

## Studies on the Indian fauna of Drosophilidae

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**Abstract.** Taxonomic account of three species representing three different genera of the family Drosophilidae is presented. Two of them, *Leucophenga rimbickana* and *Nesiodrosophila pleurostriata* are described as new, while *Stegana shirozui* Okada is recorded for the first time from India. A list of Indian species of Drosophilidae excluding the genus *Drosophila* is also given.

**Keywords.** Drosophilidae; *Leucophenga rimbickana*; *Nesiodrosophila pleurostriata*; *Stegana shirozui*.

### 1. Introduction

In recent years, studies on the systematics of Indian Drosophilidae have accumulated large data on *Drosophila* species, but our knowledge regarding allied genera of Drosophilidae is very meagre. However, a few papers have been published on this subject to date, comprising altogether 38 species representing 17 genera of the family Drosophilidae excluding the genus *Drosophila* (Malloch 1924; Parshad and Duggal 1965; Gupta 1970, 1974; Jha *et al* 1971; Reddy and Krishnamurthy 1971, 1973-74; Godbole and Vaidya 1972, 1973; Bächli 1973; Vaidya and Godbole 1973, 1976; Singh and Gupta 1974; Sajjan and Krishnamurthy 1975; Singh 1976; Dwivedi and Gupta 1979; Dwivedi *et al* 1979).

In the present paper a list of Indian Drosophilidae (excluding members of the genus *Drosophila*) in addition to the description of two new and one known species is given (see Table 1).

### 2. Taxonomic descriptions

#### 2.1. Genus *Leucophenga* Mik.

*Leucophenga* Mik 1886; Wiener Ent. Zeitung 5: 317. Type-species: *Drosophila maculata* Dufour, Europe; Duda 1924, Arch. Naturgesch A, 90 (3): 185.

Table 1. List of Indian Drosophilidae (Excluding *Drosophila* species).

- Amiota* Loew  
*shillongensis* Singh and Gupta, 1979
- Cacoxenus* Loew  
*punctatus* Duda, 1924, Syn. of *Gitonides perspicax* Knab, 1914. Ref. Mac Alpine, 1968, Canad. Ent., 100 (5) : 514
- Chymomyza* Czerny  
*vaidyai* Okada, 1976 : Nom. nov. for *Chymomyza pararufithorax* Vaidya and Godbole, 1973, DIS, 50 : 71.
- Curtonotum* Macquart  
*neoangustipennis* Dwivedi and Gupta, 1979
- Gitonides* Knab  
*perspicax* Knab, 1914
- Hypselothyrea* de Meijere  
*guttata* Duda, 1926  
*varanasiensis* Gupta, 1974
- Leucophenga* Mik  
*albicincta* (de Meijere, 1908)  
*flavicosta* Duda, 1926  
*guttiventris* (de Meijere, 1911)  
*interrupta* Duda, 1924  
*neoangusta* Vaidya and Godbole, 1976  
*rimbickana*, sp. nov.  
*shillongensis* Dwivedi and Gupta, 1979  
*subpollinosa* (de Meijere, 1914)
- Liодrosophila* Duda  
*angulata* Dwivedi and Gupta, 1979  
*okadai* Dwivedi and Gupta, 1979  
*Penispinosa* Dwivedi and Gupta, 1979  
*rufa* Okada, 1974
- Lissocephala* Malloch  
*metallescens* (de Meijere, 1914)  
*sabroskyi* Wheeler and Takada, 1964
- Microdrosophila* Malloch  
*purpurata* Okada, 1956
- Mycodrosophila* Oldenberg  
*gratiosa* (de Meijere, 1911)
- Nesiodrosophila* Wheeler and Takada  
*pleurostriata*, sp. nov.
- Paraleucophenga* Hendel  
*invicta* (Walker, 1857)
- Scaptomyza* Hardy  
*cristata* Singh, 1976  
*elmoi* Takada, 1970  
*graminum* (Fallen, 1823)  
*pallida* (Zetterstedt, 1847)  
*plumata* Singh, 1976

*Sinophthalmus* Coquillett Syn. of subgenus *Erima* Kerte'sz of genus *Amiota* Loew. Ref. Okada, 1971, Kontŷu 39 : 83.  
*creberii* Singh, 1976  
*pictus* Coquillett, 1904

*Stegana* Meigen

*shirozui* Okada, 1971 (New record)  
*subexcavata* Vaidya and Godbole, 1976

*Zaprionus* Coquillett

*indiana* Gupta, 1970  
*multistriata* Sturtevant, 1927  
*paravittiger* Godbole and Vaidya, 1972  
*striata* Nirmala Sajjan and Krishnamurthy, 1975

2.2. *Leucophenga rimbickana* sp. nov.

Head, ♂ and ♀ : Arista with 5 dorsal and 1 ventral branches in addition to small terminal fork. Antennae with second segment pale brown; third segment yellow. Frons yellowish brown, ocellar triangle black. Orbitals in ratio of 6:5:9, anterior reclinate orbital closer to proclinate. Vibrissa well-developed, second oral not differentiated. Palpi yellow, slender, with one apical and 3-4 ventral setae. Carina brownish, low and broad below. Face and cheek pale, greatest width of cheek one-tenth greatest diameter of eye. Clypeus dark brown. Eyes bright red.

Thorax, ♂ and ♀ : Acrostichal hairs in about ten irregular rows. Anterior scutellars parallel; posterior crossing each other. Anterior dorsocentral two-fifth the length of posterior dorsocentral; distance between anterior and posterior dorsocentral one-third of distance between two anterior dorsocentrals. Mesonotum tan, with a large brown patch above. Scutellum dark brown, apex yellow. Thoracic pleura yellow, with scattered black patches on sternopleura, hypopleura and pteropleura. Sterno-index about 0.75. Legs straw yellow, preapicals on all tibiae; apicals on mid and hind tibiae.

Abdomen, ♂ and ♀ : Abdominal tergites yellow with a pattern of dark areas (figure 5) : 1 T yellow; 2 T with one black spot on each side; 3 T entirely black; 4-5 Ts in ♀ with bands projected anteriorly at middle and each lateral side, while in ♂ only 5T; and the remainder in both sexes completely black.

Wings, ♂ and ♀ (figure 4) : Dusky.  $C_1$  bristles two, unequal;  $C_3$  bristles on basal about two-third of third costal section. Indices : C-index 2.86; 4V-index 1.85; 4C-index 0.98; 5X-index 1.44. Halteres yellow.

Average length of wing : 3.15 mm (♂); 3.4 mm (♀)

Average length of body : 3.04 mm (♂); 3.35 mm (♀).

Periphallic organs (figure 1) : Genital arch (Epandrium) yellowish orange, broad, pubescent, with elongated fragma proximally and broadly truncate below, with about 10 upper and 6 lower marginal bristles. Clasper (Surstylus) large, slightly longer than broad, with 25 fine setae and numerous microtrichia. Anal plate (Cerci) pubescent, elongate and narrowly extended ventrally, and with 22 large bristles.

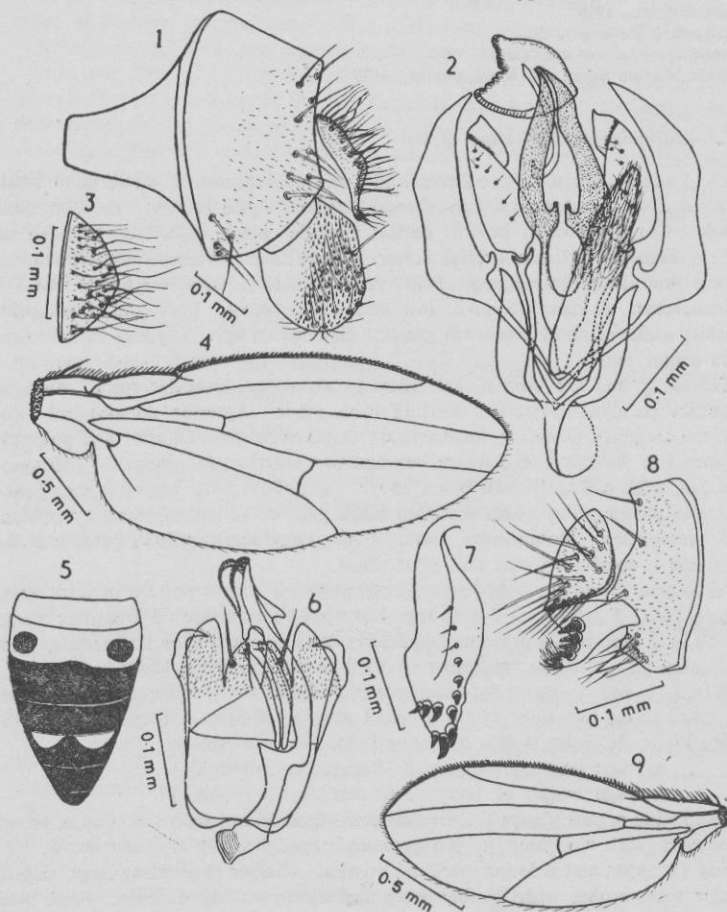
Phallic organs (figure 2) : Aedeagus black, elongate, bifid, with a short basal apodeme; ventral recurved process long, apically narrowing and hairy. Anterior

parameres (anterior gonopophyses) long and broad, with a longitudinal row of 7 sensilla at middle. Posterior parameres (posterior gonopophyses) fused to form a somewhat triangular lobe. Ventral fragma broad proximally.

Egg-guides (figure 3): Lobe pale yellow, completely fused, pubescent and with 4-5 long marginal bristles.

Holotype ♂, India : Rimbick, Darjeeling district, West Bengal, September 1979, Colls. Singh and Gupta.

Paratypes: 6 ♂♂, 5 ♀♀, Collection data same as holotype.



Figures 1-9. 1-5. *Leucophenga rimbickana* sp. nov. 1. Peripheral phallic organs. 2. Phallic organs. 3. Egg-guide. 4. Male wing. 5. Male abdomen. 6-9. *Nestiodrosophila pleurostriata* sp. nov. 6. Phallic organs. 7. Egg-guide. 8. Peripheral phallic organs. 9. Male wing.

All type specimens are at present deposited in the Museum, Department of Zoology, Banaras Hindu University, Varanasi, India. 1 ♂ and 2 ♀♀ from the paratype series are also deposited in the "*Drosophila* collection" of Department of Biology, Tokyo Metropolitan University, Setagaya-Ku, Tokyo, Japan.

*Relationships* : This species closely resembles *L. nigriceps* Okada in having similar number of arista branches, thoracic pleura with scattered black patches, anterior reclinate orbital closer to proclinate and also with one prominent oral bristle, but differs from it in having a different abdominal pattern, mid and hind knees yellow and the clasper with numerous fine setae.

*Distribution* : India.

### 2.3. Genus *Nesiodrosophila* Wheeler and Takada

*Nesiodrosophila wheeler* and Takada 1964, Ins. Micronesia 14 (6) : 238. Type species: *Nesiodrosophila lindae* Wheeler and Takada; Caroline Is. (Palau).

### 2.4. *Nesiodrosophila pleurostriata* sp. nov.

Head, ♂ and ♀: Arista with 3-4 dorsal and 1 ventral branches in addition to terminal fork. Antennae with second segment pale; third segment yellow. Frons including ocellar triangle tan. Orbitals in ratio of 5:3:6, anterior reclinate closer to proclinate than to posterior reclinate. Second oral thin, about two-fifth of vibrissa. Palpi dull tan, with one prominent apical seta. Carina tan and flat. Face and cheek pale, greatest width of cheek one-seventh greatest diameter of eye. Clypeus brown. Eyes dark red.

Thorax, ♂ and ♀: Acrostichal hairs in six regular rows above dorsocentrals. Anterior scutellars divergent; posterior ones crossing each other. Distance between anterior and posterior dorsocentral two-third of distance between two anterior dorsocentrals. Mesonotum pale yellow, scutellum little darker. Thoracic pleura yellow, with two dark brown longitudinal stripes, upper one broad. Sternite index about 0.4. Legs yellow, preapicals on all three tibiae; apicals on fore and mid tibiae.

Abdomen, ♂ and ♀: Abdominal tergites with broad dark brown apical bands.

Wings, ♂ and ♀ (figure 9): Clear.  $C_1$  bristles two;  $C_3$  bristles on basal half of third costal section. Indices: C-Index 2.14; 4V-index 2.53; 4C-index 1.32; 5X-index 3.34. Halteres yellow, upper surface of stalk brown.

Average length of wing: 1.72 mm (♂); 1.8 mm (♀)

Average length of body: 1.58 mm (♂); 1.79 mm (♀).

Periphallallic organs (figure 8): Genital arch (Epandrium) broad at middle, yellowish brown, pubescent, upper portion with 3 and lower with 9-10 bristles. Clasper (Surstylus) large, quadrate, apically little broad, with four stout large teeth and several small ventral setae. Anal plate (Cerci) triangular, orange brown, pubescent, and with about 20 bristles.

Phallic organs (figure 6): Aedeagus pale orange, rod shaped, curved, subapically somewhat swollen and apically with fine serrations. Basal apodeme half the length of aedeagus. Anterior parameres (anterior gonopophyses) narrow and elongate, pale yellow, each with two minute sensilla apically. Hypandrium has a pair of long conical processes with a pair of large submedian spines. Ventral fragma nearly quadrate.

Egg-guides (figure 7): Lobe somewhat fusiform, yellowish brown, with about 10 marginal and 3 discal stout black teeth. Penultimate marginal tooth largest. Basal isthmus narrow and short.

Holotype ♂, India: Rimbick, Darjeeling District, West Bengal, September 1979, Colls. Singh and Gupta.

Paratypes : 3 ♂♂, 8 ♀♀, collection data same as holotype.

All type specimens are at present deposited in the Museum, Department of Zoology, Banaras Hindu University, Varanasi, India. 1 ♂ and 2 ♀♀ from the paratype series are also deposited in the "Drosophila collection" of the Department of Biology, Tokyo Metropolitan University, Setagaya-Ku, Tokyo, Japan.

Relationships: This species superficially resembles *Nesiodrosophila raridentata* Okada and Chung (= *Drosophila raridentata* Okada and Chung, 1960 as cited by Takada, Beppu and Toda 1979) but distinctly differs from it in having no process corresponding to secondary clasper (secondary clasper present in *N. raridentata*), narrow and elongate anterior parameres with 2 apical sensilla (anterior parameres large, quadrate, with one apical and 2 basal sensilla in *N. raridentata*) and arista with 3-4 dorsal and 1 ventral branches (5 dorsal and 2 ventral branches in *N. raridentata*).

Distribution: India.

Note: This genus is recorded for the first time from India.

## 2.5. Genus *Stegana* Meigen

*Stegana* Meigen 1830, Syst. Beschreib. 5: 79. Type-species: *Drosophila curvipennis* Fallen, 1823; Europe.

## 2.6. Subgenus *Steganina* Wheeler

*Steganina* Wheeler 1960, Proc. Entomol. Soc. of Washington, 62: 110. Type-species: *Musca coleoprata* Scopoli, 1763; Europe.

## 2.7. *Stegana* (*Steganina*) *Shirozui* Okada

*Stegana shirozui* Okada, 1971, Mushi 45 (5): 84.

Head, ♂: Arista with 5-6 dorsal and 3 ventral branches in addition to terminal fork. Orbitals in ratio of 3:2:4. Palpi yellow, with 4 ventral setae. Cheek yellowish orange, greatest width of cheek one-sixth greatest diameter of eye.

Thorax, ♂: Prescutellars well developed, one additional pair of bristles on either side of prescutellars present. Distance between anterior and posterior dorsocentral one-third of distance between two anterior dorsocentrals. Mesonotum (figure 12) shiny dark brown, with incomplete longitudinal yellow stripes along dorsocentral lines.

Wings, ♂ (figure 13): Dark brown, paler towards caudal margin. Indices: C-index 2.22; 4V-index 1.5; 4C-index 0.88; 5X-index 1.57. Other details as described by Okada (1971).

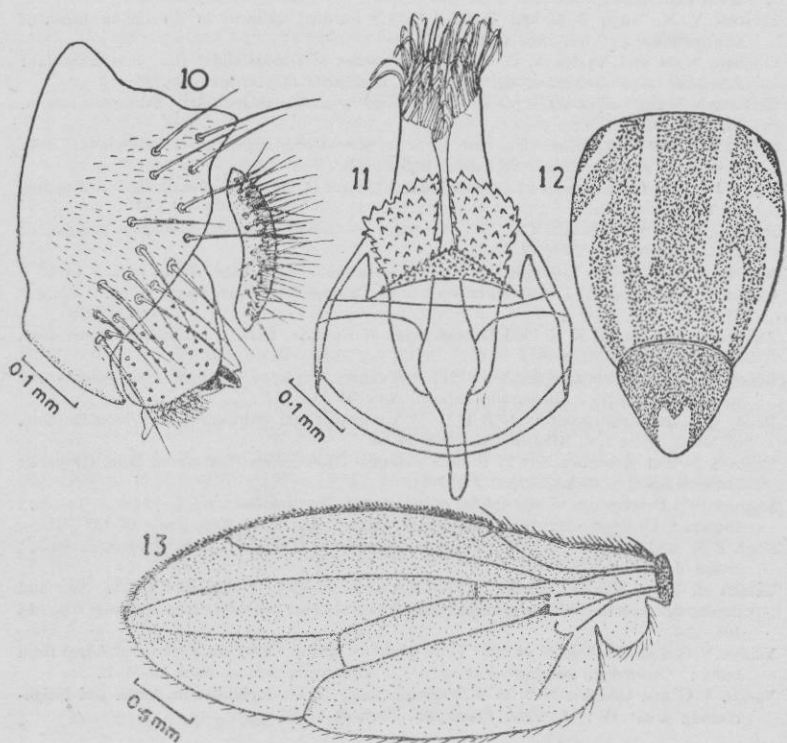
Periphallic organs (figure 10): Genital arch (Epandrium) dark brown, pubescent, dorsally broadened and narrowly projected ventrally, with 18 long bristles. Clasper (Surstylus) brown, quadrate, dorsally with numerous fine denticles, and with 2 black and 2 yellow teeth apically in addition to several fine ventral setae. Anal plate (Cerci) pale brown, elongate, with 32 bristles.

Phallic organs (figure 11): Aedeagus pale brown, straight, apically with hair crown, laterally with numerous conical projections. Basal apodeme of aedeagus short. Ventral fragma broadly rounded.

Specimens examined: 1 ♂, September 1979, Rimbick, Darjeeling district, West Bengal. Colls. Singh and Gupta.

Distribution: Taiwan and India (new record).

Remarks: The Indian strain of *Stegana shirozui* Okada slightly differs from its original form (Taiwan) in having arista with 5-6 dorsal and 3 ventral branches (6 dorsal and 4 ventral in Taiwanese form) and clasper with 2 black and 2 yellow instead of 3 black and 2 yellow in Taiwanese form. Other features strictly agree with those of the Taiwanese form.



Figures 10-13. *Stegana shirozui*. 10. Periphallallic organs. 11. Phallic organs. 12. Male thorax. 13. Male wing.

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