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✓ **DROSOPHILIDAE (DIPTERA) IN MYANMAR (BURMA) VII.**  
**THE *DROSOPHILA MELANOGASTER* SPECIES-GROUP,**  
**EXCEPTING THE *D. MONTIUM* SPECIES-SUBGROUP**

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**ABSTRACT.** Based on the specimens collected from Myanmar (Burma), 5 new species of the *Drosophila melanogaster* species-group, viz., *D. flavicauda*, *D. pyo*, *D. nyinyii*, *D. fuyamai*, and *D. myamaungi*, are described, along with collection records of 20 known species of the same species-group, of which 11 species are new to Myanmar. Two new species-subgroups, the *D. rhopaloa* and the *D. longissima* subgroups, are established.

**Introduction**

The *Drosophila melanogaster* species-group established by Sturtevant (1942) is now the largest species-group of *Drosophila* Fallén. Lemeunier et al. (1986) most recently reviewed the information on taxonomy, phylogeny, biogeography, genetics and some other aspects of this species-group. They provided a list of 150 species (plus 3 subspecies) known to that date, and recognized the following 11 species-subgroups: the *ananassae*, *denticulata*, *elegans*, *eugracilis*, *figusphila*, *flavohirta*, *melanogaster*, *montium*, *nipponica*, *suzukii* and *takahashii* subgroups. However, the *nipponica* subgroup including 3 species was synonymized with the *D. miki* species-group of the subgenus *Lordiphosa* Basden by Okada (1984), and *D. coonorensis* Reddy & Krishnamurthy, 1973 was synonymized with *D. rhopaloa* Bock & Wheeler, 1972 by Okada & Carson (1983). On the contrary, 9 new species have been added to the *melanogaster* group (Zhang & Gan, 1986; McEvey et al., 1987; Chen, 1988; Chen et al., 1988; Kim & Okada, 1988; Kumar & Gupta, 1988; Okada, 1988; Tsacas & Chassagnard, 1988). Furthermore, this paper adds 5 new species and 2 new species-subgroups, based on the material collected (mainly by traps) by the author in 1981-1982 from Myanmar (new name for Burma). However, the largest species-subgroup (*montium*) is dealt with elsewhere. Thus a total of 160 species are now included in the *melanogaster* group, and all of them except for a small number of "questionable" or "unclassified" species, are assigned to one of the 12 species-subgroups.

The Oriental Region is the richest in both numbers of species (106 species, 66.3% of the total) and subgroups (11 out of 12) of this species-group. It is generally considered that the *melanogaster* group originated and flourished in the Oriental Region and later has dispersed and secondarily radiated in the adjacent biogeographical regions, the Australasian and the Afrotropical Regions (Bock & Wheeler, 1972; Throckmorton, 1975; Bock, 1980; Ashburner et al., 1984; Lemeunier et al., 1986). The most recent diagnosis of the *melanogaster* group was given by Lemeunier et al. (1986).

All the holotypes and paratypes of new species described below are deposited in the Entomological Institute, Hokkaido University, Sapporo, Japan (EHU). Myanmar is the new name for Burma and is used here for that country.

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### Abbreviations used for the Museums

AMNH:	American Museum of Natural History, New York, U.S.A.
AMS:	Australian Museum, Sydney, Australia.
BMNH:	The Natural History Museum, Cromwell Road, London, U.K.
DZBU:	Department of Zoology, Banaras Hindu University, Varanasi, India.
DZUM:	Department of Zoology, University of Mysore, Karnataka, India.
GFUT:	Genetics Foundation Coll., University of Texas, Austin, Texas, U.S.A.
HNHM:	Hungarian Museum of Natural History, Budapest, Hungary.
MNHN:	Musee National d'Histoire Naturelle, Paris.
MCZ:	Museum of Comparative Zoology, Harvard University, Cambridge, Mass., U.S.A.
NMW:	Naturhistorisches Museum, Wien, Austria.
NSMT:	Natural Science Museum, Tokyo, Japan.
QMB:	Queensland Museum, Brisbane, Australia.
ZIL:	Universitets Zoologiska Institution, Lund, Sweden.
ZMA:	Zoologisch Museum der Universiteit van Amsterdam, Amsterdam, Nederlands.

Other abbreviations used in the text: M = Male; F = Female.

#### ✓ *Drosophila melanogaster* Species-subgroup

*Drosophila melanogaster* species-subgroup: Hsu, 1949, Univ. Texas Publ., No. 4920: 121.

*Diagnosis* (modified from Bock & Wheeler, 1972): Palpus with several prominent bristles. Sex-comb arranged in short, oblique row distally on fore metatarsus only. Wing clear. Epandrium posteriorly with process covering base of surstylus. Surstylus with 2 sets of teeth: medial or ventromedial row or cluster of pointed teeth, and lateral row of more blunt, darker teeth. Secondary clasper not differentiated. Anterior paramere apically with long sensilla.

#### ✓ 1. *Drosophila* (*Sophophora*) *melanogaster* Meigen

*Drosophila melanogaster* Meigen, 1830. Syst. Besch. Bek. Europ. Zweifl. Inst., 6: 85. Lectotype: M, Austria: Oesterreich (MNHN); Kikkawa & Peng, 1938. Japanese J. Zool., 7: 534. M. key, des., fig.

*Drosophila fasciata* Meigen, 1830. Syst. Besch. Bek. Europ. Zweifl. Inst., 6: 84. Lectotype: M, Germany: Hamburg (NMW).

*Drosophila nigriventris* Macquart, 1843. Mem. Soc. Sci. Arts, Lille (1982): 416. Lectotype: M, Viet Nam (MNHN).

*Drosophila approximata* Zetterstedt, 1847. Dipt. Scand., Diposita et descripta, 6: 2557. Lectotype: F, Sweden (ZIL).

*Drosophila ampelophila* Loew, 1862. Berliner Ent. Zeit., 6: 231. Syntypes: Cuba (MCZ).

*Drosophila* (*Sophophora*) *melanogaster*: Sturtevant, 1942. Univ. Texas Publ., No. 4213: 29. cat.; Hsu, 1949. Univ. Texas Publ., No. 4920: 96. M. des., fig.; Okada, 1954. Kontyû, Tokyo, 22: 38. M. key, des., fig.; 1956. Syst. Study, p. 110. M, F. key, des., fig.

*Specimens examined:* MYANMAR: Pyin Oo Lwin, 1 F, 30.xii.1981 - 6.i.1982; Mandalay, 3 M, 6 F, 26.xii.1981 - 4.i.1982; Yangon (Rangoon), 92 M, 106 F, 16.xii.1981, 11-15.i.1982, Toda Coll.

*Distribution:* Cosmopolitan; Myanmar (new record).

## ***Drosophila ficusphila* Species-subgroup**

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

*Diagnosis* (slightly modified from Bock & Wheeler, 1972): Sex-combs longitudinal along entire lengths 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 protuberance. Epandrium setigerous only on lower portion; ventral lobe elongate, narrow. Secondary clasper not differentiated. Cercus elongate, narrow, more or less constricted in middle or lower part, with longer bristles on upper part and shorter, sometimes thicker ones on lower part. Aedeagal apodeme longer than aedeagus. Basal branch of posterior paramere very broad and long.

## 2. ***Drosophila (Sophophora) ficusphila* Kikkawa & Peng (Figs. 1, 2)**

*Drosophila ficusphila* Kikkawa & Peng, 1938. Japanese J. Zool., 7: 531. M. key, des., fig. Syntypes: M, F, Japan: Kôhu (NSMT).

*Drosophila (Sophophora) ficusphila*: Sturtevant, 1942. Univ. Texas Publ., No. 4213: 29. cat.; Okada, 1954, Kontyû, Tokyo, 22: 39. M. key, des. fig.; 1956, Syst. Study, p. 111. M, F. key, des., fig.

*Diagnosis:* Male 5th abdominal tergite nearly entirely black or anteromedially slightly yellowish; female 6th nearly entirely or at least partly dark brown; female 7th entirely dark brown. Basal process of posterior paramere shorter than aedeagus (Fig. 2).

*Male and female:* Body length, male ca. 2.4 mm (range: 2.02-2.90), female ca. 2.6 mm (2.33-2.96). Thorax length (including scutellum) male ca. 1.0 mm (0.77-1.20), female ca. 1.1 mm (0.89-1.27).

*Head:* Eye with sparse, thin pile. Third antennal segment grayish yellow. Arista with 3 upper and 2 lower branches in addition to large terminal fork. Frons ca. 3/7 (mean = 0.42, 0.40-0.44; measured at level of anterior ocellus) as broad as head, anteriorly with a few frontal hairs; periorbit paler. Anterior reclinate orbital ca. 4/9 (0.45, 0.35-0.59) length of posterior reclinate; proclinate slightly shorter than or subequal (0.94, 0.85-1.10) to posterior reclinate. Clypeus brownish yellow. Cheek ca. 1/8 (0.13, 0.09-0.18) as broad as greatest diameter of eye. Second oral ca. 5/8 (0.62, 0.48-0.79) length of vibrissa. Palpus grayish yellow, apically with 1 prominent bristle.

*Thorax:* Humerals 2, lower one slightly longer. Anterior dorsocentral ca. 5/9 (0.56, 0.46-0.61) length of posterior; length distance of dorsocentrals ca. 2/5 (0.40, 0.31-0.47) cross distance. Anterior scutellar ca. 5/6 (0.83, 0.74-0.93) length of posterior. Sterno-index ca. 0.7 (0.61-0.78).

*Legs* pale yellow. All metatarsi as long as 3 succeeding tarsal segments together.

*Wing:* Veins yellow; crossveins clear.  $R_{2+3}$  slightly curved to costa at tip;  $R_{4+5}$  and M nearly parallel. Wing indices: C ca. 2.1 (1.84-2.48), 4V ca. 2.2 (1.85-2.58), 4C ca. 1.2 (1.04-1.44), 5x ca. 2.1 (1.87-2.36), Ac ca. 3.2 (2.77-4.18), C3-fringe ca. 0.6 (0.56-0.68). Haltere pale grayish yellow.

*Phallic organs* (Figs. 1, 2): Aedeagus apically bilobed, i.e., medially notched deeply like U, subapically slightly pubescent on ventral surface. Anterior paramere distally somewhat triangular in lateral view, elongate dorsad. Posterior parameres slightly longer than aedeagus, covering aedeagus laterally.

*Specimens examined:* MYANMAR: Pyin Oo Lwin, 2 M, 30.xii.1981; Mandalay, 2 M, 9 F, 26.xii.1981 - 6.i.1982; Yangon, 7 M, 9 F, 17.xii.1981, 11-15.i.1982, Toda Coll.

*Distribution:* Korea, Japan, Ryukyu Is., Taiwan, southern China, Java, Andaman Is., Nicobar Is., eastern India, Australia, Myanmar.

### 3. *Drosophila* (*Sophophora*) *flavicauda*, sp. nov. (Figs. 3-7)

*Diagnosis:* Male 5th abdominal tergite dark brown, but anteromedially with large, yellow patch; female 6th and 7th nearly entirely yellow. Basal process of posterior paramere longer than aedeagus (Fig. 4).

*Male and female:* Body length male ca. 2.5 mm (1.92-2.84). Thorax length, male ca. 0.9 mm (0.92-0.96), female ca. 1.0 mm (0.77-1.20).

*Head* yellow. Eye with sparse, thin pile. Third antennal segment pale grayish yellow. Arista with 3 upper and 2 lower branches in addition to large terminal fork. Frons ca. 3/7 (0.42, 0.39-0.45) as broad as head, anteriorly with a few frontal hairs; periorbit paler. Anterior reclinate orbital ca. 4/9 (0.46, 0.35-0.54) length of posterior reclinate; proclinate slightly shorter (0.94, 0.88-1.00) than posterior reclinate. Carina narrow, low. Clypeus brownish yellow. Cheek ca. 1/7 (0.14, 0.11-0.20) as broad as greatest diameter of eye. Second oral ca. 3/5 (0.59, 0.41-0.67) length of vibrissa. Palpus pale yellow, apically with 1 prominent bristle.

*Thorax* yellow. Humerals 2, lower one slightly longer. Acrostichal hairs in 8 rows. Anterior dorsocentral ca. 1/2 (0.53, 0.48-0.58) length of posterior; length distance of dorsocentrals ca. 2/5 (0.40, 0.34-0.48) cross distance. Anterior scutellar ca. 5/6 (0.83, 0.77-0.90) length of posterior. Sterno-index ca. 0.7 (0.65-0.82).

*Legs* pale yellow. Preapicals on all tibiae; apicals on fore and mid tibiae. Metatarsal sex-comb consisting of ca. 16 shorter and ca. 5 longer teeth; 2nd tarsal one of ca. 15 shorter and ca. 4 longer teeth. All metatarsi as long as 3 succeeding tarsal segments together.

*Wing* hyaline. Veins yellow; crossveins clear.  $R_{2+3}$  slightly curved to costa at tip;  $R_{4+5}$  and M nearly parallel. C1-bristles 2, subequal. Wing indices: C ca. 2.1 (1.94-2.28), 4V ca. 2.2 (2.06-2.43), 4C ca. 1.2 (1.13-1.28), 5x ca. 2.0 (1.70-2.29), Ac ca. 3.3 (2.84-4.07), C3-fringe ca. 0.6 (0.56-0.65). Haltere pale grayish yellow.

*Abdomen:* Tergites pale yellow; male 2nd to 4th and female 2nd to 5th with narrow, dark brown, caudal band; male 6th nearly entirely black. Male 1st to 3rd and female all sternites pale yellow; male 4th brownish; male 5th dark brown, broader than long.

*Periphallitic organs* (Fig. 3): Epandrium narrow above, broad laterally, tapering below, with ca. 14 (13-14) bristles; anterior margin slightly constricted at anteroventral corner. Surstylus somewhat oblong, with ca. 7 (6-7) small, apically pointed primary teeth and a few small bristles on distal margin. Cercus separate from epandrium, constricted in lower part; upper lobe large, oval, with ca. 18 (17-18) bristles; lower lobe small, apically round, with tuft of ca. 9 (8-9) short bristles.

*Phallic organs* (Figs. 4, 5): Aedeagus rod-like, apically bilobed, i.e., medially notched deeply and widely, with micropubescence subapically and minute spinules on ventral surface. Anterior paramere distally somewhat triangular in lateral view, elongate dorsad, subapically somewhat rugged and with ca. 2 sensilla. Posterior paramere much longer than aedeagus, apically round; basal process distally covered with numerous minute finger- or hair-like processes. Hypandrium triangular, with 1 pair of small submedian spines on caudal margin.

*Female reproductive organs*: Ovipositor lobe (Fig. 6) slender, with ca. 16 (14-17) small marginal teeth and long subterminal hair; basal ithmus narrow, short. Spermatheca (Fig. 7) shaped somewhat like hat; outer capsule submedially folded, smooth on upper part, finely wrinkled on lower part; introvert deep, broad but distally slightly narrowing, basally wrinkled; duct apically slightly constricted.

*Holotype*: Male, MYANMAR: Mandalay, 26.xii.1981 - 4.i.1982 (EHU). *Paratypes*: Myanmar: 1 M, 4 F, same data as holotype; Pyin Oo Lwin, 2 F, 30.xii.1981 - 6.i.1982; Yangon, 5 F, 18.xii.1981, 11-15.i.1982 (EHU).

*Distribution*: Myanmar.

*Relationship*: This species is sibling to the foregoing species, *D. ficusphila*. The differences from the latter are seen only in the abdominal color pattern and the length of basal process of posterior paramere. No statistically significant differences were detected in any quantitative characters.

*Etymology*: The specific name *flavicauda* = "yellow caudal" refers to the yellow color of the distal part of abdomen.

### ***Drosophila takahashii* Species-subgroup**

*Drosophila takahashii* species-subgroup: Hsu, 1949. Univ. Texas Publ., No. 4920: 122.

*Diagnosis* (slightly modified from Bock & Wheeler, 1972): 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; ventral lobe elongate somewhat like finger. Surstylus with comb of primary teeth ventrolaterally, row of secondary teeth dorsolaterally and several medial bristles. Secondary clasper not differentiated. Aedeagus non-bifid, bare (ornamented in *D. retnasabapathyi* Takada & Momma, 1975), slender; apodeme longer than aedeagus. Anterior paramere large, long, apically black and pointed. Posterior paramere large, with larger or smaller basal branch. Hypandrium with 1 pair of long or moderate submedian spines relatively close to each other on caudal margin. Ovipositor lobe less sclerotized.

Females can not be identified to species on morphological characters.

#### 4. *Drosophila (Sophophora) takahashii* Sturtevant

*Drosophila takahashii* Sturtevant, 1927. Philippine J. Sci., 32: 371. M. des. Holotype: M, Taihoku, Taiwan (AMNH); Kikkawa & Peng, 1938. Japanese J. Zool., 7: 534. M, F. key, des. fig.

*Drosophila (Sophophora) takahashii*: Sturtevant, 1942. Univ. Texas Publ., No. 4213: 29. cat.; Hsu, 1949. Univ. Texas Publ., No. 4920: 96. M. des. fig.; Okada, 1954, Kontyû, Tokyo, 22: 38. M. key, des. fig.; 1955, Fauna and Flora of Nepal Himalaya, 1: 388. M. des., fig.; 1956, Syst. Study, p. 109. M, F. key, des. fig.; Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 13. M. fig.

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 234 M, 30.xii.1981 - 6.i.1982; Mandalay, 304 M, 25.xii.1981 - 6.i.1982; Yangon, 10 M, 11-15.i.1982, Toda Coll.

*Distribution*: Northern to southern China, Korea, Japan, Micronesia, Ryukyu Is., Taiwan, Philippines, Thailand, Malaya, Borneo, Java, Nepal, northern to southern India, Myanmar.

#### 5. *Drosophila (Sophophora) prostipennis* Lin

*Drosophila (Sophophora) prostipennis* Lin, in Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 19. M, F. des., fig. Type culture: Texas stock 3146.7, Taiwan: Wulai (GFUT).

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 15 M, 30.xii.1981 - 6.i.1982; Mandalay, 4 M, 26.xii.1981 - 4.i.1982, Toda Coll.

*Distribution*: Taiwan, central and southern China, north-eastern India, Myanmar (new record).

#### 6. *Drosophila (Sophophora) nepalensis* Okada

*Drosophila (Sophophora) nepalensis* Okada, 1955, Fauna and Flora of Nepal Himalaya, 1: 388. M. des., fig. Holotype: M, Nepal: Kakani (NSMT).

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 23 M, 30.xii.1981 - 6.i.1982, Toda Coll.

*Distribution*: Ryukyu Is., Taiwan, central and southern China, Thailand, Singapore, Nepal, northern India, Myanmar.

#### 7. *Drosophila (Sophophora) jagri* Prakash & Sreerama Reddy (Figs. 8-11)

*Drosophila (Sophophora) jagri* Prakash & Sreerama Reddy, 1979. Entomon, 4: 73. M, F. des., fig. Holotype: M, India: Karnataka: Jagra Valley, Western Ghats (DZUM).

*Male*: Thorax length ca. 0.8 mm.

*Head*: Eye with thick pile. Frons ca. 4/9 (0.45) as broad as head, anteriorly with a few frontal hairs. Anterior reclinate orbital ca. 2/5 (0.41) length of posterior reclinate; proclinate ca. 9/10 (0.91) length of posterior reclinate. Carina high, broader below. Clypeus brown. Cheek ca. 1/10 (0.10) as broad as greatest diameter of eye.

*Thorax*: Humerals 2, lower one longer. Anterior dorsocentral ca. 1/2 (0.52) length of posterior; length distance of dorsocentrals ca. 4/9 (0.46) cross distance. Anterior scutellar ca. 6/7 (0.86) length of posterior; posteriors nearer to each other than to anterior. Sterno-index ca. 0.6.

*Legs* pale yellow. Hooked scaly bristles present at distal end of mid tibia and on basal part of mid metatarsus (Fig. 8). All metatarsi as long as 2 succeeding tarsal segments together.

*Wing*: Veins brownish yellow; crossveins clear.  $R_{2+3}$  slightly curved to costa at tip;  $R_{4+5}$  and M nearly parallel. C1-bristles 2, subequal. Wing indices: C ca. 1.8, 4V ca. 2.3, 4C ca. 1.4, 5x ca. 2.3, Ac ca. 3.2, C3-fringe ca. 0.5.

*Periphallic organs*: Surstylus with 5 sets of teeth and bristles: dorsolaterally ca. 2 black teeth, ventrolaterally comb of ca. 5 long, black teeth, dorsomedially 1 row of ca. 3 slightly curved bristles, ventromedially ca. 1 thin, long bristle, and ventrally ca. 5 flare-shaped bristles (Fig. 9). Decasternum longer than broad, with median notch between lateral arms (Fig. 10).

*Phallic organs* (Fig. 11): Aedeagal apodeme ca. 1.8 times longer than aedeagus. Anterior paramere sclerotized, laterally expanded, submedially with ca. 3 sensilla.

*Specimen examined*: MYANMAR: Mandalay, 1 M, 26.xii.1981 - 4.i. 1982, Toda Coll.

*Distribution*: Southern India, Myanmar (new record).

#### 8. *Drosophila (Sophophora) pyo*, sp. nov. (Figs. 12-14)

*Diagnosis*: Male fore leg with sex-combs on 2 proximal tarsal segments: metatarsus with 1 transverse row of ca. 4 (3-5) black teeth; 2nd segment with 2 transverse rows of 1 and ca. 2 (2-3) teeth, respectively. Basal branch of posterior paramere long, ca. 3/4 (0.75) of main lobe, distally finely serrate (Fig. 14).

*Male*: Body length ca. 1.8 mm (1.76-1.83). Thorax length ca. 0.9 mm (0.69-0.94).

*Head* orange yellow. Eye with thick pile. Arista with 4 upper and ca. 3 (2-3) lower branches in addition to terminal fork. Frons slightly narrower than 1/2 of head width (0.47, 0.45-0.50), anteriorly with a few frontal hairs. Anterior reclinate orbital ca. 3/7 (0.43, 0.38-0.47) length of posterior reclinate; proclinate ca. 9/10 (0.93, 0.87-0.98) length of posterior reclinate. Carina high, broader below. Cheek ca. 1/6 (0.16, 0.12-0.18) as broad as greatest diameter of eye. Second oral ca. 5/7 (0.73, 0.55-0.94) length of vibrissa. Palpus pale yellow.

*Thorax* pale brownish yellow. Humerals 2, subequal. Acrostichal hairs in 8 rows. Anterior dorsocentral ca. 4/7 (0.59, 0.54-0.63) length of posterior; length distance of dorsocentrals ca. 3/7 (0.42, 0.41-0.44) cross distance. Anterior scutellar ca. 6/7 (0.86, 0.76-0.98) length of posterior; posteriors nearer to each other than to anterior. Sterno-index ca. 0.6 (0.56-0.69).

*Legs* yellow. Preapicals on all tibiae; apicals on fore and mid tibiae. Hooked scaly bristles present at distal end of mid tibia and on basal part of mid metatarsus. All metatarsi as long as 2 succeeding tarsal segments together.

*Wing* hyaline. Veins brownish yellow; crossveins clear.  $R_{2+3}$  slightly curved to costa at tip;  $R_{4+5}$  and M nearly parallel. C1-bristles 2, subequal. Wing indices: C ca. 2.4 (2.15-2.81), 4V ca. 2.2 (2.08-2.31), 4C ca. 1.2 (1.05-1.29), 5x ca. 2.1 (1.84-2.29), Ac ca. 2.6 (2.35-2.81), C3-fringe ca. 0.4 (0.32-0.42). Haltere pale grayish yellow.

*Abdomen*: First to 3rd tergites grayish yellow, 2nd and 3rd with diffuse, broad, dark brown, caudal band; 4th nearly entirely dark brown; 5th and 6th entirely black. Sternites pale yellow.

*Periphallic organs* (Fig. 12): Epandrium with dorsolateral large apodeme, 2 long, stout bristles and ca. 35 (28-39) moderate to small bristles; anteroventral corner indistinct; ventral lobe apically round. Surstylus with ca. 11 (11-12) long primary teeth in slightly convex row on ventrolateral margin, ca. 6 (5-6) small secondary teeth and ca. 8 (7-8) bristles. Cercus separate from epandrium, somewhat triangular, with ca. 35 (26-42) bristles smaller below.

*Phallic organs* (Figs. 6, 7): Aedeagus basally broader, apically slightly dilated and notched. Anterior paramere subapically with ca. 4 sensilla. Posterior paramere basally with numerous small thorn-like processes; main lobe elongate like finger, smooth on distal half surface. Hypandrium somewhat longer than broad, pubescent on caudolateral portions.

*Holotype*: Male, MYANMAR: Pyin Oo Lwin, 30.xii.1981 - 6.i.1982 (EHU).

*Paratypes*: Myanmar: 5 M, same data as holotype; Mandalay, 1 M, 26.xii. 1981 - 4.i.1982 (EHU).

*Distribution*: Myanmar.

*Relationships*: This species certainly belongs to the *takahashii* subgroup, in having sex-combs of transverse rows and genitalia characteristic of this species-subgroup, but can be clearly distinguished from other members by the diagnostic characters.

*Etymology*: The specific name means "small fly" in Burmese, referring to the smaller body size in the *takahashii* subgroup.

### ***Drosophila suzukii* Species-subgroup**

*Drosophila suzukii* species-subgroup: Hsu, 1949. Univ. Texas Publ., No. 4920: 122.

*Diagnosis* (modified from Bock & Wheeler, 1972): Surstylus with several sets of distinctly different teeth. Secondary clasper not differentiated. Cercus with lower bristles differentiated to a larger or smaller extent in length and/or thickness from upper bristles. Posterior paramere large, without basal branch.

This species-subgroup is more or less miscellaneous, varying considerably in the morphology of sex-comb, aedeagus, anterior paramere and so on (cf. Bock & Wheeler, 1972; Bock, 1980).

### **9. *Drosophila (Sophophora) suzukii* (Matsumura)**

*Leucophenga suzukii* Matsumura, 1931. 6000 Illustrations of Insects of Japan Empire, p. 367. Syntype: Aomori, Japan (EHU).

*Drosophila suzukii*: Kanzawa, 1934, Report Yamanashi Agri. Expt. Stn., 1; Kikkawa & Peng, 1938, Japanese J. Zool., 7: 536. M. key, des., fig.



*Drosophila (Sophophora) suzukii*: Sturtevant, 1942. Univ. Texas Publ., No. 4213: 29. cat.; Hsu, 1949. Univ. Texas Publ., No. 4920: 97. M. des., fig.; Okada, 1954. Kontyû, Tokyo, 22: 37. M. key, des., fig.; 1956, Syst. Study, p. 105. M, F. key, des. fig.; Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 21. M. fig.

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 14 M, 9 F, 30.xii. 1981 - 6.i.1982; Mandalay, 2 F, 26.xii.1981 - 4.i.1982, Toda Coll.

*Distribution*: Northern to southern China, Korea, Quelpart I., Japan, Bonin Is., Ryukyu Is., Hawaii, Thailand, northern India, Myanmar.

✓ 10. *Drosophila (Sophophora) pulchrella* Tan, Hsu & Sheng

*Drosophila (Sophophora) pulchrella* Tan, Hsu & Sheng, 1949. Univ. Texas Publ., No. 4920: 198. M, F. des. Type: Never designated (material used, China: Meitan); Hsu, 1949. Univ. Texas Publ., No. 4920: 97. M. des., fig.; Okada, 1954, Kontyû, Tokyo, 22: 37. M. key, des., fig.; 1956, Syst. Study, p. 106. M, F. key, des., fig.; Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 22. M. fig.

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 9 M, 7 F, 30.xii.1981 - 6.i.1982; Mandalay, 18 M, 9 F, 26.xii.1981 - 4.i.1982, Toda Coll.

*Distribution*: Japan, Ryukyu Is., Taiwan, central and southern China, Nepal, northern India, Myanmar.

India  
Parshad & Duggal 1966

✓ 11. *Drosophila (Sophophora) biarmipes* Malloch

*Drosophila biarmipes* Malloch, 1924. Mem. Dept. Agri. India, Ent. Ser., 8: 64. M, F. des. Holotype: M, India: Coimbatore.

*Drosophila (Sophophora) rajasekari* Sreerama Reddy & Krishnamurthy, 1968. Proc. Indian Acad. Sci., (B) 68: 202. M, F. des., fig. Types: M, F, India. Mysore (DZUM); Bock & Wheeler, 1972. Univ. Texas Publ., 7213: 23. M. fig. Cambodia, Thailand; synonymized by Bock (1980).

*Drosophila (Sophophora) raychaudhuri* Gupta, 1969. Proc. Zool. Soc., Calcutta, 22: 54. M, F. des., fig. Holotype: M, India: U.P.: Varanasi District: Chandraprabha: Chakia forest (DZBU); synonymized by Bock (1980).

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 1 F, 30.xii.1981 - 6.i.1982; Shwebo, 1 F, 3.i.1982; Mandalay, 13 M, 33 F, 26.xii.1981 - 4.i.1982; Yangon, 2 M, 4 F, 11-15.i.1982, Toda Coll.

*Distribution*: Southern China, northern to southern India, Sri Lanka, Myanmar (new record).

Cambodia, Thailand

✓ 12. *Drosophila (Sophophora) mimetica* Bock & Wheeler

*Drosophila (Sophophora) mimetica* Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 25. M, F. des., fig. Type culture: Texas stock 3033.11, Malaya: Kuala Lumpur (GFUT).

*Specimen examined*: MYANMAR: Mandalay, 1 M, 26.xii.1981 - 4.i. 1982, Toda Coll.

*Distribution*: Malaya, Singapore, Myanmar (new record).

✓ 13. *Drosophila (Sophophora) nyinyii*, sp. nov. (Figs. 15-18)

*Drosophila (Sophophora) lucipennis*: Gupta & Singh, 1977, Ent. Monthly Mag., 113: 73 (not Lin, 1972). misdet.

*Diagnosis*: Male fore leg without recurved setae. Epandrium with characteristic and downward curved expansion just below anteroventral corner; ventral part of this expansion narrowly elongate, with apically slightly sinuate, long, stout, basal bristle, gently curved, stout, apical bristle and 2 fine hairs; dorsal part somewhat quadrate, with tuft of numerous long bristles (Fig. 16). Surstylus triangular, with 5 sets of teeth, bristles and spines: submedially 2 sets of ca. 4 apically round, black teeth; ca. 3 short, apically expanded spade-like, pale teeth below lower set of black teeth; ca. 4 ventrad curved bristles in 1 row on median part of lateral margin; ca. 2 long, apically dorsad curved spines at caudoventral corner, subapical one extraordinarily long, shaped like tusk (Fig. 17).

*Male*: Body length ca. 1.9 mm. Thorax length, ca. 0.9 mm.

*Head* brownish yellow. Eye with thick pile. Arista with ca. 5 upper and ca. 3 lower branches in addition to terminal fork. Frons ca. 3/7 (0.43) as broad as head, anteriorly with a few frontal hairs. Anterior reclinate orbital ca. 1/2 (0.49) length of posterior reclinate; proclinate somewhat longer (1.14) than posterior reclinate. Carina high, broader below. Cheek narrow, less than 1/10 greatest diameter of eye (0.09). Second oral weak, but ca. 3/5 (0.61) length of vibrissa. Palpus pale grayish yellow, apically with 1 prominent bristle.

*Thorax*: Mesoscutum and scutellum yellow; thoracic pleura dark brown, with yellow patches. Humerals 2, subequal. Acrostichal hairs in 8 rows. Anterior dorsocentral ca. 5/9 (0.56) length of posterior; length distance of dorsocentrals ca. 3/8 (0.38) cross distance. Anterior scutellar ca. 9/10 (0.92) length of posterior; posteriors equidistant from each other and from anterior. Sterno-index ca. 0.6.

*Legs* pale yellow. Preapicals on all tibiae; apicals on fore and mid tibiae. Hooked scaly bristles present at distal end of mid tibia. Fore metatarsus as long as 2 succeeding tarsal segments together; mid and hind metatarsi slightly shorter than 3 succeeding together.

*Wing* hyaline. Veins brownish yellow; crossveins clear.  $R_{2+3}$  slightly curved to costa at tip;  $R_{4+5}$  and M nearly parallel. C1-bristles 2, lower one thin. Wing indices: C ca. 2.0, 4V ca. 2.5, 4C ca. 1.4, 5x ca. 3.0, Ac ca. 2.8, C3-fringe ca. 0.4. Haltere pale grayish yellow.

*Abdomen*: First to 4th tergites grayish yellow, with diffuse, dark, caudal band; 5th and 6th nearly entirely dark gray. Fourth and 5th sternites dark brown, large, broader than long.

*Periphallic organs* (Figs. 15-17): Epandrium broad, triangularly pointed just above insertion of surstylus, with ca. 5 bristles along caudal margin; lower part broadly round, longitudinally wrinkled on lower half, with ca. 13 bristles. Cercus separate from epandrium, oval, elongate below, with ca. 26 bristles on upper main lobe, dense short bristles on lower elongation, and 1 very large, curved spine at ventral apex.

*Phallic organs* (Fig. 18): Aedeagus slender, bilobed; apodeme as long as aedeagus. Anterior paramere U-shaped in lateral view; inner dorsal process longer, strongly sclerotized, black, apically pointed; outer ventral process shorter, less sclerotized, apically somewhat truncate and with ca. 2 long sensilla. Posterior paramere large, as long as aedeagus, fused medially to each other and laterally to caudal margin of hypandrium. Hypandrium anteriorly triangular, caudolaterally slightly pubescent, with 1 pair of small submedian spines on caudal margin of median notch.

*Holotype*: Male, MYANMAR: Pyin Oo Lwin, 30.xii.1981 - 6.i.1982 (EHU).

*Distribution*: Northeastern India, Myanmar.

*Relationships*: This species is close to *D. lucipennis* Lin, 1972, but clearly distinguishable from the latter by the diagnostic characters.

*Etymology*: Patronym, in honor of Dr. Nyi Nyi, Rangoon University, who helped me in collecting the specimen.

#### 14. *Drosophila (Sophophora) siangensis* Kumar & Gupta (Figs. 19-23)

*Drosophila (Sophophora) siangensis* Kumar & Gupta, 1988. Ann. Soc. Ent. France (N.S.), 24: 337. M. des., fig. Holotype: M, India: Arunachal Pradesh: West Siang District: Tai (DZBH).

*Male*: Body length ca. 1.7 mm (1.60-1.70). Thorax length ca. 0.9 mm (0.86-0.90).

*Head*: Eye with thick pile. Arista with ca. 4 upper and ca. 3 (2-3) lower branches in addition to terminal fork. Frons ca. 3/7 (0.43, 0.42-0.43) as broad as head, anteriorly with a few frontal hairs. Anterior reclinate orbital ca. 1/2 (0.52, 0.48-0.55) length of posterior reclinate; proclinate slightly shorter (0.95, 0.93-0.98) than posterior reclinate. Cheek ca. 1/10 (0.10, 0.09-0.10) as broad as greatest diameter of eye. Second oral ca. 3/5 (0.59, 0.51-0.69) length of vibrissa.

*Thorax*: Humerals 2, lower one slightly longer. Anterior dorsocentral ca. 4/7 (0.57, 0.54-0.60) length of posterior; length distance of dorsocentrals ca. 3/8 (0.37, 0.35-0.39) cross distance. Anterior scutellar ca. 5/6 (0.82, 0.80-0.84) length of posterior; posteriors nearly equidistant from each other and from anterior. Sterno-index ca. 0.6 (0.55-0.67).

*Legs* pale grayish yellow, hind tibia slightly darker. Hooked scaly bristles present at distal end of mid tibia. Fore leg with 2 longitudinal sex-combs on 2 proximal tarsal segments, consisting of ca. 11 (10-11) and ca. 6 (6-7) teeth, respectively. Fore metatarsus as long as 2 succeeding tarsal segments together; mid and hind metatarsi slightly shorter than 3 succeeding together.

*Wing*: Veins yellowish brown; crossveins clear.  $R_{2+3}$  slightly curved to costa at tip;  $R_{4+5}$  and M nearly parallel. C1-bristles 2, lower one thin. Wing indices: C ca. 2.1 (2.04-2.20), 4V ca. 2.5 (2.37-2.51), 4C ca. 1.3 (1.26-1.35), 5x ca. 2.5 (2.40-2.50), Ac ca. 2.9 (2.53-3.48), C3-fringe ca. 0.45 (0.43-0.47).

*Abdominal sternites* broader than long, grayish brown, 5th darker.

*Periphalllic organs* (Figs. 19-21): Epandrium broad, quadrangularly expanded just above insertion of surstylus, with ca. 2 bristles on upper caudal margin; lower part broadly round, slightly longitudinally wrinkled, with ca. 23 bristles; anteroventral part narrowly elongate, with 1 apical, stout bristle and several subapical

small ones. Surstylus with extraordinarily long, apically flattened and somewhat triangularly expanded process on lower distal margin, comb of ca. 5 apically pointed, small teeth dorsolaterally, ca. 2 bristles on upper distal margin, and ca. 7 somewhat flare-shaped bristles on caudoventral margin (Fig. 20). Cercus separate from epandrium, oval above, elongate below, with ca. 28 (25-30) bristles on upper lobe and 1 very large, black tooth at apex of lower elongation. Decasternum trapezoid (Fig. 21).

*Phallic organs* (Figs. 22, 23): Aedeagus basally with strong serrations on lateral margins, apically round and fringed with curved hairs; apodeme ca. 1.7 times longer than aedeagus. Anterior paramere apically strongly sclerotized and shaped like claw, basally curved inward. Posterior paramere apically quadrate, laterally with strongly sclerotized, claw-like projection, basally heavily hirsute. Hypandrium anteriorly triangular, caudolaterally pubescent, with 1 pair of moderate submedian spines on caudal margin of median notch.

*Specimens examined*: MYANMAR: Mandalay, 2 M, 26.xii.1981 - 6.i.1982; Yangon, 1 M, 13.i.1982, Toda Coll.

*Distribution*: Northeastern India, Myanmar (new record).

*Relationships*: This species belongs to the *suzukii* subgroup and somewhat resembles the foregoing species, *D. nyinyii*, in having extraordinarily large tooth on surstylus and epandrium with broadly round, wrinkled lower part and ventral narrow elongation, but is very unique among members of the *suzukii* subgroup in having 2 longitudinal sex-combs on 2 proximal tarsal segments of fore leg.

### ***Drosophila elegans* Species-subgroup**

*Drosophila elegans* species-subgroup: Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 27.

*Diagnosis* (Bock, 1980): Sex-combs arranged in short transverse rows on 3 proximal tarsal segments of fore leg. Male wing apically with black patch. Anterior paramere exceptionally long and slender, apically pointed, basally recurved. Posterior paramere large, with numerous small finger-like branches.

### 15. ***Drosophila (Sophophora) elegans* Bock & Wheeler**

*Drosophila (Sophophora) elegans* Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 28. M, F. des., fig. Type culture: Texas stock 3140.2, Philippines: Luzon: Baguio (GFUT).

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 1 M, 6.i.1982; Yangon, 1 M, 13.i.1982, Toda Coll.

*Distribution*: Ryukyu Is., Philippines, New Guinea, Myanmar (new record).

### ***Drosophila eugracilis* Species-subgroup**

*Drosophila eugracilis* species-subgroup: Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 31.

*Diagnosis* (Bock, 1980): Sex-comb consisting only of 2 large bristles on distal portion of fore metatarsus. Sexual dimorphism strong in shape of abdomen: male abdomen apically black, sharply truncate, without protruding genitalia. Secondary clasper not differentiated. Aedeagus large, highly ornate.

✓ 16. *Drosophila* (*Sophophora*) *eugracilis* Bock & Wheeler

*Drosophila* (*Sophophora*) *eugracilis* Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 31. M, F. des., fig. (nom. nov.)

*Tanygastrella gracilis* Duda, 1924. Arch. Naturg., 90(A): 253 (preocc.). M. key, des. Type: M, Java: Semarang (ZMA).

*Drosophila* (*Tanygastrella*) *gracilis*: Duda, 1926. Suppl. Ent., 14: 99. M. des., fig. Sumatra; Okada, 1964. Nature and Life in SE Asia, 3: 447 (not Walker, 1853). M. des., fig. Borneo: Sarawak.

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 52 M, 72 F, 30.xii. 1981 - 6.i.1982; Shwebo, 1 M, 3.i.1982; Mandalay, 181 M, 228 F, 26.xii.1981 - 6.i. 1982; Yangon, 120 M, 233 F, 16,18,22.xii.1981, 11-15.i.1982, Toda Coll.

*Distribution*: Taiwan, Philippines, Cambodia, Thailand, Malaya, Singapore, Sumatra, Borneo, Java, Sulawesi (= Celebes), Andaman Is., northern to southern India, Sri Lanka, New Guinea, Australia, Myanmar (new record).

***Drosophila rhopaloa* Species-subgroup**

*Diagnosis*: Epandrium triangularly pointed just above, roundly expanded just below insertion of surstylus, more or less tapering in ventral lobe. Surstylus more or less curved inward like C. Cercus elongate below and with 1 very large tooth on apex. Aedeagus basally strongly curved, apically hooked dorsad, subapically with 1 pair of lateral membranous processes. Hypandrium with 2 pairs of long processes in addition to anterior and posterior parameres.

This newly established species-subgroup includes *D. rhopaloa*, *D. palmata* Takada, Momma & Shima, 1973, *D. prolongata* Singh & Gupta, 1977, *D. kurseongensis* Gupta & Singh, 1977 and a new species described below. However, they are so variable in the morphology of sex-combs and the wing coloration that the four known species have been assigned to different species-subgroups, i.e., *D. rhopaloa* and *D. palmata* both having longitudinal sex-combs and wing without markings have been assigned to the *montium* subgroup, *D. prolongata* having no sex-combs but wing with black markings to the *suzukii* subgroup, and *D. kurseongensis* having short, oblique rows of sex-combs and wing with large cloud to the *takahashii* subgroup. In spite of such a variation in the external morphology, their male genitalia share the above diagnostic characters so unique among members of the *melanogaster* group as that they should be treated as a separate species-subgroup.

✓ 17. *Drosophila* (*Sophophora*) *fuyamai*, sp. nov. (Figs. 24-31)

*Drosophila* (*Sophophora*) *rhopaloa*-like: Ohnishi & Watanabe, 1984. Zool. Sci., 1: 802.

*Diagnosis:* Aedeagus subapically with 1 pair of strongly sclerotized, apically pointed, hook-like processes on ventrolateral margins, medioventrally with vertical, thin plate sinuate on distal margin (Fig. 29). Anterior paramere longer than Y-shaped process, apically sclerotized and pointed, subapically with 2 sensilla, basally broad (Fig. 28). Hypandrial lateral process completely fused to inner process, forming Y-shaped organ (Fig. 28).

*Male and female:* Body length, male ca. 2.3 mm (1.92-2.52), female ca. 2.8 mm (2.36-3.02). Thorax length, male ca. 1.0 mm (0.84-1.05), female ca. 1.1 mm (0.99-1.15).

*Head:* Eye dark red, with thick pile. Antenna with 2nd segment yellow and 3rd segment white in male, pale gray in female. Arista with ca. 4 (3-4) upper and ca. 2 (2-3) lower branches in addition to terminal fork. Frons brownish orange, ca. 4/9 (0.44, 0.41-0.45) as broad as head, anteriorly with frontal hairs; periorbit paler. Anterior reclinate orbital ca. 1/2 (0.50, 0.44-0.64) length of posterior reclinate; proclinate as long as (0.96, 0.86-1.11) posterior reclinate. Carina pale yellow, high, narrow. Face pale yellow. Clypeus brown. Cheek brownish orange, ca. 1/8 (0.13, 0.09-0.17) as broad as greatest diameter of eye. Second oral ca. 7/10 (0.70, 0.60-0.94) length of vibrissa. Palpus grayish yellow, apically with 1 prominent bristle.

*Thorax* yellow. Humerals 2, subequal. Acrostichal hairs in 8 rows. Anterior dorsocentral ca. 4/7 (0.58, 0.52-0.62) length of posterior; length distance of dorsocentrals ca. 3/7 (0.43, 0.33-0.48) cross distance. Anterior scutellar ca. 6/7 (0.85, 0.76-0.90) length of posterior; posteriors nearer to each other than to anterior. Sterno-index ca. 0.6 (0.47-0.69).

*Legs* pale yellow. Preapicals on all tibiae; apicals on fore and mid tibiae. Male fore leg with sex-combs on 2 proximal tarsal segments: metatarsus with 1 oblique, short row of ca. 8 (6-9) black teeth; 2nd segment with 2 oblique rows of ca. 4 (2-5) and ca. 3 (3-4) teeth, respectively (Fig. 24). Fore metatarsus slightly shorter, mid and hind metatarsi slightly longer than 2 succeeding tarsal segments together.

*Wing* hyaline, antero-apically with large, diffuse cloud in male (Fig. 25), without cloud in female. Veins grayish brown; crossveins clear.  $R_{2+3}$  slightly curved to costa at tip;  $R_{4+5}$  and M nearly parallel. C1-bristles 2, subequal. Wing indices: C ca. 2.4 (2.25-2.68), 4V ca. 2.2 (2.00-2.31), 4C ca. 1.1 (1.04-1.24), 5x ca. 2.0 (1.67-2.40), Ac ca. 2.5 (2.10-2.68), C3-fringe ca. 0.4 (0.33-0.49). Haltere pale grayish yellow.

*Abdomen:* First tergite entirely pale yellow; 2nd pale yellow, with medially interrupted, narrow, grayish brown, caudal band; male 3rd laterally pale yellow, medially with large, grayish brown patch; male 4th to 6th entirely black; female 3rd to 5th pale yellow, with medially protruded, narrow, grayish brown, caudal band not reaching lateral margins; female 6th pale yellow, medially with grayish brown patch. Sternites pale yellow.

*Periphallic organs* (Figs. 26, 27): Epandrium broad, with ca. 5 (4-6) bristles on upper caudal margin and ca. 45 (42-48) on middle to lower portion; anterior margin slightly constricted at anteroventral corner; ventral lobe somewhat triangular. Surstylus basally somewhat quadrate, with 4 or 5 primary teeth and a few small setae on distal margin, 1 long recurved bristle subapically, ca. 3 small secondary teeth arranged linearly near upper caudal margin and ca. 2 bristles below secondary teeth.

Cercus separate from epandrium, oval above, elongate below, with ca. 23 (21-25) bristles on upper to middle portion, tuft of ca. 12 bristles on lower portion and 1 very large, black tooth on apex of lower elongation.

*Phallic organs* (Figs. 28, 29): Aedeagus long, subapically with 1 pair of membranous, tripartite processes laterally; vertical rod well developed, contiguous to strongly sclerotized, somewhat Y-shaped process; apodeme shorter than aedeagus. Hypandrium slightly longer than broad, anteriorly triangular, laterally pubescent in part, with 1 pair of small, widely separated, submedian spines near caudolateral corners of median notch. Posterior paramere somewhat semicircular, fused to outer process of Y-shaped organ.

*Female reproductive organs*: Ovipositor lobe (Fig. 30) distally triangularly broad, with ca. 12 marginal teeth and subterminal hair; basal ithmus indistinct, but 2 lobes widely separated. Spermatheca (Fig. 31) somewhat ellipsoidal, wrinkled on basal half; introvert very deep, basally wrinkled; duct apically slightly expanded.

*Holotype*: Male, MYANMAR: Pyin Oo Lwin, 30.xii.1981 - 6.i.1982 (EHU).  
*Paratypes*: THAILAND: 9 M, 10 F, a culture strain (771) from Chaing Mai (EHU).

*Distribution*: Thailand, Myanmar.

*Relationships*: This species is close to *D. kurseongensis*, but clearly distinguishable from the latter by the diagnostic characters.

*Etymology*: Patronym, in honor of Dr. Y. Fuyama, Tokyo Metropolitan University, who provided me with the material from Thailand.

## 18. *Drosophila (Sophophora) prolongata* Singh & Gupta (Figs. 32-36)

*Drosophila (Sophophora) prolongata* Singh & Gupta, 1977. Proc. Zool. Soc., Calcutta, 30: 31. M, F. des., fig. Holotype: M, India: Meghalaya: Shillong District: Khasi Hill: Motinagar forest (DZBU).

*Diagnosis*: Wing with 5 black markings at both crossveins, apices of  $R_{2+3}$  and  $R_{3+4}$ , and distal portion of M; apical markings more or less confluent to one another in male (cf. Singh & Gupta, 1977, Figs. 1C, F). Male fore leg exceptionally elongate and robust, patterned with black and white as illustrated by Singh and Gupta (1977, Fig. 1D), without sex-comb.

*Male and female*: Body length, male ca. 3.7 mm (3.40-4.06), female ca. 3.5 mm (3.12-3.65). Thorax length male ca. 1.7 mm (1.43-1.76), female ca. 1.4 mm (1.25-1.59).

*Head*: Eye with thick pile. Third antennal segment white in male, pale gray in female. Arista with ca. 5 (3-6) upper and ca. 3 (2-3) lower branches. Frons slightly narrower than 1/2 head width (0.47, 0.46-0.49), anteriorly with frontal hairs. Anterior reclinate orbital ca. 1/2 (0.49, 0.45-0.52) length of posterior reclinate; proclinate ca. 6/7 (0.85, 0.78-0.90) length of posterior reclinate. Carina pale yellow. Clypeus brown. Cheek ca. 1/5 (0.20, 0.11-0.26) as broad as greatest diameter of eye. Second oral ca. 5/6 (0.84, 0.71-0.96) length of vibrissa. Palpus with many short setae.

*Thorax*: Humerals 2, upper one longer. Acrostichal hairs in 8 rows. Anterior dorsocentral ca. 5/8 (0.62, 0.53-0.73) length of posterior; length distance of dorsocentrals ca. 4/9 (0.45, 0.39-0.53) cross distance. Anterior scutellar ca. 8/9 (0.89, 0.86-0.94) length of posterior. Sterno-index ca. 0.7 (0.60-0.74).

*Leg:* Female fore leg ordinary, grayish yellow, but whitish in proximal portions of coxa, femur and metatarsus and at knee. Fore metatarsus slightly shorter than rest tarsal segments together in male, as long as 3 succeeding together in female; mid and hind metatarsi as long as rest together in male, slightly shorter than rest together in female.

*Wing:*  $R_{2+3}$  gently curved to costa in distal portion;  $R_{4+5}$  and M distally somewhat divergent. Wing indices: C ca. 2.0 (1.90-2.18), 4V ca. 1.6 (1.46-1.85), 4C ca. 1.1 (1.02-1.21), 5x ca. 1.2 (0.92-1.42), Ac ca. 2.1 (1.76-2.50), C3-fringe ca. 0.6 (0.54-0.70).

*Periphallalic organs* (Fig. 32): Epandrium with ca. 4 bristles on upper caudal margin and ca. 57 on middle to lower portion. Surstylus distally elongate, with ca. 7 primary teeth, 1 long spine and several setae on distal margin, ca. 9 secondary teeth in nearly straight row on lateral surface and ca. 4 stout, downward curved spines arranged linearly and somewhat sparsely on mediocaudal margin. Cercus separate from epandrium, oval above, elongate below, with ca. 38 bristles on upper to middle portion, ca. 14 stout, somewhat recurved bristles on lower portion and 1 very large, black tooth subapically on lower elongation.

*Phallic organs* (Figs. 33, 34): Aedeagus long, subapically with 1 pair of membranous, somewhat dendroid processes laterally and several fine spinules on ventral surface; vertical rod well developed, contiguous to strongly sclerotized, apically pointed, basally expanded process; apodeme shorter than aedeagus, somewhat sinuate in lateral view. Anterior paramere long, but shorter than strongly sclerotized, inner process, basally broad, apically tapering, subapically with 2 sensilla. Hypandrium broader than long, laterally pubescent in part and with 1 pair of very long, apically pointed processes partially connected with inner process by thin, imperfect plate; 1 pair of short, widely separated, submedian spines present near caudal margin of median notch. Posterior parameres somewhat semicircular, fused to long, outer process.

*Female reproductive organs:* Ovipositor lobe (Fig. 35) distally triangularly broad, with ca. 18 (17-19) marginal teeth and subterminal hair; basal ithmus indistinct, but 2 lobes widely separated. Spermatheca (Fig. 36) somewhat hemispherical, basally wrinkled; introvert very deep and broad; duct apically slightly constricted.

*Specimens examined:* MYANMAR: Pyin Oo Lwin, 3 F, 30.xii.1981 - 6.i.1982, Toda Coll. CHINA: 8 M, 2 F, a culture strain from Kunming, Yunnan Province.

*Distribution:* Northeastern India, southwestern China (new record), Myanmar (new record).

### *Drosophila ananassae* Species-subgroup

*Drosophila ananassae* species-subgroup: Hsu, 1949. Univ. Texas Publ., No. 4920: 122.

*Diagnosis* (Bock, 1980): Sex-comb(s) absent (*D. ironensis* Bock & Parsons, 1978) or in transverse, oblique or longitudinal row(s). Secondary clasper differentiated (except *D. varians* Bock & Wheeler, 1972). Surstylus with 2 sets of teeth.



A. *Drosophila ananassae* Species-complex

*Drosophila ananassae* species-complex: Bock, 1971. Univ. Texas Publ., No. 7103: 273.

*Diagnosis* (Bock & Wheeler, 1972): Aedeagus non-bifid, apically hirsute.

✓ 19. *Drosophila (Sophophora) ananassae* Doleschall

*Drosophila ananassae* Doleschall, 1858. Natuurk. Tijds. Nederl. Indie (1858-1859), 17: 128.

Type: Lost. Indonesia: Moluccas Is.: Amboina; Kikkawa & Peng, 1938. Japanese J. Zool., 7: 526. M. key, des., fig. Japan, Ryukyu Is., Taiwan, Micronesia.

*Drosophila imparata* Walker, 1859. J. Proc. Linn. Soc. (Zool.), 3: 126. F. des. Type: Lost? Aru Is.

*Drosophila similis* Lamb, 1914. Trans. Linn. Soc. London, Ser. 2 (Zool.), 16: 347 (preocc.). M. des., fig. Type: M, Seychelles (BMNH).

*Drosophila caribea* Sturtevant, 1916. Ann. Ent. Soc. America, 9: 335. Holotype: M, Cuba: Havana (AMNH).

*Drosophila errans* Malloch, 1933. Bull. Bishop Mus., 114: 21. (nom. nov.).

*Drosophila (Sophophora) ananassae*: Sturtevant, 1942. Univ. Texas Publ., No. 4213: 29. cat.; Hsu, 1949. Univ. Texas Publ., No. 4920: 96. M. des., fig.; Okada, 1954, Kontyû, Tokyo, 22: 39. M. key, des., fig.; 1956, Syst. Study, p. 116. M, F. key, des., fig.; Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 37. M. des.

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 1 M, 30.xii.1981 - 6.i.1982; Mandalay, 359 M, 496 F, 26.xii.1981 - 6.i.1982; Yangon, 149 M, 157 F, 16,17,22.xii.1981, 11-15.i.1982, Toda Coll.

*Distribution*: Cosmopolitan; Myanmar.

✓ 20. *Drosophila (Sophophora) atripex* Bock & Wheeler

*Drosophila (Sophophora) atripex* Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 42. M, F. des., fig. Type culture: Philippines: Luzon: Laguna (GFUT).

*Specimens examined*: MYANMAR: Yangon, 24 M, 26 F, 16,17,20.xii. 1981, 13.i.1982, Toda Coll.

*Distribution*: Philippines, Sulawesi, Borneo, Thailand, Myanmar (new record).

*Singapore, New Caledonia*

B. *Drosophila bipectinata* Species-complex

*Drosophila bipectinata* species-complex: Bock, 1971. Univ. Texas Publ., No. 7103: 273.

*Diagnosis* (Bock & Wheeler, 1972): Aedeagus bifid, bare, apically hooked.

Females can not be identified to species on morphological characters.

✓ 21. *Drosophila (Sophophora) bipectinata* Duda

*Drosophila bipectinata* Duda, 1923. Ann. Hist.-Nat. Mus. Natl. Hungarici, 20: 52. M. des. Type: M, India (HNHM); Kikkawa & Peng, 1938. Japanese J. Zool., 7: 527. M. des., fig. Ryukyu Is., Taiwan.

*Drosophila (Sophophora) szentivanii* Mather & Dobzhansky, 1962, Pacific Ins., 4: 247. M, F. des., fig. Types: M, F, New Guinea: Lae (AMS).

*Drosophila (Sophophora) bipectinata*: Sturtevant, 1942. Univ. Texas Publ., No. 4213: 29. cat.; Hsu, 1949. Univ. Texas Publ., No. 4920: 122. M. des., fig.; Okada, 1954, Kontyu, Tokyo, 22: 39. M. key, des., fig.; 1956, Syst. Study, p. 117. M, F. key, des., fig. Taiwan, Nepal, India; Bock, 1971, Univ. Texas Publ., No. 7103: 273. M. key; Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 46. M. fig. Thailand.

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 2 M, 30.xii.1981 - 6.i.1982; Mandalay, 1,229 M, 25.xii.1981 - 6.i.1982; Yangon, 709 M, 16-20,22.xii. 1981, 11-15.i.1982, Toda Coll.

*Distribution*: Ryukyu Is., Taiwan, Philippines, Cambodia, Thailand, Malaya, Singapore, Sumatra, Borneo, Java, Sulawesi, Micronesia, New Guinea, Australia, Samoa, Fiji, Nepal, northern to southern India, Sri Lanka, Pakistan, Myanmar. *New Caledonia*

## 22. *Drosophila (Sophophora) parabiptinata* Bock

*Drosophila (Sophophora) parabiptinata* Bock, 1971. Univ. Texas Publ., No. 7103: 277. M, F. key, des., fig. Types: M, F, Borneo: Sabah (QMB).

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 1 M, 30.xii.1981 - 6.i.1982; Shwebo, 1 M, 3.i.1982; Mandalay, 1,294 M, 25.xii.1981 - 6.i.1982; Yangon, 304 M, 16-20,22.xii.1981, 11-15.i.1982, Toda Coll.

*Distribution*: Philippines, Sulawesi, Borneo, Cambodia, Thailand, southern India, Myanmar (new record).

## 23. *Drosophila (S.) malerkotliana malerkotliana* Parshad & Paika

*Drosophila (Sophophora) malerkotliana* Parshad & Paika, 1964. Panjab Univ. Res. Bull. (N. S.), 15: 235. M, F. des., fig. Types: M, F, India: Chandigarh, Pinjore, Malerkotla (PARSHAD COLL.); Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 47. M. fig. Malaya.

*Drosophila (Sophophora) malerkotliana malerkotliana*: Bock, 1971. Univ. Texas Publ., No. 7103: 274. M. key, des. India, Thailand, Malaya.

*Specimens examined*: MYANMAR: Pyin Oo Lwin, 3 M, 30.xii.1981 - 6.i.1982; Mandalay, 763 M, 25.xii.1981 - 6.i.1982; Yangon, 245 M, 16,17,22.xii.1981, 11-15.i.1982, Toda Coll.

*Distribution*: Southern China, Thailand, Malaya, Singapore, Sumatra, Java, Andaman Is., Nicobar Is., northern to southern India, Sri Lanka, Myanmar.

## 24. *Drosophila (Sophophora) pseudoananassae nigrens* Bock & Wheeler

*Drosophila (Sophophora) pseudoananassae nigra* Bock, 1971. Univ. Texas Publ., No. 7103: 277 (preocc.). M. key, des. Types: M, F, Borneo: Sabah (QMB).

*Drosophila (Sophophora) pseudoananassae nigrens* Bock & Wheeler, 1972. Univ. Texas Publ., No. 7213: 48. (nom. nov.)

*Specimens examined*: MYANMAR (Burma): Pyin Oo Lwin, 5 M, 30.xii.1981 - 6.i.1982; Mandalay, 41 M, 26.xii.1981 - 6.i.1982; Yangon, 17 M, 16, 17.xii.1981, 11-15.i.1982, Toda Coll.

*Distribution*: Thailand, Malaya, Singapore, Borneo, southern India, Myanmar.

***Drosophila longissima* Species-subgroup**

*Diagnosis:* Surstylus simple, without teeth. Aedeagus very long and thick tube. Hypandrium small, arched.

This species-subgroup is newly established to include *D. longissima* Okada & Carson, 1983 and the new species described below. Okada & Carson (1983) suggested some affinities between the former species and the *D. montium* species-subgroup, especially *D. rhopaloa* which had been included in the *montium* subgroup at that time. However, *D. longissima* and the new species are so unique among members of the *D. melanogaster* species-group by the diagnostic characters that they can not be assigned to any known subgroups.

**25. *Drosophila (Sophophora) myamaungi*, sp. nov. (Figs. 37-41)**

*Diagnosis:* Surstylus elongate, apically not claw-like but round, with ca. 4 small bristles caudodorsally and ca. 5 microsetae caudoventrally (Fig. 37). Aedeagus basally with very large, tongue-like flap (Figs. 38, 39).

*Male and female:* Body length male ca. 1.9 mm (1.83-1.98), female ca. 2.2 mm (2.14-2.21). Thorax length, male ca. 1.0 mm (0.92-1.02), female ca. 1.1 mm (1.01-1.08).

*Head* brownish yellow. Eye with thick pile. Third antennal segment yellowish gray. Arista with ca. 3 (3-4) upper and 2 lower branches in addition to large terminal fork. Frons ca. 4/9 (0.44, 0.43-0.46) as broad as head, anteriorly with a few frontal hairs; ocellar triangle and periorbit paler. Anterior reclinate orbital ca. 1/2 (0.49, 0.44-0.57) length of posterior reclinate; proclinate slightly shorter than or subequal to (0.97, 0.88-1.04) posterior reclinate. Carina high, broader below. Clypeus brown. Cheek ca. 1/8 (0.13, 0.10-0.17) as broad as greatest diameter of eye. Second oral ca. 3/5 (0.59, 0.49-0.74) length of vibrissa. Palpus pale yellow, apically with 1 prominent bristle.

*Thorax* brownish yellow. Humerals 2, lower one longer. Acrostichal hairs in 8 rows. Anterior dorsocentral ca. 3/5 (0.60, 0.54-0.65) length of posterior; length distance of dorsocentrals ca. 2/5 (0.41, 0.37-0.47) cross distance. Anterior scutellar ca. 7/8 (0.88, 0.78-0.92) length of posterior. Sterno-index ca. 0.7 (0.63-0.79).

*Legs* pale yellow. Preapicals on all tibiae; apicals on fore and mid tibiae. Two longitudinal sex-combs present on fore metatarsus and 2nd tarsal segment, consisting of ca. 12 (11-14) and ca. 7 (6-8) teeth, respectively. Fore metatarsus slightly shorter than, mid and hind metatarsi as long as 2 succeeding tarsal segments together.

*Wing* hyaline. Veins yellow; crossveins clear.  $R_{2+3}$  slightly curved to costa at tip;  $R_{4+5}$  and M nearly parallel. C1-bristles 2, subequal. Wing indices: C ca. 2.2 (2.03-2.28), 4V ca. 2.6 (2.37-2.72), 4C ca. 1.4 (1.27-1.45), 5x ca. 2.3 (2.05-2.79), Ac ca. 2.9 (2.69-3.19), C3-fringe ca. 0.5 (0.41-0.56). Haltere pale grayish yellow.

*Abdomen:* Male 1st to 4th and female 1st to 6th tergites pale yellow to grayish yellow, with narrow, brown, caudal band; male 5th and 6th entirely black; female 7th entirely brown.

*Periphallitic organs* (Fig. 37): Epandrium narrow, long, with ca. 30 long bristles caudally and ventrally and many small setae on ventral margin; ventral lobe apically somewhat pointed. Cercus separate from epandrium, small, circular above, triangularly elongate below, with ca. 21 bristles.

*Phallic organs* (Figs. 38, 39): Aedeagus subapically slightly expanded, finely serrate on apical margin, with numerous minute spinules on dorsal surface; apodeme as long as aedeagus excepting basal flap. Anterior paramere basally broad and thick, distally elongated into thin flap apically tapering and somewhat irregularly serrate. Posterior paramere absent. Hypandrium with 1 pair of minute submedian spines on caudal margin.

*Female reproductive organs*: Ovipositor lobe (Fig. 40) simple, somewhat parallelogrammic plate without any teeth. Spermatheca (Fig. 41) hemispherical, basally strongly constricted and finely wrinkled; introvert deep, wrinkled; duct distally slightly expanded.

*Holotype*: Male, MYANMAR: Pyin Oo Lwin, 30.xii.1981 - 6.i.1982 (EHU).  
*Paratypes*: MYANMAR: 8 M, 4 F, same data as holotype.

*Distribution*: Myanmar.

*Relationships*: This species can be clearly distinguished from *D. longissima* by the diagnostic characters.

*Etymology*: Patronym, in honor of Dr. Mya Maung, Rangoon University, who helped me in collecting the specimens.

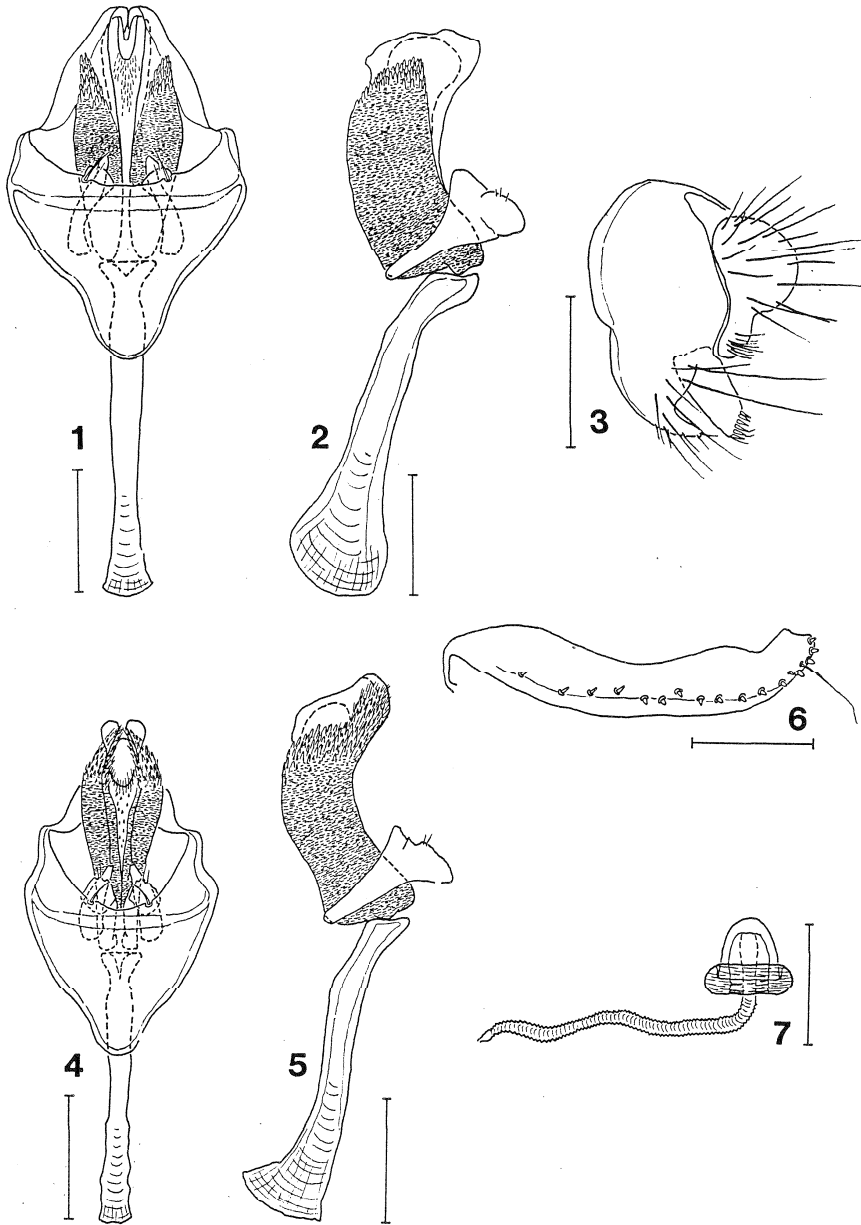
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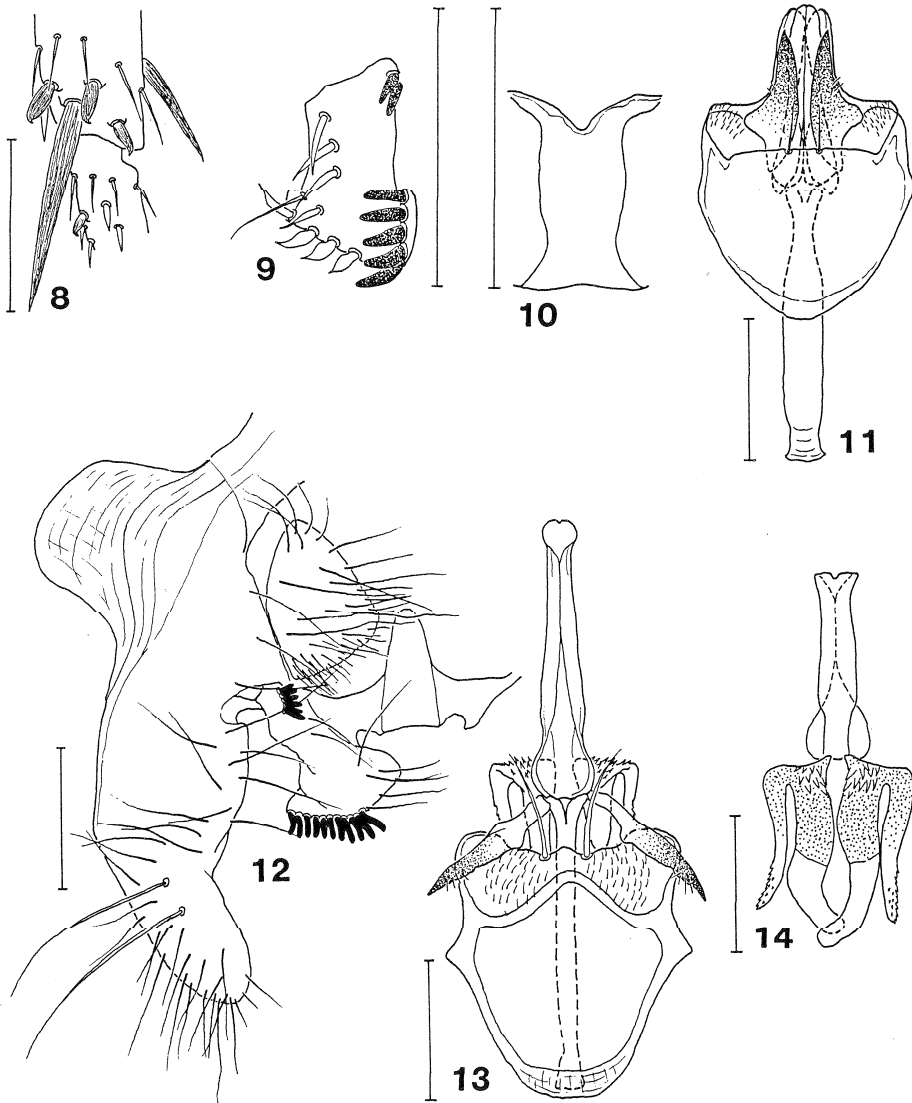
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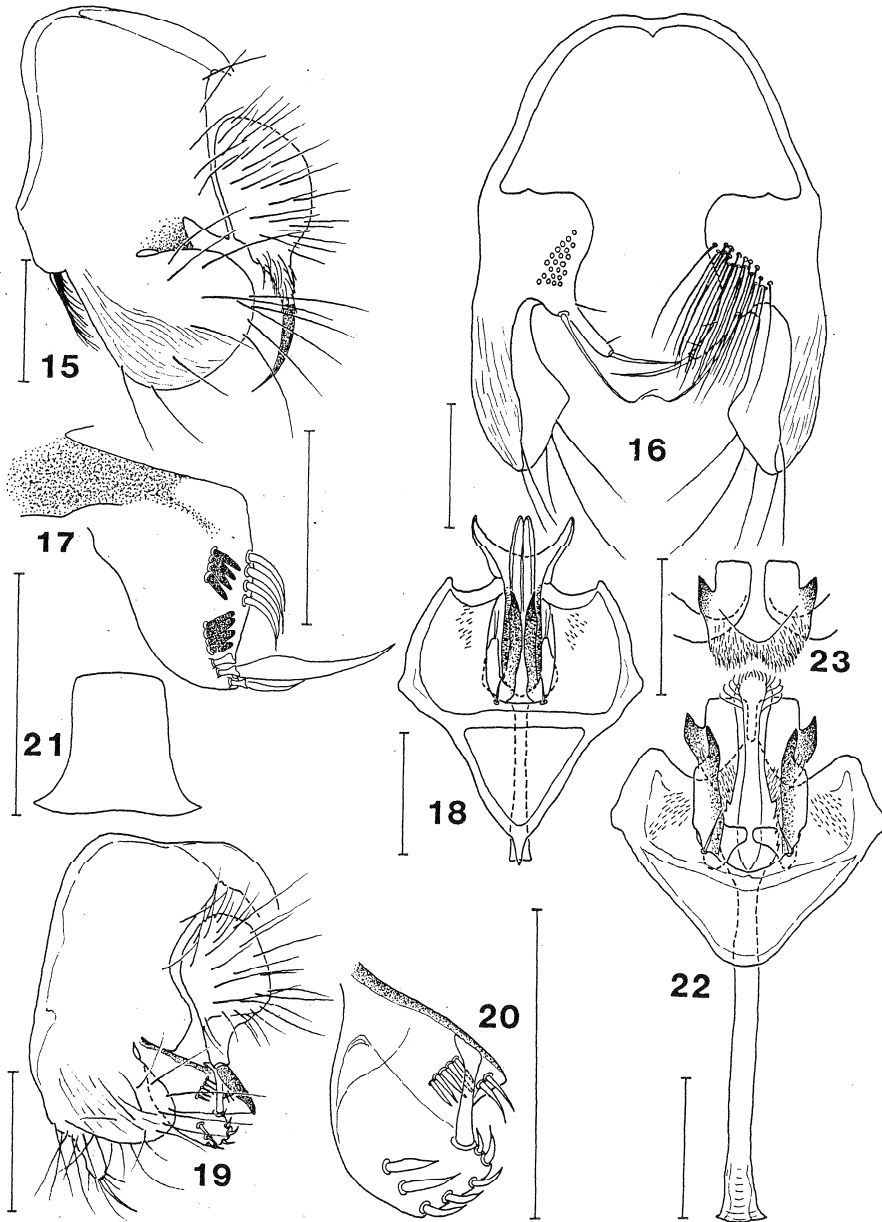
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Figs. 1-7. 1-2. *Drosophila (Sophophora) ficusphila* Kikkawa & Peng, 1938: 1, phallic organs, ventral view; 2, aedeagus, anterior and posterior parameres, lateral view. 3-7. *Drosophila (Sophophora) flavicauda*, sp. nov.: 3, peripheral phallic organs; 4, phallic organs, ventral view; 5, aedeagus, anterior and posterior parameres, lateral view; 6, ovipositor lobe; 7, spermatheca. (Scale-line = 0.1 mm.)

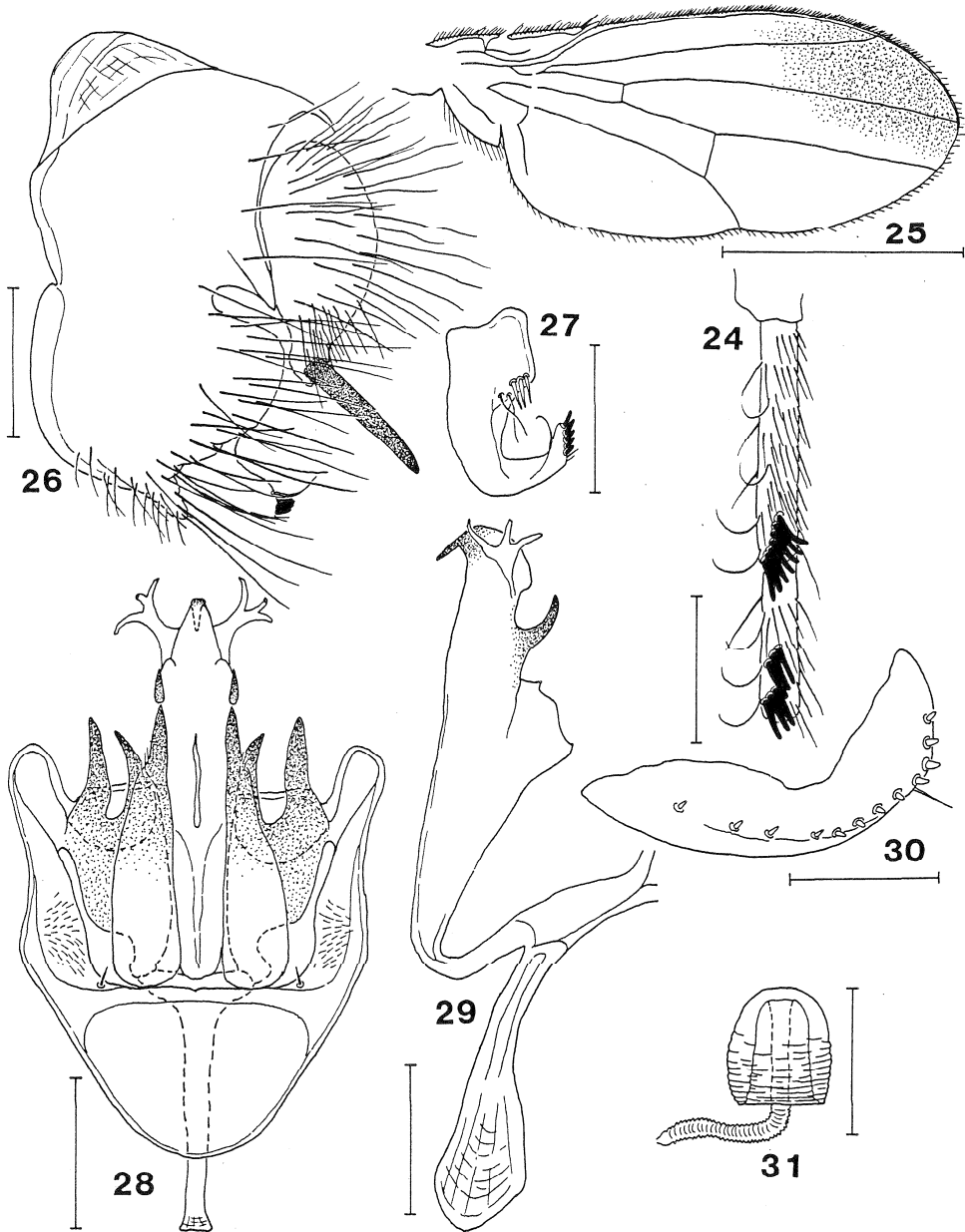


Figs. 8-14. 8-11. *Drosophila (Sophophora) jagri* Prakash & Sreerama Reddy, 1979: 8, joint of tibia and metatarsus of mid leg; 9, surstylus; 10, decasternum; 11, phallic organs. 12-14. *Drosophila (Sophophora) pyo*, sp. nov.: 12, periphallic organs; 13, phallic organs, ventral view; 14, aedeagus and posterior parameres, dorsal view. (Scale-line = 0.1 mm.)

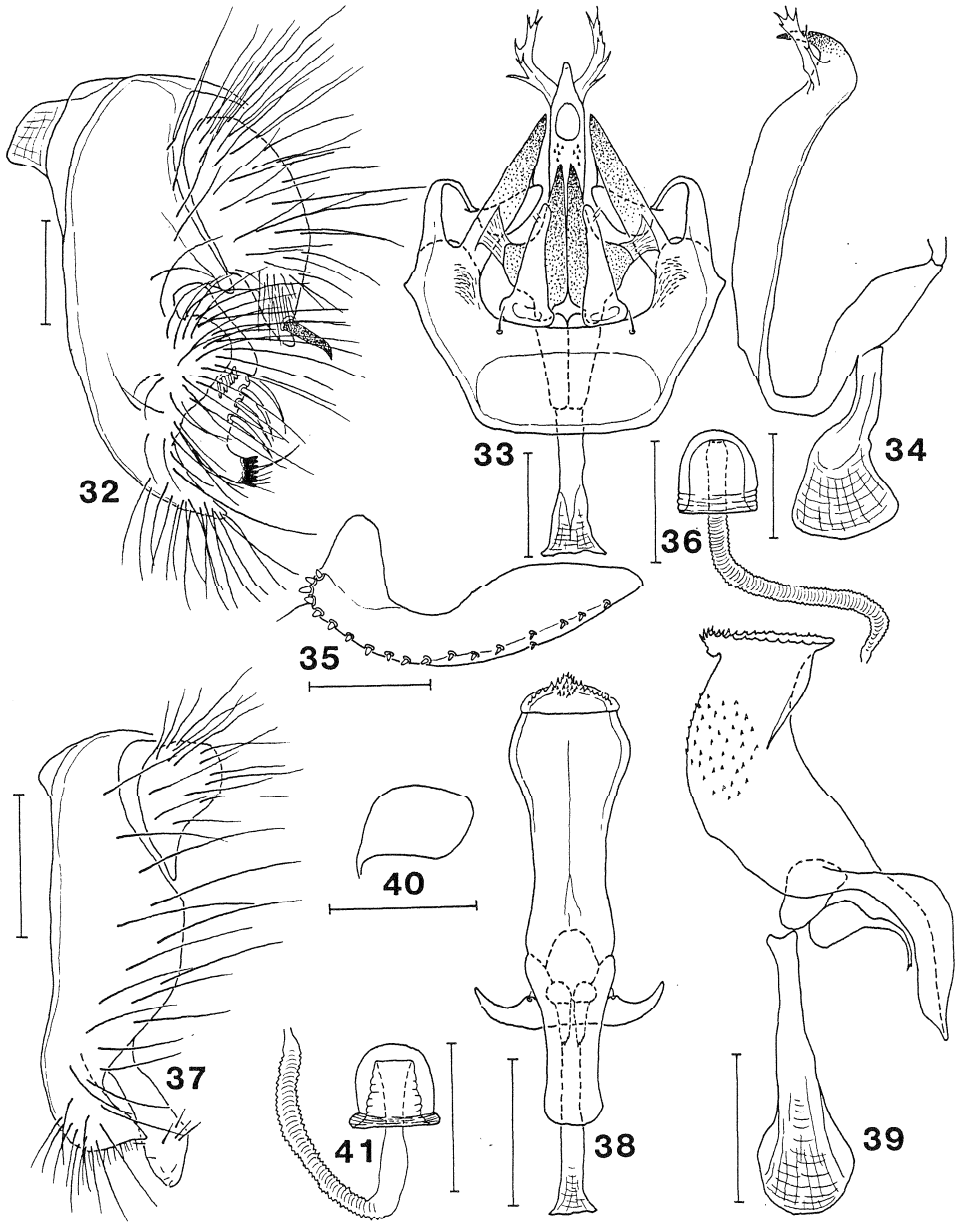


Figs. 15-23. 15-18. *Drosophila (Sophophora) nyinyii*, sp. nov.: 15, periphallallic organs, lateral view; 16, epandrium, ventral view; 17, surstylus; 18, phallic organs. 19-23. *Drosophila (Sophophora) siangensis* Kumar & Gupta, 1988: 19, periphallallic organs; 20, surstylus; 21, decasternum; 22, phallic organs; 23, posterior parameres. (Scale-line = 0.1 mm.)





Figs. 24-31. *Drosophila (Sophophora) fuyamai*, sp. nov.: 24, sex-combs on proximal two tarsal segments of male fore leg; 25, wing; 26, peripheral organs; 27, surstylus; 28, phallic organs, ventral view; 29, aedeagus, lateral view; 30, ovipositor lobe; 31, spermatheca. (Scale-line = 1 mm in 25, 0.1 mm in the others.)



Figs. 32-41. 32-36. *Drosophila (Sophophora) prolongata* Singh & Gupta, 1977: 32, periphallallic organs; 33, phallic organs, ventral view; 34, aedeagus, lateral view; 35, ovipositor lobe; 36, spermatheca. 37-41. *Drosophila (Sophophora) myamaungi*, sp. nov.: 37, periphallallic organs; 38, phallic organs, ventral view; 39, aedeagus and anterior paramere, lateral view; 40, ovipositor lobe; 41, spermatheca. (Scale-line = 0.1 mm.)