

Two new species of *Drosophila* FALLEN 1823 associated with flowers in Sikkim, India

(Insecta: Diptera: Drosophilidae).

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With 8 figures.

Abstract: Described are *Drosophila ovilongata* n. sp. and *D. sikkimensis* n. sp., belonging to the subgenus *Drosophila* associated with flowers in Sikkim, India; the extreme elongation of ovipositors in these species appears to be an adaptation for placing the eggs deep inside flowers.

Besides usual larval food sources such as garbage, fermenting fruits, fungi and bleeding trees, living flowers also serve as an important food source for several species of *Drosophila* FALLEN 1823 (PIPKIN et al. 1966; OKADA 1975; CARSON & OKADA 1980; OKADA & CARSON 1980, 1982a, b). The present paper deals with the description of two new species of *Drosophila* associated with flowers belonging to the family Leguminosae in Sikkim, India.

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Drosophila (Drosophila) ovilongata n. sp.

Figs. 1-4.

Holotype: ♂ (Accession No. GS-101), Gangtok, Sikkim, India, XI.1988, GUPTA & GUPTA leg.

Paratypes: 3 ♀♀ (SMF D 3449), 3 ♂♂ ♀♀ (Genetics Laboratory, Varanasi), 1 ♂ 2 ♀♀ (*Drosophila*-Collection, Dept. Biology, Tokyo Metropolitan University); all same data as holotype.

Remaining alcoholic preserved specimens of the paratype series bearing Accession No. GS-102 along with the mounted slides of genitalia and other taxonomic structures are at present deposited in the Genetics Laboratory, Dept. of Zoology, Banaras Hindu University, Varanasi.

Diagnosis: Unusually long ovipositor, wing with a clear light spot at the apex of submarginal cell.

Description: Head (σ ♀): Arista with 2 dorsal and 1 ventral branches besides a small terminal fork. Antennae with 2. and 3. segments pale brown. Frons including ocellar triangle dark brown, little lighter anteriorly. Ocellars long. Orbitals in ratio of 7:3:6; anterior reclinate orbital equidistantly placed. Vibrissa single, long and strong, second oral not differentiated. Palpi pale yellow, with one stout apical seta and few marginal setae. Carina brown and low. Face and cheek brown; greatest width of cheek $\frac{1}{5}$ the greatest diameter of eye. Clypeus dark brown. Eyes dark red.

Thorax (σ ♀): Acrostichal hairs in 8 regular rows between dorsocentrals. Anterior scutellars nearly divergent; posterior scutellars crossing each other. Distance between anterior and posterior dorsocentrals $\frac{1}{3}$ the distance between two anterior dorsocentrals. Mesonotum shining brown to black, scutellum little lighter. Humeral lobes lighter, with two equal bristles. Thoracic pleura brown, with yellow patches. All three sternopleural bristles well developed. Sterno-index 0.6.

Wings (σ ♀): Dark, with a clear light spot at the apex of submarginal cell (Fig. 4). Approximate indices: C-index 3.1; 4 V-index 1.56; 4 C-index 0.7; 5 X-index 1.33. Two equal bristles at the apex of the first costal section; heavy bristles on about basal $\frac{1}{4}$ of third costal section. Wing length 2.86 mm. Halteres whitish yellow.

Legs (σ ♀): Pale yellow, with last tarsal segment of all legs black. Preapicals on all three tibiae; apicals on first and second tibiae.

Abdomen (σ ♀): Shiny yellow, 1 T completely yellow, 2 and 3 T with broad dark brown bands widely interrupted medianly, 4 T with a narrowly interrupted band, 5 T with a complete broad band and 6 T completely brown.

Average length of body: σ 2.32 mm; ♀ 2.68 mm.

Periphallic organs (Fig. 2): Epandrium dark brown, broadened below, with numerous large and fine bristles scattered in the middle and lower portion. Surstylus rectangular, with 9 long and pointed teeth on distal margin. Cerci yellowish brown, oblong, separated from epandrium and with about 27 bristles.

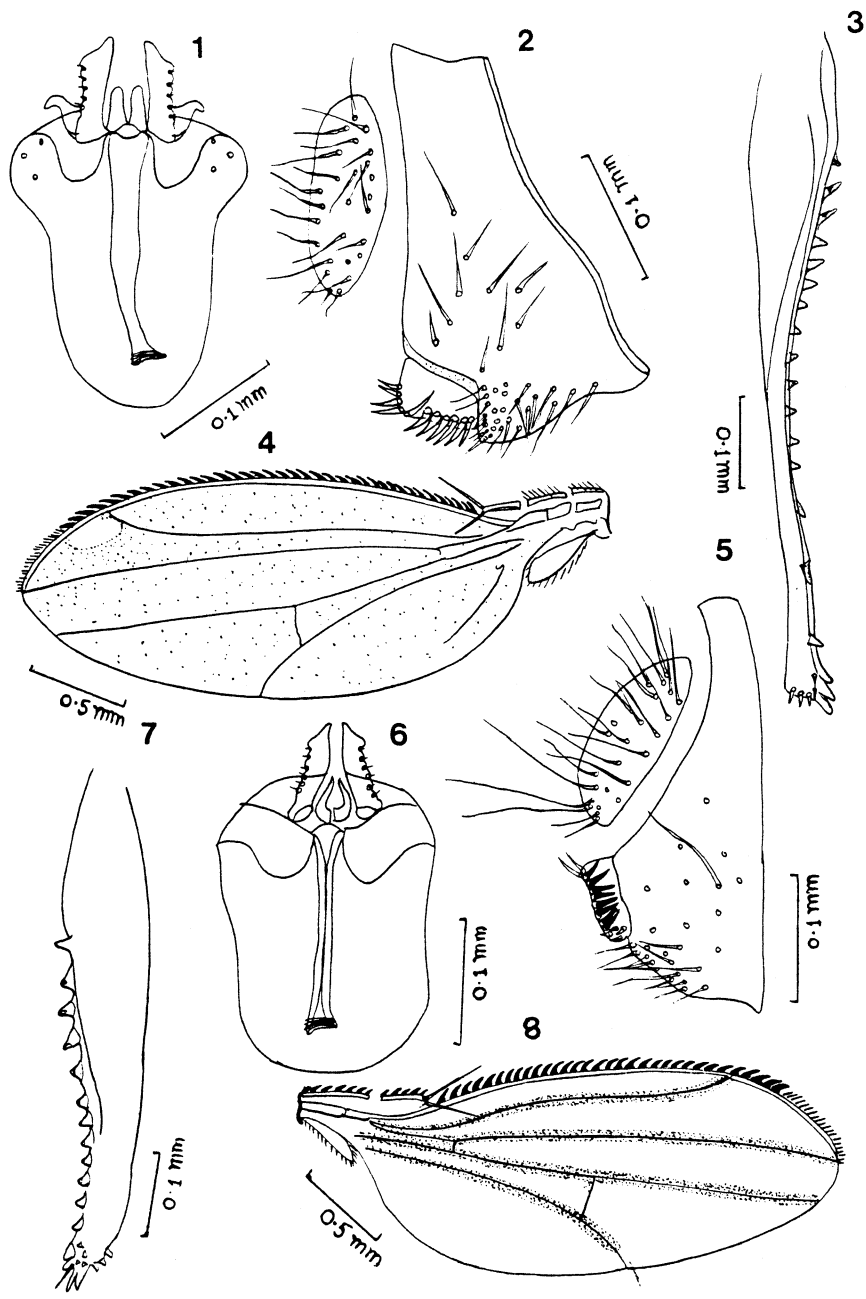
Phallic organs (Fig. 1): Aedeagus yellowish orange, bifid and small, basal apodeme of aedeagus very large. Anterior gonapophysis brown, elongate, with a row of 5 sensilla. Ventral fragma longer than broad.

Egg-guide (Fig. 3): Lobe yellowish brown, unusually long, narrowing distally and with 19 marginal teeth, distal ones more strong.

Remarks: This species somewhat resembles *D. paralongifera* GUPTA & SINGH 1981 in general morphology, but clearly differs from it in having unusually long ovipositor and wing with a clear light spot at the apex of submarginal cell.

Figs. 1-4. *Drosophila ovilongata* n. sp. — 1) Phallic organs; 2) periphallic organs; 3) egg-guide; 4) σ wing.

Figs. 5-8. *Drosophila sikkimensis* n. sp. — 5)Periphallic organs; 6) phallic organs; 7) egg-guide; 8) σ wing.



Drosophila (Drosophila) sikkimensis n. sp.

Figs. 5-8.

Holotype: ♂ (Accession No. GS-103), Gangtok, Sikkim, India, XI.1988, GUPTA & GUPTA leg.

Paratypes: 2♂♂ 2♀♀ (SMF D 3450), 4♂♂ 11♀♀ (Genetics Laboratory, Varanasi), 1♂ 1♀ (*Drosophila*-Collection, Dept. Biology, Tokyo Metropolitan University); all same data as holotype.

Remaining alcoholic preserved specimens of the paratype series bearing Accession No. GS-104 along with the mounted slides of genitalia and other taxonomic structures are at present deposited in the Genetics Laboratory, Dept. of Zoology, Banaras Hindu University, Varanasi.

Diagnosis: Longitudinal veins of the wings with dark covering along their entire length.

Description: Head (♂ ♀): Arista with 2 dorsal and no ventral branches besides a small terminal fork. Antennae with 2. and 3. segments pale brown. Frons including ocellar triangle dark brown. Orbitals in ratio of 9:5:8; anterior reclinate orbital little closer to proclinate. Vibrissa single, large and strong; second oral not differentiated. Palpi pale yellow, with one large apical seta. Carina pale brown and low. Face and cheek pale brown; greatest width of cheek $\frac{1}{8}$ greatest diameter of eye. Clypeus brown. Eyes dark red.

Thorax (♂ ♀): Acrostichal hairs in 8 regular rows between dorsocentrals. Anterior scutellars divergent; posterior ones crossing each other. Distance between anterior and posterior dorsocentrals $\frac{1}{3}$ the distance between two anterior dorsocentrals. Mesonotum pale brown to shining dark brown, with a obscure light brown longitudinal stripe. Scutellum brown. Thoracic pleura pale yellow. Humeral 2, equal. All three sternopleural bristles well developed. Sterno-index 0.75.

Wings (♂ ♀): Clear, all longitudinal veins with dark covering along their entire length (Fig. 8). Approximate indices: C-index 2.64, 4V-index 1.7; 4C-index 0.85; 5X-index 1.66. Two equal bristles at the apex of first costal section; heavy bristles on about basal $\frac{1}{4}$ of third costal section. Halteres yellowish white.

Legs (♂ ♀): Pale yellow, with last tarsal segment of all legs brown. Preapicals on all three tibiae; apicals on first and second tibiae.

Abdomen (♂ ♀): Shining yellow, with light brown bands; 2 and 3 T with medianly interrupted bands, while 4 and 5 T with complete bands and 6 T completely yellow.

Average length of body: ♂ 2.35 mm; ♀ 2.76 mm.

Periphallalic organs (Fig. 5): Epandrium dark brown, apically narrowing and broadened below, with about 12 long bristles and several fine setae scattered on lower portion. Surstylus small and rectangular, with 8-9 pointed teeth and few small setae. Cerci yellowish brown, oblong, separated from epandrium and with about 25 long bristles.

Phallic organs (Fig. 6): Aedeagus yellowish orange, small and bifid, basal apodeme of aedeagus much longer than aedeagus. Anterior gonapophysis brown, basally contiguous with aedeagus and with a row of 6-7 sensilla arranged along outer margin. Ventral fragma quadrate.

Egg-guide (Fig. 7): Lobe yellowish brown, long, with 16 stout marginal teeth.

Remarks: This species closely resembles the foregoing *D. ovilongata* n. sp. in general morphology as well as in the details of ♂ genital structures, but distinctly differs from it in having all longitudinal veins with a dark covering along their entire length and the egg-guide being relatively more broad and short.

Comments: The drosophilid species show a wide adaptability in their habitats, resulting into various types of structural modifications. Among flower associated species, structural adaptations like rudimentary arista branches, absence of egg filaments, coloration of imagines and the shape of ovipositor have been noticed (PIPKIN et al. 1966; OKADA & CARSON 1980, 1982a, b).

The situation encountered in the present species also represent the adaptive response to their specialised ecological niche, resembling very much to that of *D. xiphiphora* (PIPKIN et al. 1966) where an extreme elongation of ovipositor is believed as an adaption for placing the eggs deep inside flowers.

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