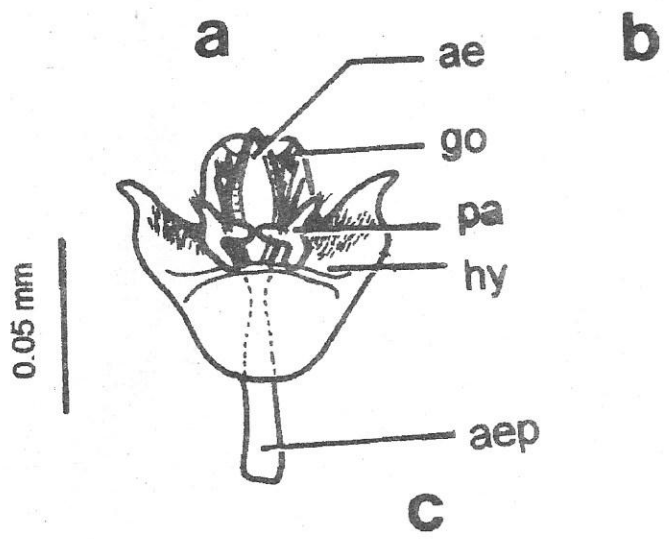
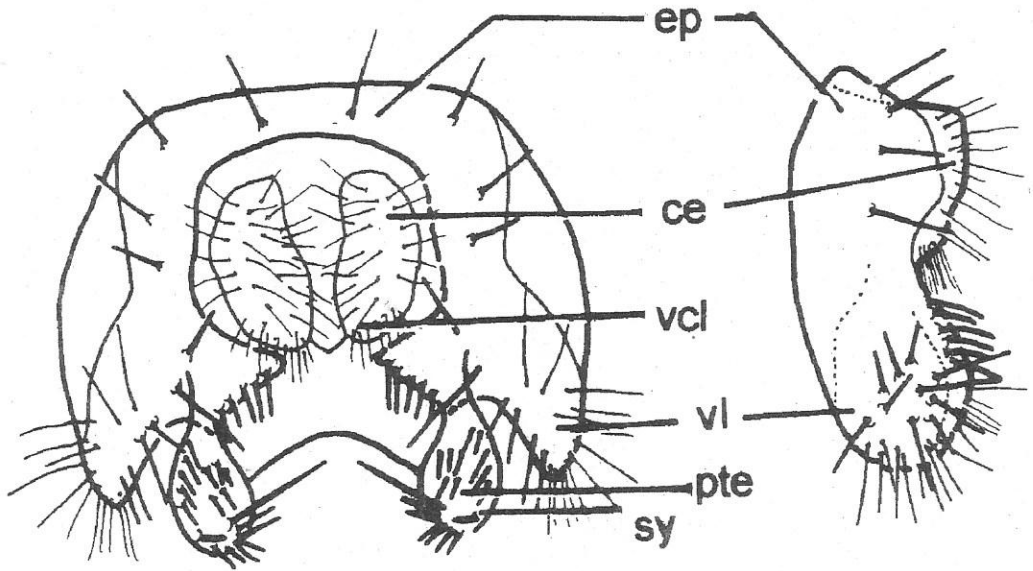
Appendix Figure 2. *Drosophila* sp., head. a. frontal, b. lateral, c. vertex, and d. postcranium



Appendix Figure 3. *Drosophila* sp. a. thorax, and b. wing



Appendix Figure 4. *Drosophila* sp., foreleg



Appendix Figure 5. *Drosophila* sp. a. periphallic organs (caudal), b. periphallic organs (lateral), and c. phallic organs (ventral)

Appendix Table 1. Basic characters and terms used for standard description of drosophilids.

CHARACTERS	FORMER TERMS USED	FIGURE LABEL
HEAD	=	1-he
eye(s)	=	2ab-ey
vertex	=	2d
ocellar triangle	=	2a-ot
ocellus(-i)	=	2a-oc
ocellar seta(e)	=	2a-os
inner vertical seta(e)	=	2a-iv
outer vertical seta(e)	=	2a-ov
post ocellar seta(e)	postvertical(s)	2a-po
frons	=	-
frontal vitta	=	2d-fv
interfrontal setula(e)	frontal hairs(s)	2d-is
fronto-orbital plate(s)	periorbit(s), orbit(s)	2d-fop
proclinate orbital seta(e)	or1, Orb3	2a-pos
anterior reclinate orbital seta(e)	or2, Orb2	2a-aro
posterior reclinate orbital seta(e)	or3, Orb1	2a-pro
face	=	-
facial carina	=	2a-fc
clypeus	=	2ab-cp
gena(e)	cheek(s)	2b-ge
vibrissa(e)	1 st oral(s)	2b-vi
subvibrissal seta(e)	2nd oral(s)	2b-sv
genal seta(e)	=	2a-gs
postcranium	postocciput, occiput	2c
occiput	=	2c-op
post ocular seta(e)	=	2c-pe
supracervical seta(e) or setula(e)	=	2c-ss
occipital foramen	=	2c-of
postgena(e)	=	2c-pg
antenna(e)	=	2a-an
pedicel	2nd antennal segment	2a-pd
1st flagellomere	3rd antennal segment	2bd-fl
arista	=	2a-ar
dorsal branch(es)	=	2b-db
ventral branches	=	2a-vb
medial branches	=	2a-me
terminal bifurcation	terminal fork	2ab-tb
palpus(-i)	maxillary palp(s)	2b-pp
terminal or apical seta(e)	=	2a-ae
THORAX	=	1-th
Prothorax	=	1-px
postpronotal lobe(s)	humerus(-i), humeral callus(-i)	3b-pl

Appendix Table 1. Continued...

CHARACTERS	FORMER TERMS USED	FIGURE LABEL
postpronotal seta(e)	humeral(s)	3b-pp
propleuron	propleurite	1-pr
Mesothorax	=	-
Mesonotum	=	-
Scutum	mesoscutum, mesonotum	3b-sm
transverse suture	=	3b-tu
presutural area	prescutum	3b-pre
postsutural area	scutum	3b-poa
acrostichal setula(e)	acrostichal hair(s)	3b-ah
presutural acrostichal seta(e)	=	-
postsutural acrostichal seta(e)	=	-
prescutellar seta(e)	=	3b-pt
dorsocentral seta(e)	=	3b-dc
presutural supra-alar seta(e)	presutural(s)	3b-pu
supra-alar seta(e)	=	3b-sa
basal scutellar seta(e)	anterior scutellar (s)	3b-bs
apical scutellar seta(e)	posterior scutellar (s)	3b-us
mesopleuron	=	-
episternum	=	-
anepisternum	=	1-am
katépisternum	sternoepisternum, sternopleuron, mesepisternum, sternopleuron	1-km
katépisternal seta(e)	sternopleural(s)	1-ks
epimeron	pteropleurite	-
anepimeron	pteropleuron	1-ai
katépimeron	=	1-ki
meron	meropleuron, hypopleuron	1-mi
scutellum	=	3b-st
WINGS	=	3a
axillary area	wing base	3a-ax
costal breaks	=	-
humeral break	1 st costal incision	3a-hbr
subcostal break	2 nd costal incision	3a-scr
Veins	=	3a
costa	=	3a-c
costal lappet(s)	=	3a-clp
C ₁ seta(e) = apical seta(e)	=	3a-cis
on 1 st costal section		
Sc = subcosta	=	3a-sc
R ₁ = anterior branch of radius	1 st longitudinal vein	3a-R ₁
Radial sector	=	-
R ₂₊₃	2 nd longitudinal vein	3a-R ₂₊₃

Appendix Table 1. Continued...

CHARACTERS	FORMER TERMS USED	FIGURE LABEL
R ₄₊₅	3 rd longitudinal vein	3a-R ₄₊₅
M ₁	M = posterior medial vein	3a-M ₁
M ₁₊₂	4 th longitudinal vein	3l-M ₁₊₂
CuA ₁ = 1 st anterior branch of cubitus	M ₃ +Cu ₁ a = 5 th longitudinal vein	3a-CuA ₁
CuA ₂ = 2 nd anterior branch of cubitus	=	3a-CuA ₂
A ₁ = 1 st branch of anal vein	6 th longitudinal vein	3a-A ₁
A ₂ = 2 nd branch of anal vein	=	-
Crossveins	=	=
h = humeral	=	3a-h
r-m = radial-medial	=	3a-r-m
bm-cu = basal medial-cubital	=	-
dm-cu = discal medial-cubital	m = medial cross vein/ posterior c.v.	3a-dm-cu
Cells	=	-
c = costal	=	3a-cc
radial	=	-
r ₁	R ₁ = marginal cell	3a-r ₁
r ₂₊₃	R ₂₊₃ = submarginal cell	3a-r ₂₊₃
r ₄₊₅	R ₄₊₅ = 1 st posterior cell	3a-r ₄₊₅
br = basal radial	R = 1 st basal cell	-
bm = basal medial	2 nd M = 2 nd basal cell	-
dm = discal medial	1 st M ₂ = discal cell	-
m = medial	M ₂ = 2 nd posterior cell	-
cup = posterior cubital	1 st An = anal cell	3a-cup
cua ₁ = anterior cubital	2 nd M ₂ = 3 rd posterior cell	-
a = anal	2 nd An = axillary cell	-
alula	axillary lobe	-
haltere(s)	=	1-hr
base	=	-
stem	stalk	-
knob	=	-
LEG	=	-
foreleg(s)	=	4
midleg(s)	=	-
hindleg(s)	=	-
coxa(e)	=	4-co
trochanter(s)	=	4-tr
femur(-ora)	=	4-fe
tibia(e)	=	4-ti
apical seta(e)	ventroapical seta(e)	4-ap
preapical dorsal seta(e)	dorsopreapical seta(e)	4-ps

Appendix Table 1. Continued...

CHARACTERS	FORMER TERMS USED	FIGURE LABEL
tarsus(-i)	=	-
sex-comb(s)	=	4-sc
cuneiform setula(e)	=	-
tarsomere(s)	tarsal segment(s)	4-t
1 st tarsomere(s)	basitarsus, metatarsus, proximal	4-ta1
2 nd tarsomere(s)	=	4-ta2
3 rd tarsomere(s)	=	4-ta3
4 th tarsomere(s)	=	4-ta4
5 th tarsomere(s)	=	4-ta5
ABDOMEN	=	1-ab
tergite(s)	=	1-t
sternite(s)	=	1-s
pleural membrane	=	-
abdominal spiracle(s)	stigma	-
terminalia	genitalia, external reproductive organ	1-mt
MALE TERMINALIA	=	5-
Epandrium	genital arch	5a-ep
ventral lobe(s)	=	5a-vl
surstylus(-i)	clasper(s)	5a-sy
prensiseta(e)	tooth(teeth)	5a-pte
10th sternite	decasternum, bridge, ventral epandrial plate	-
cercus(-i)	anal plate(s)	5a-ce
ventral cercal lobe(s)	secondary clasper	5a-vcl
hypandrium	novasternum	5c-hy
hypandrial apodeme	anterior hypandrial lobe, ventral fragma	-
paramedian spine	submedian spine	5c-pas
aedeagal guide	posterior hypandrial process, vertical rod	-
gonopod(s)	paramere(s)	5c-go
posterior gonopophysis(-es)	=	-
medial part of gonopophysis(-es)	=	-
paramere(s)	anterior paramere(s)	5c-pa
anterior gonopophysis(-es)	penis, phallosome, phallus	-
aedeagus	=	5b-ae
aedeagal apodeme	=	5c-aep
ejaculatory apodeme	=	-

Appendix Table 2. Measurements and indices for characterization of *Drosophila* Fallen.

CHARACTER	DESCRIPTION
MEASUREMENTS	
BL	Body length = straight distance from distal edge of pedicel to tip of abdomen
HW	Head width = greatest distance between apical portions of eyes
FW	Frontal width = distance between eyes measured through anterior ocellus
ThL	Thorax length = distance from anterior notal margin to apex of scutellum
WING	
WL	Wing length = distance from humeral crossvein to wing apex
WW	Wing width = maximum wing width
a	= 2 nd costal section between subcostal break and R ₂₊₃
b	= 3 rd costal section between R ₂₊₃ and R ₄₊₅
c	= M ₁ between dm-cu and wing margin
d	= M ₁ between r-m and dm-cu
e	= CuA ₁ between dm-cu and wing margin
f	= dm-cu between M ₁ and CuA ₁
g	= length of heavy setation in 3 rd costal section
h	= length of light setation in 3 rd costal section
i	= distance between distal ends of R ₄₊₅ and M ₁
INDICES	
Number	
arb	= dorsal branches of arista/ventral branches of arista
Proportion	
FW/HW	= frontal width/head width
ch/o	= maximum width of gena/maximum diameter of eye
Relative length of setae	
prorb	= proclinate orbital/posterior reclinate orbital
rcorb	= anterior reclinate orbital/posterior reclinate orbital
vb	= subvibrissal seta/vibrissa
dcl	= anterior dorsocentral seta/posterior dorsocentral seta
sctl	= basal scutellar/apical scutellar
sterno	= anterior katapisternal/posterior katapisternal
Relative position of setae	
orbito	= distance between proclinate and posterior reclinate orbitals/ distance between inner vertical and posterior reclinate orbital
dcp	= length distance between inner vertical and posterior reclinate orbital
sctlp	= distance between basal and apical scutellars/cross distance between apical scutellars
Wing	Refer to measurements subheading
C = a/b	
4c = b/d	
4v = c/d	
5x = e/f	
M = e/d	
C3F = g/(g+h)	