

With compliments from
the authors —

Systematic Study of Drosophilidae in
Poona and Neighbouring Areas—I

V. G. Vaidya and N. N. Godbole

Reprinted from the
Journal of the University of Poona,
Science and Technology Section, No. 40, pp. 49 to 61, 1971.

Systematic Study of Drosophilidae in Poona and Neighbouring Areas - I

By

V. G. Vaidya and N. N. Godbole

(Received on 5th September, 1970)

The drosophilid fauna of many vast areas of the Indian subcontinent is never or poorly explored. Reports on the occurrence of few species in some isolated parts of the country have been made by Bezzi (as quoted by Sturtevant¹), Brunetti², Duda³, Malloch⁴, Sturtevant⁵, Ray-Chaudhuri and Mukherjee⁶. As a result of a survey undertaken by the Japanese Expedition to Nepal Himalaya in 1952-53, Okada⁷ has described six *Drosophila* species from that region. Chandigarh and adjoining regions in Punjab are being extensively surveyed by Prashad and Paika⁸ and the Kashmir Valley by Prasad and Duggal⁹. Studies on the Drosophilidae occurring around Bhagalpur in Bihar, in Chakia forest in Uttar Pradesh and on those inhabiting the Islands of Andaman and Nicobar have been started by Rahman and Singh¹⁰, Gupta and Ray-Chaudhuri¹¹ and Singh¹² respectively.

Nothing however seems to have been known about the Drosophilidae of the south-western India. The present paper deals with the first part of the results of a survey undertaken since June 1968 around Poona in the State of Maharashtra.

Region surveyed

Poona (lat. 18°31' N and long. 73°51' E) is located at the confluence of the rivers Mula and Mutha in the shadows of the Western Ghats. It is surrounded by low hills. As the crow flies, it is about 105 km from the Arabian Sea and is at a height of 564 m from the mean sea level. The average annual rainfall is about 62.5 cm, most of which occurs in the months from June to October. The warmer months are March, April and May while it is cooler from November to February.

Collections were made all the year round at the following 25 places, which cover the total area of about 315 sq km. (i) Phule Market, (ii) Peshwe Park, (iii) Parvati, (iv) Swargate, (v) Katraj, (vi) Golibar Maidan, (vii) Lullanagar, (viii) Hadapsar, (ix) Empress Botanical Garden, (x) Bund Garden, (xi) Yerawada, (xii) Vishrantwadi, (xiii) Dhanori, (xiv) Wakade-wadi, (xv) Kirkee, (xvi) Dapodi, (xvii) Pimpri (xviii) Ganeshkhind Fruit Experimental Station, (xix) Poona University Campus, (xx) Aundh, (xxi) Pashan, (xxii) South Khadakwasla, (xxiii) Paud Road, (xxiv) Deccan Gymkhana, (xxv) Sambhaji Park.

Methods of collection and study

Three different methods were employed for obtaining flies. These were generally based on the techniques described by Patterson¹³.

(a) Banana baiting : Fermenting bananas with peels were crushed and placed in empty cans of different sizes ranging from 200 ml to 4000 ml capacity. The cans were first lined at the bottom with coarse filter paper, which not only absorbed excess of moisture from the fermenting fruit, but also facilitated removal of old and used up baits. The cans were loosely fitted with lids so that a slit remained at one side for the flies to enter. The cans were then placed in kitchens, near refuge bins, in gardens, in fruitshops or in wooded areas in cool and shaded locations. After fixed periods, flies were collected from a can by quickly removing the lid and replacing it by an inverted polyethylene funnel of the same diameter as the can and fitted with a glass vial at the upper end. Flies quickly gathered in the vial due to their positive phototaxis. Slight shaking of the can helped in the process.

(b) Sweeping with net : On many occasions, especially when flies were abundant, they were collected from fermenting fruit, decaying vegetables or oozing sap of trees with a muslin hand-net. The same method was employed for sweeping vegetation of different kinds.

(c) Collecting fermenting fruits : Fermenting over-ripe fruits were collected from nature and were placed in suitable containers in the laboratory till adult flies emerged.

On obtaining the adult flies, males were all over-etherized and studied. Females were transferred singly to 7.5×2.5 cm vials containing cornmeal-agar medium seeded with yeast. The F_2 progeny obtained from females inseminated in nature was used for identifying species.

For observation of internal characters over-etherized flies were dissected under Reichert (Austria) stereo-dissecting microscope (Model "Mak MS"). For convenient observation of external characters of flies this microscope was fitted with a special accessory consisting of a revolving arc to mount pinned insects ("Thirring insect holder").

Permanent slides of various organs such as periphallid organs, phallic organs, legs, wings, sterno-pleura, antenna and palpus were made for detailed study. For this, a fly was first boiled in 5% KOH, washed in tap water, the required parts were dissected out, dehydrated in ethyl alcohol and finally mounted in euparal. Sketches were made with the help of camera lucida.

Description of species

Nine species belonging to genus *Drosophila* are described below. Out of these, seven belong to subgenus *Sophophora* and the remaining two to subgenus *Drosophila*.

Genus *Drosophila* Fallén, 1823
Subgenus *Sophophora* Sturtevant, 1939
Species group *melanogaster* Sturtevant, 1942
Series *suzuki* Okada, 1954
Species subgroup *suzuki* Hsu, 1949

I. *Drosophila* (*Sophophora*) *biarmipes* Malloch, 1925

Drosophila biarmipes: Malloch, I. R. 1925. *Mom. Dept. Agric. in India*, 8: 64-65; Patterson, J. T. and Stone, W. S. 1952. *Evolution in the genus Drosophila*: 16, The Macmillan Co. Ltd., New York.

A. Description of the male imago:

General features and head: Body yellowish unicolourous, about 2.5 mm in length. Eyes dark red with thick pile. Ocellar triangle pale yellow. Middle orbital bristle less than half the size of the other two. Antenna yellowish, third segment darker. Arista with 9 rays including terminal fork, 5 dorsal rays and 4 vental rays. Front pale yellow, slightly less than half as broad as head width. Carina yellow, narrower above. Cheek pale yellow. Palpus pale yellow with one prominent apical bristle.

Thorax: Thorax brownish yellow. Humeral 2 subequal. Acrostichal hairs in 8 rows. Sterno-index about 0.4.

Legs: Legs yellow. Preapicals on all three tibiae. Apicals on middle tibiae only. Middle tibiae with three subapical hooked scaly bristles. Metatarsus of middle leg with a similar hooked scaly bristle basally. Sex-comb in two sets on first metatarsus, proximal row of 5-6 and distal row of 3-4 similar teeth.

Wings: Wings with a general faint brown tinge and with a dark brown spot around the tip of the second vein. About 2 mm in length. Costal index about 2.7. 4th vein index about 2.2. 4C-index about 1.5 X-index about 1.7. C-1 bristles 2 equal. C-3 bristles on basal 1/3.

Abdomen: Abdominal tergites yellow. Second to fourth tergites with thin uninterrupted dark posterior margins. Remaining posterior tergites totally black. Sternites pale yellow.

Periphallic organs: Genital arch brown above, paler below, broader in the middle, with about 8 bristles on the posterior margin. Heel absent. Toe low, bent forwards, slender, tubular, with about 18-20 bristles. Anal plate broader below, with about 36 bristles which are denser on the lower part. Clasper one, tapering below. Primary teeth about 6 arranged in a straight row. Secondary teeth 3-4 in a row in upper inner corner.

B. Description of the female imago:

Similar to male except (a) in absence of sex-comb, (b) in absence of a dark brown spot around the tip of the second wing vein and (c) in having a dark brown posterior margin on all the abdominal tergites except the first one.

Series *melanogaster* Okada, 1954
Species subgroup *takahashii* Hsu, 1949

II. *Drosophila* (*Sophophora*) *takahashii* Sturtevant, 1927

Drosophila takahashii : Sturtevant, A. H. 1927. *Philippine Journ. Sci.*, 32 : 371; Peng, F. T. 1937. *Annot. Zool. Japon.*, 16 : 27; Kikkawa, H. and Peng, F. T. 1938. *Japan. Journ. Zool.*, 7 : 534.

Drosophila (*Sophophora*) *takahashii* : Sturtevant, A. H. 1942. *Univ. Texas Publ.*, 4213 : 29; Hsu, T. C. 1949. *Univ. Texas Publ.*, 4920 : 96; Wheeler, M. R. 1949. *Univ. Texas Publ.*, 4920 : 175; Tan, C. C., Hsu, T. C. and Sheng, T. C. 1949. *Univ. Texas Publ.*, 4920 : 197; Patterson, J. T. and Stone, W. S. 1952. *Evolution in the genus Drosophila* : 16, The Macmillan Co., New York; Okada, T. 1955. *Sci. Result. Japan. Exped. Nepal Himalaya*, 1 : 388; Okada, T. 1956. *Systematic study of Drosophilidae and allied families of Japan* : 109, Gihodo Co. Ltd., Tokyo.

A. Description of male imago :

General features and head : Body about 1.8 mm in length. Eyes red with thick pile. Middle orbital about one-third the size of the other two. Antenna brown. Arista with 9 rays including terminal fork, 5 dorsal rays and 4 ventral rays. Front yellow brown, about one-third the width of the head. Carina brownish, narrow. Palpus with only one prominent bristle.

Thorax : Thorax yellow brown. Humerals 2 subequal. Acrostichal hairs in 8 rows. No prescutellars. Sterno-index about 0.7.

Legs : Legs yellow. Preapicals on all three tibiae. Apicals on first and second tibiae. Sex-comb on foreleg in four sets of similar teeth, two sets on metatarsus with 3 and 4 teeth and two sets on the next tarsal segment with 1 and 3 teeth.

Wings : Wings clear, about 1.7 mm in length. Costal index about 2.4. 4th vein index about 2.2. 4C-index about 1.2. 5X-index about 1.4. C-1 bristles 2 subequal. C-3 bristles on basal 1/3.

Abdomen : Abdominal tergites yellow. Second to fourth tergites with dark brown bands on posterior margin. Remaining posterior tergites totally dark brown. Sternites pale yellow.

Periphallic organs : Genital arch brown, paler below, with wavy anterior and posterior margins. Lower part of the genital arch narrowed to a baglike structure directed ventrally and bearing three long prominent bristles and numerous small bristles. Upper part of the genital arch with about 4 bristles. Anal plate not fused with the genital arch, oval, with numerous small bristles. Clasper one, with a convex row of 14 long primary teeth and two secondary teeth in the upper inner corner.

Internal characters : Testis whitish with 1 inner and 2 outer coils.

B. Description of female imago :

Similar to male except (*a*) in absence of sex-comb and (*b*) in having dark brown bands on posterior margins of all abdominal tergites except the first one.

Egg guide : Lobe apically rounded with about 14 black marginal teeth. No discal teeth. Basal isthmus long and narrow.

Internal characters : Spermatheca dark brown, small. Receptacle with about 4 transverse folds.

C. Other features :

Egg : Egg with 2 filaments.

Puparium : Puparium reddish orange. Anterior spiracle with 5 branches. Horn-index about 9.5.

Species subgroup *melanogaster* Hsu, 1949

III. *Drosophila (Sophophora) melanogaster* Meigen, 1830

Drosophila melanogaster : Kikkawa, H. and Peng, F. T. 1938. *Japan. Journ. Zool.*, 7 : 534.

Drosophila (Sophophora) melanogaster : Sturtevant, A. H. 1942. *Univ. Texas Publ.*, 4213 : 29; Patterson, J. T. 1943. *Univ. Texas Publ.*, 4313 : 71; Patterson, J. T. and Mainland, G. B. 1944. *Univ. Texas Publ.*, 4445 : 32; Hsu, T. C. 1949. *Univ. Texas Publ.*, 4920 : 96; Wheeler, M. R. 1949. *Univ. Texas Publ.*, 4920 : 174; Tan, C. C., Hsu, T. C. and Sheng, T. C. 1949. *Univ. Texas Publ.*, 4920 : 197; Basden, E. B. 1952. *Ent. Month. Mag.*, 88 : 200; Patterson, J. T. and Stone, W. S. 1952. *Evolution in the genus Drosophila* : 16, The Macmillan Co., New York; Okada, T. 1955. *Sci. Result. Japan. Exped. Nepal Himalaya*, 1 : 387; Okada, T. 1956. *Systematic study of Drosophilidae and allied families of Japan* : 110, Gihodo Co. Ltd., Tokyo.

A. Description of the male imago :

General features and head : Body about 2.0–2.2 mm in length. Eyes bright red with thick pile. Middle orbital one-third the size of the other two. Antenna yellow. Arista with 9 rays including terminal fork. Front yellow, about one-half the width of the head. Carina yellow, broad, flat. Second oral nearly as long as the first. Palpus with few prominent bristles.

Thorax : Thorax reddish yellow. Humerals 2. Acrostichal hairs in 8 rows. No prescutellars. Sterno-index about 0.5.

Legs : Legs pale yellow. Preapicals on all three tibiae. Apicals on first and second tibiae. Sex-comb on first metatarsus consisting of about 10 similar teeth.

Wings : Wings clear, about 2.0–2.2 mm in length. Costal index about 2.2. 4th vein index about 2.4. 4C-index about 1.3. 5X-index about 1.6. C-1 bristles 2 equal. C-3 bristles on basal 1/3.

Abdomen : Abdominal tergites reddish yellow. Posterior margins of second to fourth tergites with black bands. Remaining posterior tergites totally black. Sternites yellow.

Periphallialic organs : Genital arch brown, paler below, broad in the middle. Upper posterior margin of genital arch with about 9 bristles. Lower part of genital arch bearing many bristles and bifurcated into two broad lobes. Upper lobe truncate, covering upper part of primary clasper. Lower lobe saclike, with broadly rounded almost imperceptible heel. Toe low, pointed downwards, with a tuft of bristles. Anal plate oval, with numerous bristles which are denser below. Clasper one, long, narrow and curved.

Primary teeth in three irregular rows. Upper row of 5 teeth covered by lobe of genital arch. Lower two rows consisting of about 13–17 teeth. A tuft of bristles at the tip of the primary clasper, one especially long and curved upwards.

Internal characters : Testis yellow, inner part coiled only at proximal end, outer part has 3 coils which are lighter in colour.

B. Description of female imago :

Similar to male except (*a*) in being slightly larger in size, (*b*) in the absence of sex-comb and (*c*) in having posterior black bands on all the abdominal tergites except the first and the last ones. Last tergite totally black.

Egg guide : Lobe pale yellow with about 10 black marginal teeth. Tip rounded. Upper margin with a deep incision. Basal isthmus narrow.

Internal characters : Spermatheca small, chitinized. Receptacle consists of 4–6 folds lying against the ventral surface of the uterus.

C. Other features :

Egg : Egg with 2 filaments. Apical half of filament expanded.

Puparium : Puparium yellowish brown. Anterior spiracle with about 7 branches which are borne on a short stock. Horn-index about 12.

Series *montium* Okada, 1954

Species subgroup *ananassae* Hsu, 1949

IV. *Drosophila* (*Sophophora*) *ananassae* Doleschall, 1858

Drosophila ananassae : Kikkawa, H. and Feng, F. T. 1938. *Japan. Journ. Zool.*, 7 : 526.

Drosophila (*Sophophora*) *ananassae* : Sturtevant, A. H. 1942. *Univ. Texas Publ.*, 4213 : 29; Patterson, J. T. 1943. *Univ. Texas Publ.*, 4313 : 74; Patterson, J. T. and Mainland, G. B. 1944. *Univ. Texas Publ.*, 4445 : 32; Hsu, T. C. 1949. *Univ. Texas Publ.*, 4920 : 96; Wheeler, M. R. 1949. *Univ. Texas Publ.*, 4920 : 175; Tan, C. C., Hsu, T. C. and Sheng, T. C. 1949. *Univ. Texas Publ.*, 4920 : 197; Patterson, J. T. and Stone, W. S. 1952. *Evolution in the genus Drosophila* : 16, The Macmillan Co., New York; Okada, T. 1956. *Systematic study of Drosophilidae and allied families of Japan* : 116, Gihodo Co. Ltd., Tokyo.

A. Description of male imago :

General features and head : Body about 2.0–2.3 mm in length. Eyes scarlet with thick pile. Middle orbital about one-half the size of the other two. Antenna yellow, third segment brown. Arista with 8–9 rays. Front yellow, nearly one-half the width of the head. Carina yellow, flat, narrow above. Second oral slightly smaller than the first. Palpus yellow brown, with only one prominent terminal bristle.

Thorax : Thorax yellow brown. Humerals 2 equal. Acrostichal hairs in 8 rows. No presecutellars but a row of slightly enlarged bristles is present between the two posterior dorsocentrals. Sterno-index 0.5.

Legs : Legs pale yellow. Preapicals on all three tibiae. Apicals on first and second tibiae. Several rows of strong black bristles ventrally on proximal two tarsal segments of first leg.

Wings : Wings clear, about 2.0–2.2 mm in length. Costal index about 1.3. 4th vein index about 2.3. 4C-index about 1.7. 5X-index about 2. C-1 bristles 2 subequal. C-3 bristles on basal 1/2.

Abdomen : Abdominal tergites yellow brown. Each tergite except the first with a thin posterior brownish margin. Sternites pale yellow.

Periphallid organs : Genital arch yellowish, broad ventrally, middle and lower portion with many bristles. Upper posterior margin bearing six bristles. Heel broadly rounded. Ventral margin slightly convex. Toe low, pointed forwards. Lobe-like expansion of posterior margin covering base of primary clasper. Anal plate oval, separate from genital arch, with numerous evenly distributed long bristles. Claspers 2. Primary clasper broader and rounded apically. Primary teeth in two sets, dorsal set with about 5 and ventral set with about 3 teeth. Marginal bristles about 12, one especially long and curved upwards. Secondary clasper small, with one long curved strong tooth and four small bristles at the base.

Internal characters : Testis whitish, with about 2 inner and 5 outer coils.

B. Description of female imago :

Similar to male except in the absence of row of strong black bristles on proximal tarsi of first leg.

Egg guide : Lobe yellow, very weakly sclerotized. Tip rounded with about 15 black teeth. Basal isthmus concave.

Internal characters : Spermatheca spherical, chitinized. Receptacle with 7 folds lying flat against the ventral surface of the uterus.

C. Other features :

Egg : Egg with two filaments. Filaments tapering apically.

Puparium : Yellow. Anterior spiracle with about 8 branches on a short stock. Horn-index about 16.

✓ V. *Drosophila (Sophophora) malerkotliana* Prashad and Paika, 1964

Drosophila (Sophophora) sp. : Okada, T. 1964. *Nature and Life in South-east Asia*, 3 : 449 (Editors Kira, T. and Umesao, T.) Fauna and Flora Research Society, Kyoto.

Drosophila (Sophophora) malerkotliana : Prashad, R. and Paika, I. J. 1964. *Res. Bull. Panjab Univ.*, 15 : 235.

A. Description of male imago :

General features and head : Body about 1.8 mm in length. Eyes red with thick pile. Ocellar triangle and ocelli brown. Middle orbital about one-half the size of the other two. Antenna yellow brown. Arista with 9 rays including terminal fork, 5 dorsal rays and 4 ventral rays. Front yellow, more than one-third the width of the head. Carina yellowish, narrow. Second oral about three-fourth the size of the first. Palpus yellow brown, with one prominent terminal bristle.

Thorax : Thorax yellow brown. Humerals 2 subequal. Acrostichal hairs in 8 rows. No prescutellars. Sterno-index about 0.6.

Legs : Legs pale yellow. Preapicals on all three tibiae. Apicals on first and second tibiae. Sex-comb on foreleg in four sets of similar teeth, two sets on metatarsus with 1 and 4 teeth and two sets on the next tarsal segment with 1 and 3 teeth.

Wings : Wings clear, about 1.8 mm in length. Coastal index about 1.5. 4th vein index about 2.5. 4C-index about 1.7. 5X-index about 2.1. C-1 bristles 2 equal. C-3 bristles on basal 1/2.

Abdomen : Abdominal tergites yellowish brown. Posterior margins of second to fourth tergites with brown bands and the remaining posterior tergites totally dark brown. Sternites pale yellow.

Periphallic organs : Genital arch brown, paler below, broader in the middle. Posterior margin of genital arch with 4 bristles. Genital arch bifurcated ventrally into two broad lobes. Upper lobe truncate, covering the base of primary clasper and bearing about 8 bristles. Lower lobe saclike with about 12 bristles, ending in a broadly rounded low toe. Anal plate separate, broad ventrally, with about 18 long bristles. Claspers two. Primary clasper with two sets of stout short black primary teeth, ventral set of 3 and dorsal set of 2 teeth. About 12 stout marginal bristles, one especially long and curved upwards. Secondary clasper with one strong black apical tooth behind which there are three stout bristles.

Internal characters : Testis yellow with about 2 inner and about 4 outer coils.

B. Description of female imago :

Similar to male except (*a*) in the absence of sex-comb and (*b*) in having narrower brown bands on the posterior margins of all the abdominal tergites except the first one.

Egg guide : Lobe narrow anteriorly and broad posteriorly. Marginal teeth black, about 13.

Internal characters : Spermatheca brownish yellow, chitinized. Receptacle with about 6 ventral transverse folds.

C. Other features :

Egg : Egg with 2 filaments with expanded tips.

Puparium : Puparium yellowish. Anterior spiracle with about 12 branches which are borne on short stock. Horn-index about 15.

Species subgroup *montium* Hsu, 1949

VI. *Drosophila* (*Sophophora*) *kikkawai* Burla, 1954

Drosophila montium : Kikkawa, H. and Peng, F. T. 1938. *Japan. Journ. Zool.*, 7: 530.

Drosophila (Sophophora) montium : Sturtevant, A. H. 1942. *Univ. Texas Publ.*, 4213: 29; Hsu, T. C. 1949. *Univ. Texas Publ.*, 4920: 97; Wheeler, M. R. 1949. *Univ. Texas Publ.*, 4920: 175; Tan, C. C., Hsu, T. C. and Sheng, T. C. 1949. *Univ. Texas Publ.*, 4920: 197; Patterson, J. T. and Wheeler, M. R. 1949. *Univ. Texas Publ.*, 4920: 211; Patterson, J. T. and Stone, W. S. 1952. *Evolution in the genus Drosophila* : 16, The Macmillan Co., New York.

Drosophila (Sophophora) kikkawai : Burla, H. 1954. *Rev. Brasil. Biol.*, 14: 47; Okada, T. 1955. *Sci. Result. Japan. Exped. Nepal Himalaya*, 1: 387; Okada, T. 1956. *Systematic study of Drosophilidae and allied families of Japan* : 118, Gihodo Co. Ltd., Tokyo.

A. Description of male imago :

General features and head : Body about 2.0—2.3 mm in length. Eyes dull red with thick pile. Middle orbital about one-third the length of the other two. Antenna brown, third segment darker apically. Arista with 9 rays including terminal fork, 6 dorsal rays and 3 ventral rays. Front yellow brown, more than one-third the width of the head. Carina yellowish, narrow. Second oral nearly as long as the first. Palpus pale yellow, with one prominent bristle.

Thorax : Thorax yellow. Humerals 2 subequal. Acrostichal hairs in 6 rows. No prescutellars. Sterno-index about 0.6.

Legs : Legs yellow. Preapicals on all three tibiae. Apicals on first and second tibiae. Sex-comb on foreleg in two sets, metatarsus with about 25 and the next tarsal segment with about 18 similar teeth.

Wings : Wings clear, about 2 mm in length. Costal index about 1.8. 4th vein index about 2.5. 4C-index about 1.5. 5X-index about 2.5. C-1 bristles 2 subequal. C-3 bristles on basal 1/2.

Abdomen : Abdominal tergites yellow. Each tergite with blackish band on posterior margin. Bands on fifth and sixth segments paler. Sternites pale yellow.

Periphallic organs : Genital arch yellowish brown, posterior margin with about 9 bristles. Heel absent. Toe broadly rounded bearing a tuft of bristles. Toe not covering the clasper. Anal plate broader below, with numerous evenly distributed long bristles. Claspers two. Primary clasper with a conical ventral projection. Primary teeth 5, in a row. Secondary teeth about 9, irregularly arranged, strongly developed. Secondary clasper cylindrical, with two strong curved teeth, ventral especially stronger. Basal portion of secondary clasper with few bristles.

Internal characters : Testis whitish with about 2 inner and 3 outer coils. Outer coils thick.

B. Description of female imago :

Similar to male except in the absence of sex-comb.

Egg guide : Lobe with 18 marginal black teeth. Upper margin of lobe weakly concave. Apex rounded. Basal isthmus narrow.

Internal characters : Spermatheca globular, not chitinized. Receptacle with about 5 transverse folds.

C. Other features :

Egg : Egg with 2 filaments.

Puparium : Yellow brown. Anterior spiracle with 8-9 black branches. Horn-index about 8.

✓ VII. *Drosophila (Sophophora) jambulina* Prashad and Paika, 1964

Drosophila (Sophophora) jambulina : Prashad, R. and Paika, I. J. 1964. *Res. Bull. Panjab Univ.*, 15 : 240.

A. Description of male imago :

General features and head : Body about 2.2 mm in length. Eyes red with thick pile. Middle orbital less than one-half the size of the other two. Antenna yellow, with third segment darker. Arista with about 10 rays including terminal fork. Front yellow, about one-half the width of the head. Carina pale yellow, narrow above. Second oral shorter than the first. Palpus with single prominent bristle.

Thorax : Thorax yellow brown. Humerals 2 subequal. Acrostichal hairs in 6 rows. No prescutellars. Sterno-index about 0.5.

Legs : Legs pale brown. Preapicals on all three tibiae. Apicals on first and second tibiae. Sex-comb on first metatarsus in two sets of about 24 and 15 similar black teeth.

Wings : Wings clear, about 1.8 mm in length. Costal index about 2.3. 4th vein index about 3. 4C-index about 1.6. 5X-index about 3.4. C-1 bristles 2 equal. C-3 bristles on basal 1/2.

Abdomen : Abdominal tergites yellow. Second to fifth tergites having black posterior margins. Last tergite totally black. Sternites yellow.

Periphallic organs : Genital arch pale brown, darker at posterior margin. Posterior margin with 7 bristles, ventralmost especially long. Heel obtuse. Toe rounded, directed ventrally, with about 5 bristles. Anal plate not fused with the genital arch, oval, with about 15 long bristles plus 3 bristles on the ventral margin which are short and stout. Claspers two. Primary clasper with 5 teeth in a row and a cluster of few strongly developed marginal bristles, one especially long and curved upwards. Secondary clasper fused with anal plate, with three long stout curved teeth encircled by about 6 bristles.

Internal characters : Testis yellow with 2 inner and 2½ outer coils.

B. Description of female imago :

Similar to male except in the absence of sex-comb.

Egg guide : Lobe with about 12 marginal teeth.

Internal Characters : Spermatheca triangular. Receptacle with about 4 transverse folds.

C. Other features :

Egg : Egg with 2 slender filaments.

Puparium : Puparium brown. Anterior spiracle with about 8 branches. Horn-index about 9.5.

Subgenus *Drosophila* Fallén, 1823

Species group *immigrans* Sturtevant, 1942

V VIII. *Drosophila* (*Drosophila*) *nasuta* Lamb, 1914

Drosophila nasuta : Lamb, C. B. 1914. *Trans. Linn. Soc.*, 16 : 346; Harrison, R. A. 1954. *Trans. Roy. Ent. Soc. London*, 105 : 107.

Drosophila (*Drosophila*) *nasuta* : Sturtevant, A. H. 1942. *Univ. Texas Publ.*, 4213 : 32; Wheeler, M. R. 1949. *Univ. Texas Publ.*, 4920 : 187; Okada, T. 1964. *Nature and Life in South-east Asia*. 3 : 463 (Editors Kira, T. and Umesao, T.) Fauna and Flora Research Society, Kyoto.

A. Description of male imago :

General features and head : Body yellowish brown, about 2.5 mm in length. Eyes red with thick pile. Middle orbital about one-third the length of the first and about one-half the length of the third. Antenna yellow, third segment darker. Arista with about 10 rays including a small terminal fork, 6 dorsal rays and 4 ventral rays. Front yellow brown, about one-half the width of the head. Carina yellow brown, narrower above. Second oral about three-fourth the length of the first. Palpus yellow with few small bristles.

Thorax : Thorax yellow brown. Humerals 2 subequal. Acrostichal hairs in 8 rows. No prescutellars. Sterno-index about 0.5.

Legs : Legs yellow. Preapicals on all three tibiae. Apicals on second tibiae. First femur with a row of about 7 short stout black bristles on lower apical part.

Wings : Wings clear, about 2.5 mm in length. Cross-veins clouded. Costal index about 3.7. 4th vein index about 1.5. 4C-index about 0.6. 5X-index about 1.2. C-1 bristles 2 subequal. C-3 bristles on little more than basal 1/2.

Abdomen : Abdominal tergites yellow brown. All the tergites except the first one with a thin brownish posterior margin. Sternites pale yellow.

Periphallic organs : Genital arch yellow, broad, upper part partially pubescent, posterior margin with about 3 bristles, middle portion with about 3 bristles. Heel absent. Toe blunt, with about 3 bristles. Toe above the level of the clasper. Anal plate oval, not fused with the genital arch, pubescent, with many long evenly distributed bristles. Clasper one, with about 6 black pointed teeth arranged in a slightly convex row, with several recurved marginal bristles and few minute discal bristles.

Internal characters : Testis faint yellow with 2 inner and 3 outer coils.

B. Description of female imago :

Similar to male.

Egg guide : Lobe slender with about 23 yellowish marginal teeth, with few similar upper discal teeth.

Internal characters : Spermatheca round, chitinized. Receptacle with about 25 coils.

C. Other features :

Egg : Egg with 4 tapering filaments.

Puparium : Puparium reddish orange. Anterior spiracle with about 18-20 branches which are borne on a long stock. Horn-index about 2.3.

Species group *repleta* Sturtevant, 1942

IX. *Drosophila (Drosophila) repleta* Wollaston, 1858

Drosophila repleta : Kikkawa, H. and Peng, F. T. 1938. *Japan. Journ. Zool.*, 7 : 544; Colyer, C. N. 1954. *Ent. Month. Mag.*, 90 : 98.

Drosophila (Drosophila) repleta : Sturtevant, A. H. 1942. *Univ. Texas Publ.*, 4213 : 31; Patterson, J. T. 1943. *Univ. Texas Publ.*, 4313 : 117; Hsu, T. C. 1949. *Univ. Texas Publ.*, 4920 : 105; Wheeler, M. R. 1949. *Univ. Texas Publ.*, 4920 : 182; Patterson, J. T. and Stone, W. S. 1952. *Evolution in the genus Drosophila* : 30, The Macmillan Co., New York; Okada, T. 1956. *Systematic study of Drosophilidae and allied families of Japan* : 160, Gihodo Co. Ltd., Tokyo.

A. Description of male imago :

General features and head : Body about 2.9 mm in length. Eyes sepia with thick dark pile. Middle orbital about one-half the length of the other two. Antenna brown, third segment darker. Arista with about 8 rays including terminal fork. Front brown, about one-third the width of the head. Carina narrow above, distinctly sulcate. Second oral one-half the length of the first. Palpus brown with few prominent bristles.

Thorax : Thorax gray brown. Each bristle arising from a dark brown spot. The spots fuse to form irregular pattern. Acrostichal hairs in 8 rows. No prescutellars. Sterno-index about 0.9.

Legs : Legs yellowish brown. Preapicals on all three tibiae. Apicals on first and second tibiae.

Wings : Wings clear, about 2.5 mm in length. Costal index about 3.0. 4th vein index about 1.7. 4C-index about 0.8. 5X-index about 1.4. C-1 bristles 2 equal. C-3 bristles on basal 2/5.

Abdomen : Abdominal tergites yellow brown. Each tergite with a broad posterior medially interrupted dark brown band. This band almost reaches anterior margin leaving a yellow area laterally. Sternites yellow.

Periphallic organs : Genital arch yellow brown, upper posterior margin with about 4 bristles, lower portion with about 13 bristles. Heel broadly rounded, almost absent. Toe directed downwards. Lower portion of genital arch covering base of the primary clasper. Anal plate fused with the genital arch, with numerous long bristles. Clasper one, with primary teeth 11 in a convex row. Marginal bristles about 8.

Internal characters : Testis pale yellow, long, with many loose coils.

B. Description of female imago :

Similar to male imago except in slightly larger size.

Egg guide : Lobe brown, pointed apically, with about 24 marginal and 5 discal teeth. Basal isthmus narrow.

Internal characters : Spermatheca oval, highly chitinized. Receptacle with about 90 coils.

C. Other features :

Egg : Egg with 4 long tapering filaments.

Puparium : Puparium rust coloured. Anterior spiracle with about 17 branches which are borne on a long stock. Horn-index about 2.6.

In the above account, partial redescription of some species could not be avoided where characters were observed that have been overlooked previously. *Drosophila biarmipes* has been redescribed to conform to recent taxonomic requirements.

Acknowledgements

The authors are grateful to Prof. L. Mulherkar for extending facilities for the present work and to Prof. N. B. Inamdar for kindly offering important literature on the subject and for his valuable suggestions.

References

1. Sturtevant, A. H. *Carn. Inst. Wash. Publ.*, **301**, 1-141, 1921.
2. Brunetti, E. *Rec. Ind. Mus. Calcutta*, **25**, 303, 1923.
3. Duda, O. *Ann. Mus. Nat. Hung.*, **22**, 52, 1923.
4. Malloch, J. R. *Mem. Dept. Agric. in India*, **8**, 64-65, 1925.
5. Sturtevant, A. H. *Philip. Journ. Sci.*, **32**, 361-374, 1927.
6. Ray-Chaudhuri, S. P. and Mukherjee, D. P. *Ind. J. Ent.*, **3**, 215, 1941.
7. Okada, T. *Sci. Result. Japan. Exped. Nepal Himalaya*, **1**, 387-390, 1955.
8. Prashad, R. and Paika, I. J. *Res. Bull. Panjab Univ.*, **15**, 225-252, 1964.
9. Prashad, R. and Duggal, K. K. *Res. Bull. Panjab Univ.*, **17**, 277-290, 1966.
10. Rahman, S. M. Z. and Singh, V. K. *DIS*, **44**, 70, 1969.
11. Gupta, J. P. and Ray-Chaudhuri, S. P. *DIS*, **45**, 168, 1970.
12. Singh, A. *DIS*, **45**, 106, 1970.
13. Patterson, J. T. *Univ. Texas Publ.*, **4313**, 1-203, 1943.

Department of Zoology,
University of Poona,
Poona-7 (India)

Systematic Study of Drosophilidae in Poona and Neighbouring Areas - I

By

V. G. Vaidya and N. N. Godbole

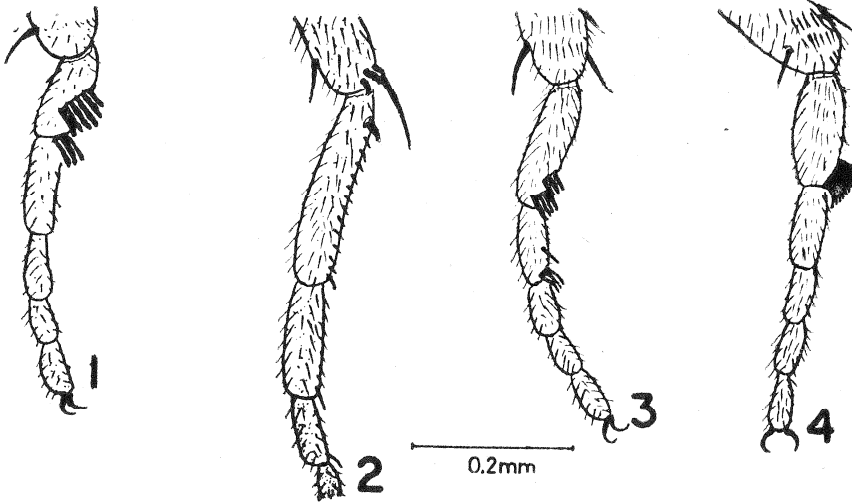


Plate I (Figures 1-4)

1. *D. biarmipes*, foreleg.
2. *D. biarmipes*, middle leg.

3. *D. takahashii*, foreleg.
4. *D. melanogaster*, foreleg.

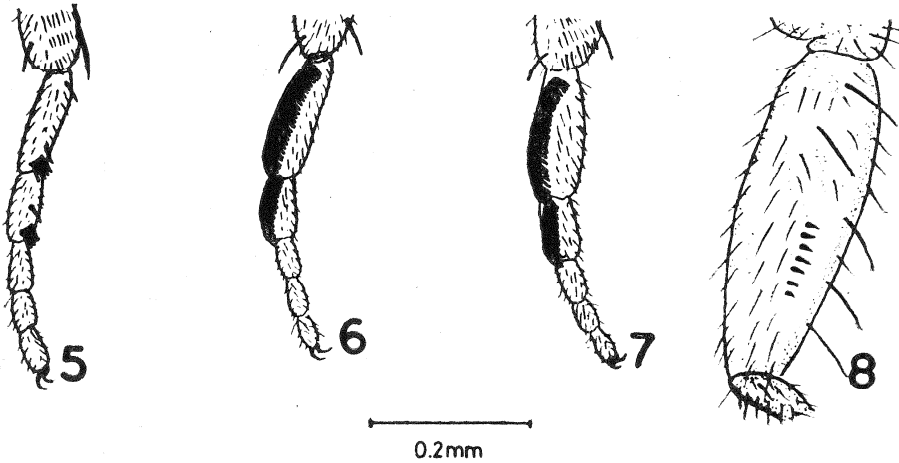


Plate II (Figures 5-8)

5. *D. malerkotliana*, foreleg.
6. *D. kikkawai*, foreleg.

7. *D. jambulina*, foreleg.
8. *D. nasuta*, femur foreleg.

Systematic Study of Drosophilidae in Poona and Neighbouring Areas - I

By V. G. Vaidya and N. N. Godbole

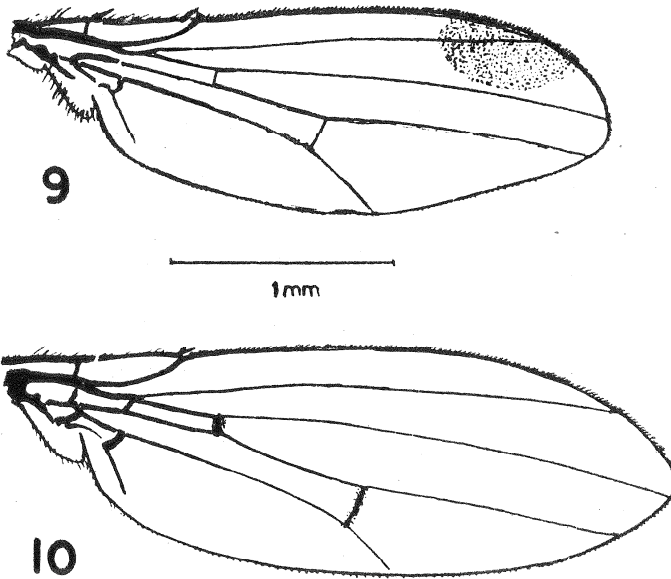


Plate III (Figures 9-10)

9. *D. biarmipes*, male wing.

10. *D. nasuta*, male wing.

Systematic Study of Drosophilidae in Poona and Neighbouring Areas - I

By

V. G. Vaidya and N. N. Godbole

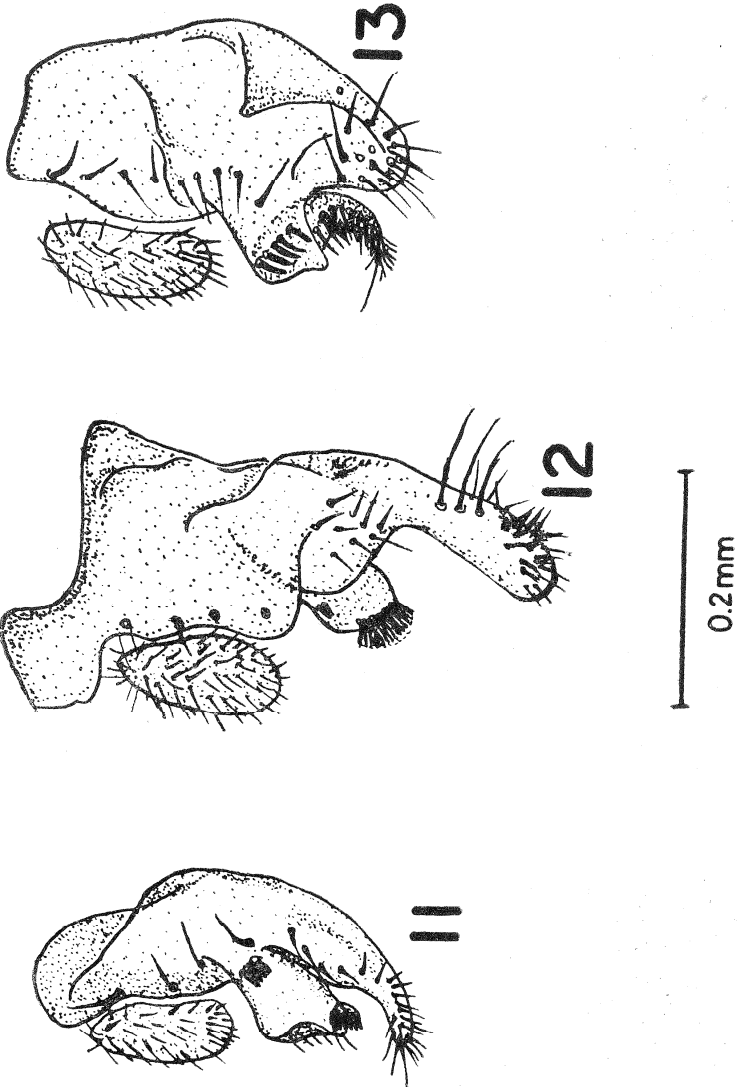


Plate IV (Figures 11-13)

Peripheral organs.

11. *D. biarmipes*.

12. *D. takahashii*.

13. *D. melanogaster*.

Systematic Study of Drosophilidae in Poona and Neighbouring Areas - I

By V. G. Vaidya and N. N. Godbole

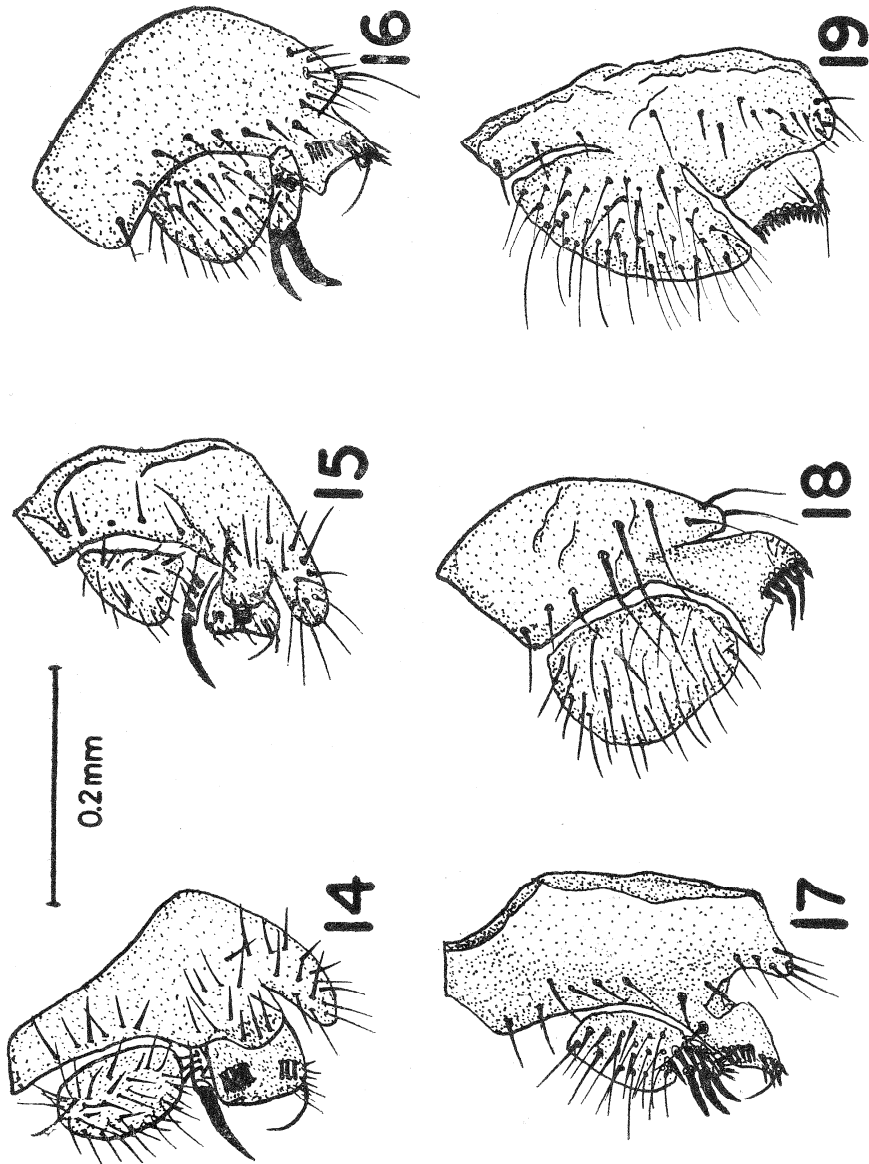


Plate V (Figures 14-19)
Periphallic organs.

14. *D. ananassae*.

15. *D. malkotliana*.

16. *D. kikkawai*.

17. *D. jambulina*.

18. *D. nasuta*.

19. *D. repleta*.

Systematic Study of Drosophilidae in Poona and Neighbouring Areas - I

By

V. G. Vaidya and N. N. Godbole

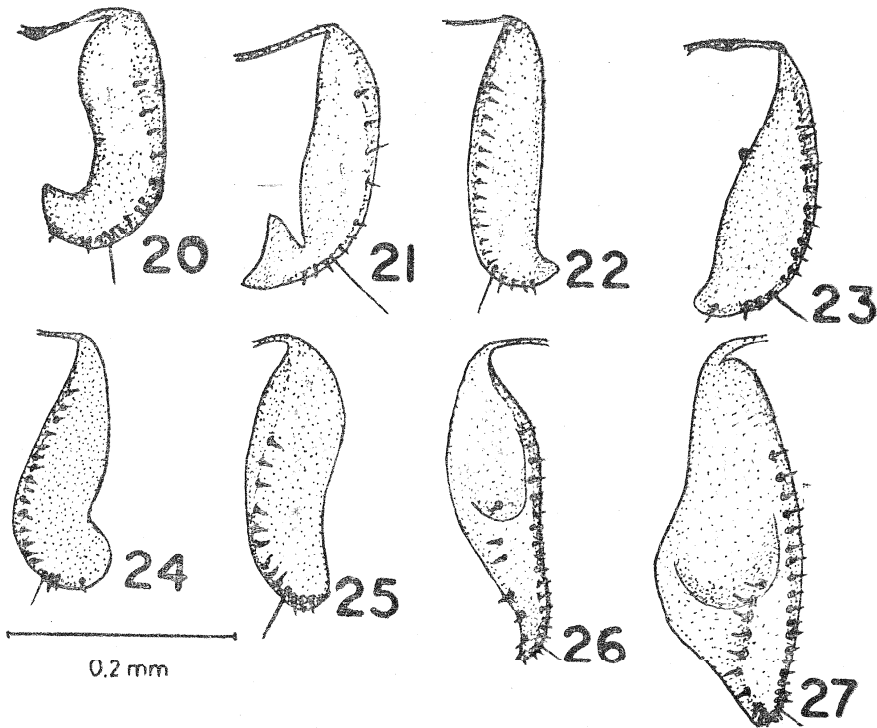


Plate VI (Figures 20-27)

Egg guides.

- 20. *D. takahashii*.
- 21. *D. melanogaster*.
- 22. *D. ananassae*.
- 23. *D. malerkotliana*.
- 24. *D. kikkawai*.
- 25. *D. jambulina*.
- 26. *D. nasuta*.
- 27. *D. repleta*.