

## TWO NEW AND TWO KNOWN SPECIES OF *DROSOPHILA* FROM RIMBICK, WEST BENGAL, INDIA

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(Received 1 June 1980)

Taxonomic account of four species of *Drosophila* is given. Two of them, *D. paralongifera* and *D. neomakinoi* are described as new, while *D. pentastrata* Okada and *D. acutissima* Okada are recorded for the first time from India.

(Key words: new *Drosophila*)

Accompanying the development of genetical and evolutionary knowledge in the genus *Drosophila*, taxonomic studies in this genus have also taken rapid strides during last few years and accumulated considerable data on the species inhabiting the subcontinent of India (See the review of Gupta, 1974 and other recent papers; Dwivedi, 1979; Dwivedi and Gupta 1980; Gupta and Dwivedi, 1980; Gupta and Singh, 1977, 1979; Prakash and Reddy, 1977, 1978, 1979 a, 1979 b; Sajjan and Krishnamurthy, 1975; Sajjan and Reddy, 1975; Singh and Gupta, 1977 a, 1977 b, 1980). These studies have indicated that the members of the genus *Drosophila* are fairly distributed throughout the subcontinent of India. However, in view the great size of the country and its considerable variety of habitats it is believed that there are undoubtedly more species awaiting discovery. The present paper embodies the results of several surveys undertaken at and around Rimbick.

Material for the present study was collected from Rimbick and its surrounding areas in the month of September 1979.

Rimbick, a wild hilly area in Darjeeling district, West Bengal, India is located at an elevation of about 7500 feet above sea level. The area is characterized by having dense evergreen, coniferous forest covering medium to very steep slopes and extremely moist condition due to heavy rainfall. The flies were collected both by using different fermenting fruits as baits and also by net-sweeping over fallen flowers, fruits and wild vegetation.

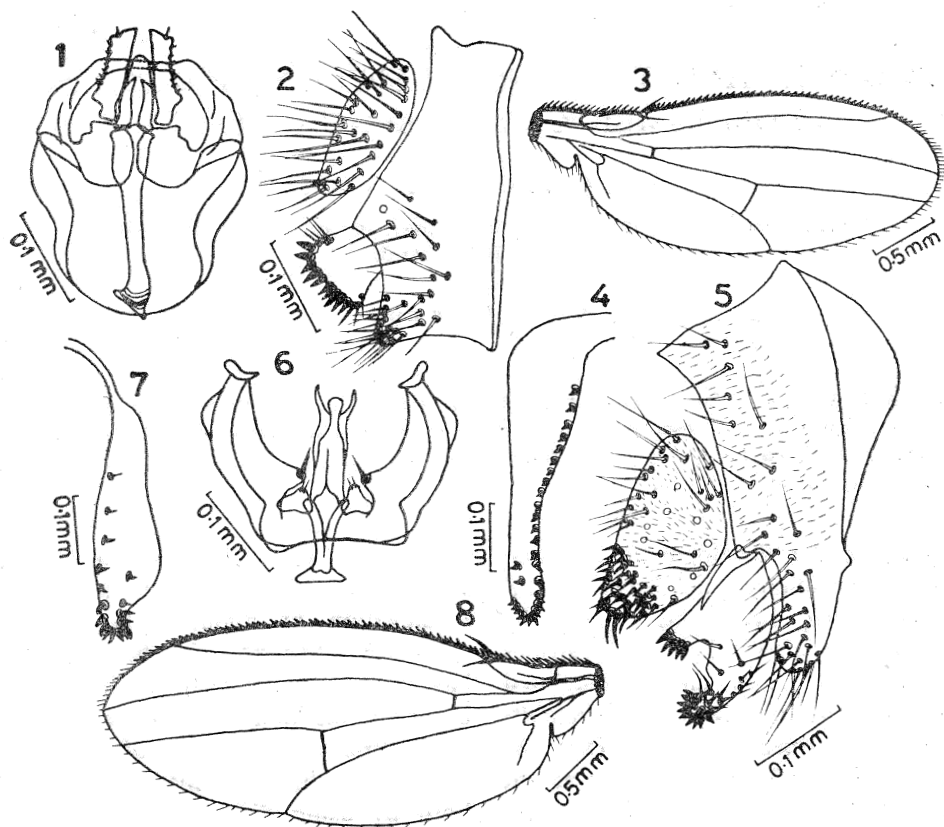
Genus *Drosophila* Fallen

*Drosophila* Fallen, 1823, Diptera Sueciae Geomyz., 2:4. Type species: *Musca funebris* Fabricious; Sweden.

1. *Drosophila (Drosophila) paralongifera* sp. nov.

Body length: 2.34 mm (♂); 2.75 mm (♀).

Head, ♂ and ♀: Arista with 2 branches above and 1 below in addition to terminal fork. Antennae with second segment brown; third segment yellowish brown. Frons brownish black, lighter anteriorly. Ocellar triangle black. Orbitals in ratio 8:5:7. Second oral not differentiated, vibrissa long and prominent. Palpi pale



Figs. 1-4: *Drosophila paralongifera* sp. nov.: 1—phallic organs; 2—periphallal organs; 3—male wing; 4—egg-guide. Figs. 5-8: *Drosophila neomakinoi* sp. nov.: 5—periphallal organs; 6—phallic organs; 7—egg-guide; 8—male wing.

brown, with one stout apical and 3-4 fine marginal setae. Carina brown, narrow and low. Face and cheek brown, greatest width of cheek  $1/9$  greatest diameter of eye. Postvertical moderate in size. Ocellars long. Clypeus dark brown. Eyes dark red.

*Thorax*, ♂ and ♀: Acrostichal hairs regular, in eight rows between dorso-centrals. Anterior scutellars divergent; posterior scutellars crossed. Distance between anterior and posterior dorsocentrals one-third distance between anterior pairs. Mesonotum dark brown, much lighter near humeral region. Scutellum brown, lighter at margin. Thoracic pleura dark brown. Sterno-index about 0.5.

*Legs* dull yellow, each with last tarsal segment brown, preapicals on all three tibiae; apicals on first and second tibiae.

*Wings* ♂ and ♀ (Fig. 3) Dusky. Length about 2.64 mm. Approximate indices: C-index 2.78; 4V-index 1.5; 4C-index 0.78; 5X-index 1.34. Two equal setae at the apex of first costal section; heavy setae on about basal  $2/7$  of third costal section. Halteres white.

*Abdomen*, ♂ and ♀: Abdominal tergites shiny yellow, 1-2T with broadly interrupted and the remainder tergites with mildly interrupted broad black bands.

*Periphallic organs* (Fig. 2): Epandrium dark brown, broad, truncate below, with upper portion bare and lower portion with about 28 long setae. Surstylus quadrate, distal margin broad, with ten pointed teeth on entire margin, and a few fine setae on either side of the teeth. Cerci oblong, yellowish brown, separated from genital arch and with 25 long setae.

*Phallic organs* (Fig. 1): Aedeagus yellowish orange, short and basally with two apically pointed curved processes. Basal apodeme of aedeagus twice as long as aedeagus. Anterior gonopophyses brown, elongate, basally contiguous with aedeagus and with a row of 7-8 sensilla along outer margin. Posterior gonopophyses yellowish brown, large and fused together giving an arch-like appearance. Caudal margin of hypandrium without submedian spines. Ventral fragma weakly quadrate.

*Egg-guides* (Fig. 4): Lobe yellowish brown, narrowing distally, with 26 small marginal and 2 discal black teeth. Basal isthmus broad and short.

**Holotype** ♂, INDIA: WEST BENGAL, Rimbick, Darjeeling district, September 1979 (Gupta and Singh). **Paratypes**: 1 ♂, 1 ♀ same locality and collectors as holotype. Deposited in Museum of Department of Zoology, Banaras Hindu University, Varanasi.

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*Relationships*: *D. paralongifera* a member of the subgenus *Drosophila* appears to be an unique species in having elongate anterior gonopophyses with a row of 7-8 sensilla along outer margin, posterior gonopophyses large and fused together giving an arch like appearance, surstylus quadrate, with ten pointed teeth on entire margin and its unusually long egg-guide. It superficially resembles *D. trizonata*

Okada (member of the *bizonata* species group) in having fused posterior gonopophyses, but differs remarkably in several other important taxonomic characters.

*Distribution*: India.

2. *Drosophila (Drosophila) neomakinovi* sp. nov.

Body length: 2.85 mm (♂); 3.02 mm (♀).

*Head*, ♂ and ♀: Arista with 3-4 minute branches above and 1 below in addition to terminal fork. Antennae with second segment dark brown; third segment pale brown. Frons tanish brown, ocellar triangle brownish black. Orbitals in ratio 5:3:7. Vibrissa well developed large and stout; second oral not differentiated. Palpi orange, with one prominent apical and one marginal setae. Carina yellowish brown, narrow and high. Face and cheek yellowish brown, greatest width of cheek 1/5 greatest diameter of eye. Postvertical long. Ocellars long inserted well outside ocellar triangle. Clypeus brown. Eyes dark red.

*Thorax*, ♂ and ♀: Acrostichal hairs regular, in six rows between dorsocentrals. Anterior scutellars convergent; posterior scutellars crossed. Distance between anterior and posterior dorsocentrals half distance between anterior pairs. Mesonotum and scutellum unicolorous, shiny yellow to yellowish brown. Thoracic pleura yellow. Sterno-index about 0.7.

*Legs* pale yellow, preapicals on all three tibiae; apicals on first and second tibiae.

*Wings* ♂ and ♀ (Fig. 8): Hyaline. Length 2.16 mm. Approximate indices: C-index 2.97; 4V-index 1.54; 4C-index 0.76; 5X-index 1.59. Two subequal setae at the apex of first costal section; heavy setae on

about basal 2/5 of third costal section. Halteres whitish yellow.

*Abdomen* ♂ and ♀: Abdominal tergite shiny yellow, with medially interrupted and laterally projected apical black bands.

*Periphallic organs* (Fig. 5): Epandrium brownish black, pubescent, broadened dorsally and narrowly projected below, upper portion with 8 long setae; lower portion with about 35 similar setae. Surstylus brown, large, apically divided into two, lower part with 11-13 stout, black teeth and 10-12 thick setae; upper part smaller, with 5-6 thick and pointed teeth. Cerci brown, oval, pubescent, with 32 setae and 28 pointed short teeth ventrally.

*Phallic organs* (Fig. 6): Aedeagus pale yellow, rod shaped, apically with lateral processes. Basal apodeme of aedeagus nearly equal. Anterior gonopophyses small, conical, each with two apical minute sensilla. Posterior gonopophyses obscure. Caudal margin of the hypandrium with a pair of small submedian spines. Ventral fragma quadrate.

*Egg-guides* (Fig. 7): Lobe yellowish brown, apically narrowly rounded, with 13 marginal and 4 discal teeth. Basal isthmus long and narrow.

**Holotype** ♂, INDIA: WEST BENGAL, Rimbick, Darjeeling district, September 1979 (Gupta and Singh). **Paratypes**: 1 ♂, 3 ♀♀, same locality and collectors as holotype. Deposited in the Department of Zoology, Banaras Hindu University, Varanasi, India, and Department of Biology, Tokyo Metropolitan University, Tokyo, Japan. 17 24625

*Relationships*: The characteristic features of its periphallic organs suggests its

inclusion in the *melanderi* species group. Where it closely resembles *D. makinoi* Okada in having identical pattern of periphallic and phallic organs, but distinctly differs from it in having 11-13 stout black teeth on lower part of surstylus (numerous recurved setae in *makinoi*), cerci with about 28 thick pointed teeth ventrally (20 short but strong setae in *makinoi*), and in many other taxonomical characters. However, *D. neomakinoi* also resembles slightly *D. cameraria* Haliday (= *pallida* Zetterstedt) superficially, but it differs drastically from it in male genitalia. The other members of the *melanderi* group, *D. melanderi* Sturtevant, *D. magnafumosa* Stalker and Spencer and *D. ordinaria* Coquillet have no significant resemblance with *D. neomakinoi*.

*Distribution*: India.

### 3. *Drosophila* (*Drosophila*) *pentastrata* Okada

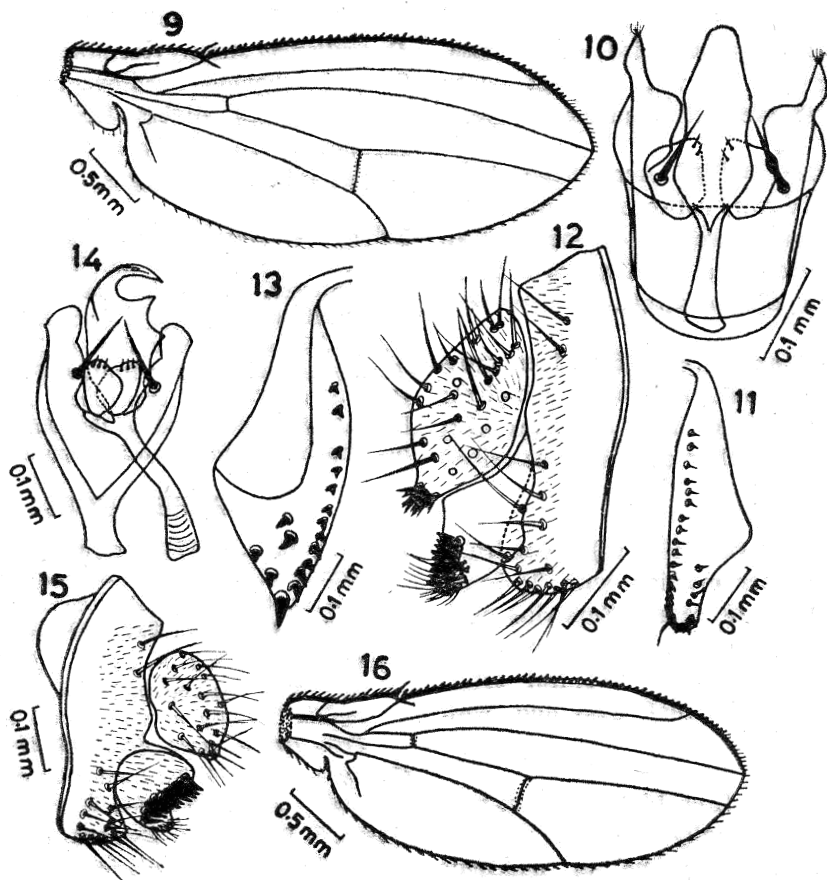
*D. pentastrata* Okada, 1966, Bull. Brit. Mus. (Nat. Hist.) Ent. Suppl. 6: 109.

*Head*, ♂ and ♀: Palpi yellowish brown, with one prominent apical and one marginal setae. Orbitals in ratio 7:3:11.

*Thorax*, ♂ and ♀: Acrostichal hairs regular, in six rows between dorsocentrals. Scutellum reddish yellow, with two longitudinal dark brown stripes.

*Wings*, ♂ and ♀: (Fig. 9): Clear posterior cross-vein mildly fuscous. Approximate indices: C-index 3.44; 4V-index 1.56; 4C-index 0.61; 5X-index 1.15. Other details as described by Okada (1966).

*Periphallic organs* (Fig. 12): Epandrium yellowish brown, pubescent, narrow, slightly swollen below, upper portion with 2 long setae; lower portion with 15 similar setae. Surstylus large, with 9-10 stout teeth and several ventral setae. Cerci



Figs. 9–12: *Drosophila pentastrata*: 9—male wing; 10—phallic organs; 11—egg-guide; 12—periphallalic organs. Figs. 13–16: *Drosophila acutissima*: 13—egg-guide; 14—phallic organs; 15—periphallalic organs; 16—male wing.

large, pubescent, with about 25 long setae, and a tuft of few small black setae ventrally.

*Phallic organs* (Fig. 10): Posterior gonopophyses obscure. Caudal margin of hypandrium with a pair of long spines. Ventral fragma quadrate. Other details as described by Okada (1966).

*Egg-guides* (Fig. 11): Lobe yellowish brown, medially swollen, apically narrow and rounded, with 21 marginal and 4 discal teeth. Basal isthmus short and narrow.

**Specimens examined:** India: West Bengal, Rimbick, Darjeeling district 3 ♂♂, 4 ♀♀, September 1979.

*Distribution:* Nepal and India (new record).

#### 4. *Drosophila* (*Drosophila*) *acutissima* Okada

*Drosophila acutissima* Okada, 1956, Syst. Study Dros. Japan: 139.

*Head*, ♂ and ♀: Arista with 4 branches above and 2 below in addition to terminal

fork. Orbitals in ratio 7:3:11. Second oral thin about one third of vibrissa. Cheek yellowish brown, greatest width of cheek  $1/5$  greatest diameter of eye.

*Thorax*, ♂ and ♀: Acrostichal hairs regular, in six rows between dorsocentrals. Distance from anterior dorsocentral to posterior dorsocentral  $3/7$  distance between two anterior dorsocentrals.

*Wings*, ♂ and ♀ (Fig. 16): Clear, cross veins mildly fuscous. Approximate indices: C-index 3.5; 4V-index 1.88; 4C-index 0.72; 5X-index 2.11. Other details as described by Okada (1956).

*Periphallidic organs* (Fig. 15): Epandrium pubescent, upper portion with 2; lower portion with 16-18 setae. Surstylus oval, apical margin concave, with a row of 10 pointed teeth, and a few ventral setae. Cerci brown, somewhat oval and with 16 setae.

*Phallic organs* (Fig. 14): Aedeagus pale brown, medioventrally swollen, apically hooked. Basal apodeme of aedeagus slightly longer than aedeagus. Anterior gonopophyses oval, with 2-3 minute apical sensilla. Posterior gonopophyses obscure. Caudal margin of hypandrium with a pair of submedian spines. Ventral fragma dark brown, Y-shaped, marginally black.

*Egg-guides* (Fig. 13): Lobe orange brown, medially broad, apically conical, with 15 marginal and 2 discal teeth, apical tooth largest. Basal isthmus narrow and long.

**Specimens examined:** India: West Bengal, Rimbick, Darjeeling disirict. 4 ♂♂; 11 ♀♀ September 1979.

*Distribution:* Japan, Nepal and India (new record).

**Remarks:** The Indian strain of *D. acutissima* strictly resembles the Nepalese form in having medioventrally swollen aedeagus, but differs from the original Japanese form in not having distinct lateral lobe of aedeagus.

*Acknowledgements:*—The authors wish to express their sincere gratitude to Dr. T. OKADA, Emeritus Professor, Department of Biology, Tokyo Metropolitan University, Tokyo, Japan for extending his help in confirming the identifications. Thanks are also due to Prof. J. P. THAPLIYAL, Head of the Zoology Department for providing laboratory facilities and to the University Grants Commission for financial support.

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