

## DROSOPHILIDAE OF GARHWAL REGION WITH THE DESCRIPTION OF ONE NEW SPECIES

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TWO TEXT-FIGURES

### ABSTRACT

A preliminary report on the eighteen species representing three genera of the Drosophilidae of Garhwal region is given. Of them, *Drosophila (Drosophila) paunii* is described as new species.

### INTRODUCTION

Although more than 150 species of Drosophilidae have been described and recorded so far from different parts of the Indian subcontinent (Gupta, 1981, 1985; Gupta and Panigrahy, 1987), a vast area of great ecological interest awaits exploration. Kumaun and Garhwal are included in Uttarakhand region and contains eight border districts of the Uttar Pradesh State. Kumaun includes three districts *viz.*, Nainital, Almora and Pithoragarh; while Garhwal includes five districts *viz.*, Dehra Dun, Tehri Garhwal, Uttarkashi, Pauri Garhwal and Chamoli. Both these regions are completely unknown for their Drosophilid fauna. A preliminary report on the Drosophilidae of Kumaun region has recently been published (Singh and Bhatt, 1988). This paper embodies the results of Drosophilid surveys of Garhwal region located at an elevation of 5,000 feet and characterized by evergreen forest.

### MATERIAL AND METHODS

Collection of drosophilid flies was undertaken during different seasons from July 1983 to July 1986. The flies were collected at several collecting stations in Garhwal region (Text-fig. 1). Several different methods were employed to collect Drosophilidae like (i) sweeping through undergrowth or above debris on the forest floor; (ii) sweeping above rotting native fruits and artificially yeasted fruits baits; and (iii) from fungi growing on decaying logs. The collected flies were etherised, categorised and species were identified. The individual females that could not be identified were isolated and allowed to breed in separate vials containing standard laboratory food medium. The progeny obtained from such single gravid females were used for species identification. The camera lucida drawings of the taxonomic characters of new species were made.

## TAXONOMIC ACCOUNT

Genus *Drosophila* Fallén

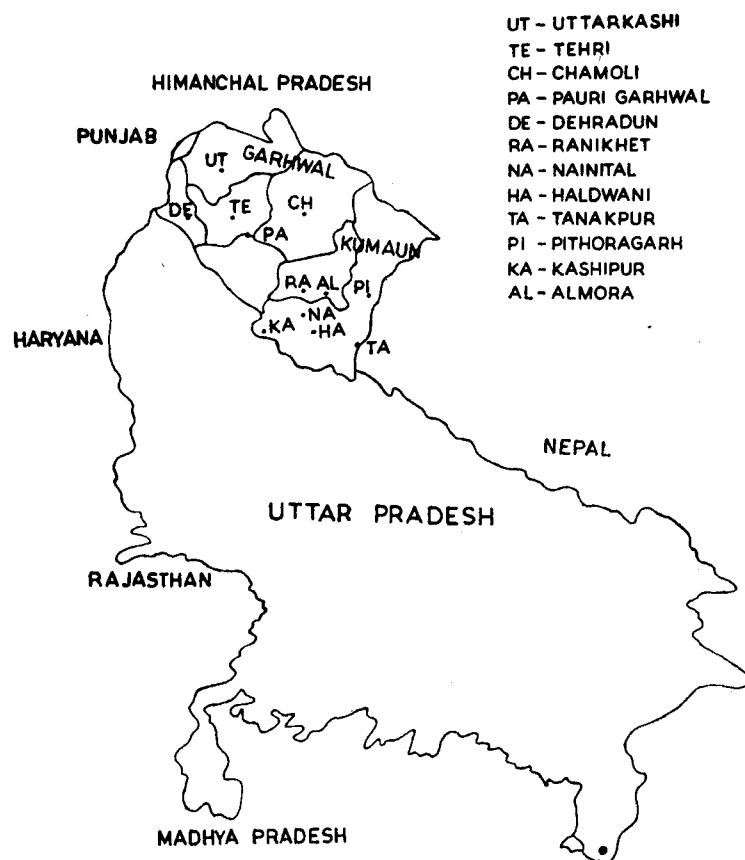
*Drosophila* Fallén 1823, *Diptera Sveciae Geomyzides*, **2** : 4.

Type species : *Musca funebris*; Sweden.

Subgenus *Sophophora* Sturtevant

*Sophophora* Sturtevant 1939, *Proc. natl. Acad. Sci.*, **25** : 139.

Type species : *Drosophila melanogaster* Meigen 1830; Austria and Germany



TEXT-FIGURE 1. Map of Garhwal region showing collection localities.

1. *Drosophila bifasciata* Pomini

*Drosophila bifasciata* Pomini 1940, *Boll. Ent. R. Univ. Bologna*, **12** : 155. Type locality : Italy.

Specimens examined : 80 ♂, 67 ♀; INDIA : Uttar Pradesh : Chamoli district, Chamoli, 4. vii. 1985: 100 ♂, 92 ♀, Dehra Dun district, Dehra Dun, 15. viii. 1983, Coll. Singh and Negi.

Distribution : Taiwan, Japan, India, Nepal, Borneo, Thailand, Philippines, New Guinea, Micronesia, Fiji, Samoa and Sumatra.

2. *Drosophila jambulina* Parshad and Paika

*Drosophila jambulina* Parshad and Paika 1964, *Res. Bull. Punjab Univ.*, **15** : 240.

Type locality : Chandigarh and Malerkotla, India.

Specimens examined : 150 ♂, 110 ♀ : INDIA : Uttar Pradesh : Pauri district, Pauri, 10. vii. 1984; 50 ♂, 48 ♀, Uttarkashi district, Uttarkashi, 18. viii. 1985, Coll. Singh and Negi.

Distribution: Cambodia, Formosa, Hong Kong, Japan and India.

3. *Drosophila kikkawai* Burla

*Drosophila kikkawai* Burla 1954, *Rev. Brasil. Biol.*, **14** : 47. Type locality : Brazil.

Specimens examined : 75 ♂, 65 ♀; INDIA : Uttar Pradesh : Chamoli district, Chamoli, 22. vii. 1983; 80 ♂, 75 ♀, Tehri district, Tehri, 12. viii. 1985, Coll. Singh and Negi.

Distribution : Samoa, Japan, Hawaii, Fiji, Micronesia, Newguinea, China, South America, Nepal, Taiwan, Korea, India, Malaya, Thailand, Sumatra and Borneo.

4. *Drosophila melanogaster* Meigen

*Drosophila melanogaster* Meigen 1830, *Syst. Besch.*, **6** : 85.

Specimens examined : 95 ♂, 82 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 14. vii. 1986; 150 ♂, 130 ♀, Dehra Dun district, Dehra Dun, 20. viii. 1983, Coll. Singh and Negi.

Distribution : Cosmopolitan.

5. *Drosophila nepalensis* Okada

*Drosophila nepalensis* Okada 1955, *Flora and Fauna, Nepal Himalaya*, **1** : 388.

Type locality : Nepal.

Specimens examined : 120 ♂, 112 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 25. vii. 1984; 156 ♂, 140 ♀, Pauri district, Pauri, 5. viii. 1986, Coll. Singh and Negi.

Distribution : Nepal and India.

6. *Drosophila suzukii indicas* Parshad and Paika

*Drosophila suzukii indicas* Parshad and Paika 1964, *Res. Bull. Punjab Univ.*, **15** : 230. Type locality : Chandigarh and Manimajra, India.

Specimens examined : 50 ♂, 47 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 28. vii. 1983; 25 ♂, 15 ♀, Pauri district, Pauri, 16. viii. 1985, Coll. Singh and Negi.

Distribution : India.

7. *Drosophila takahashii* Sturtevant

*Drosophila takahashii* Sturtevant 1927, *Philipp. J. Sci.*, **32** : 371. Type locality : Taiwan.

*Specimens examined* : 115 ♂, 110 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 22. viii. 1985; 98 ♂, 85 ♀, Uttarkashi district, Uttarkashi, 15. vii. 1984, Coll. Singh and Negi.

*Distribution* : Taiwan, Japan, Korea, Manchuria, China, Nepal, Thailand, Borneo, Philippines and Micronesia.

Subgenus *Drosophila* Fallén, S. Str.

*Drosophila* Fallén 1823, *Diptera Sveciae Geomyzides*, **2** : 4. Type species : *Musca funebris* Fabricius, 1787 : 345.

8. *Drosophila immigrans* Sturtevant

*Drosophila immigrans* Sturtevant 1921, *Carnegie Inst. Wash. Publ.*, **301** : 83. Type locality : New York, U.S.A.

*Specimens examined* : 160 ♂, 150 ♀ : INDIA : Uttar Pradesh : Pauri district, Pauri, 12. vii. 1983; 200 ♂, 197 ♀, Tehri district, Tehri, 25. vii. 1985, Coll. Singh and Negi.

*Distribution* : Cosmopolitan.

9. *Drosophila lacertosa* Okada

*Drosophila lacertosa* Okada 1956, *Syst. study Drosophilidae Japan* : 158. Type locality : Iwate Pref., Japan.

*Specimens examined* : 160 ♂, 110 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 20. vii. 1984; 85 ♂, 75 ♀, Pauri district, Pauri, 25. vii. 1986, Coll. Singh and Negi.

*Distribution* : Korea, Nepal and India.

10. *Drosophila nasuta* Lamb

*Drosophila nasuta* Lamb 1914, *Trans. Linn. Soc. Lond.*, **16** : 346. Type locality : Seychelles, Formosa.

*Specimens examined* : 45 ♂, 42 ♀ : INDIA : Uttar Pradesh : Dehra Dun districts, Dehra Dun, 28. vii. 1984, Coll. Singh and Negi.

*Distribution* : Borneo, Sumatra, Seychelles, Formosa, Molluccas, New Guinea, Samoa, Fiji, Hawaii, Micronesia and India.

11. *Drosophila repleta* Wollaston

*Drosophila repleta* Wollaston 1858, *Ann. Mag. nat. Hist.*, **41** : 117. Type locality : Madeira, Africa.

*Specimens examined* : 25 ♂, 15 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 20. vii. 1983; 50 ♂, 45 ♀, Uttarkashi district, Uttarkashi, 15. viii. 1985, Coll. Singh and Negi.

*Distribution* : Cosmopolitan.

12. *Drosophila trizonata* Okada

*Drosophila trizonata* Okada 1966, *Bull. Br. Mus. nat. Hist. (Ent.) Suppl.*, **6** : 97.

Type locality : Above Sangu, Taplejung, Nepal.

*Specimens examined* : 15 ♂, 12 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 22. viii. 1985; 35 ♂, 29 ♀, Dehra Dun district, Dehra Dun, 15. vii. 1984, Coll. Singh and Negi.

*Distribution* : Nepal and India.

13. *Drosophila paunii* sp. nov. (Text-fig. 2A-E)

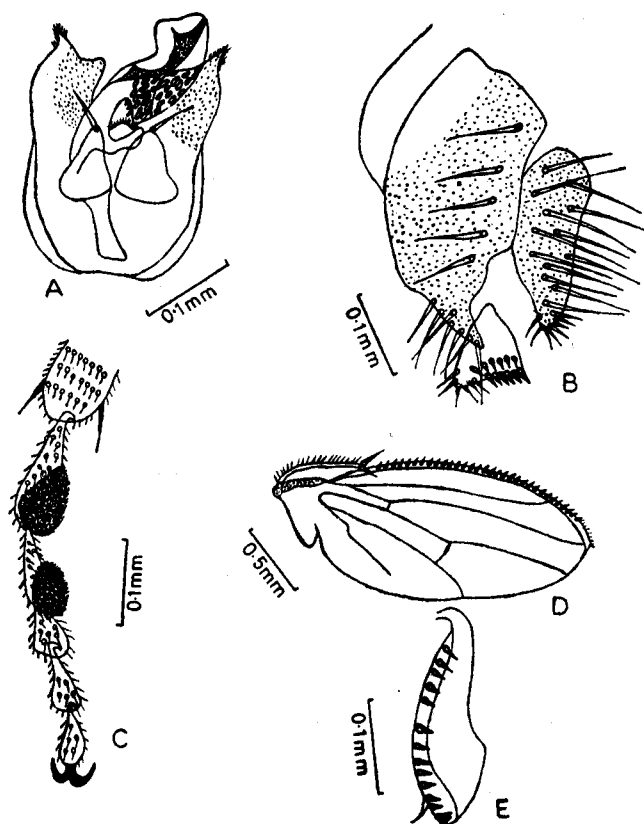
Male and female : Pale brown. Mean body-length, Males (n=4) 3.12 mm.; females (n=3) 3.32 mm.

*Head* : Arista with 3-4 dorsal and 2 ventral branches in addition to the terminal fork. Antennae with second segment brown; third segment little darker. Frons including ocellar triangle dark brown. Orbitals in the ratio of 7 : 3 : 9. Second oral bristle half the length of first oral bristle. Palpi brown, with one prominent apical seta. Carina light brown, greatest width of cheek one-fifth greatest diameter of eye. Eyes bright red.

*Thorax* : Achrostical hairs regular, in eight rows. Anterior scutellars convergent, posterior crossing each other. Anterior dorsocentral subequal to the posterior dorsocentral; distance between anterior and posterior dorsocentral  $\frac{2}{5}$  of the distance between anterior dorsocentrals. Mesonotum and scutellum dark brown. Humerals two, equal. Thoracic pleura brown. Sterno-index 0.68. Legs (Text-fig. 2C) yellowish brown, preapicals on all three tibiae. First and second tarsal segments of fore legs in male with a tuft of hairs on lower portion. Wings (Text-fig. 2D) : Clear. C1 bristles two unequal; C3 bristles on basal about two third of third costal section. Indices: C-index 4.00; 4V-index 1.8; 4C-index 0.76; 5X-index 1.16. Halteres shiny yellow. Length (holotype) : 2.86 mm.

*Abdomen* : Abdominal tergites shiny yellow, with thick dark brown apical bands, broadly interrupted in the middle. Periphallic organs (Text-fig. 2B) : Epandrium pubescent, broad dorsally, with about 14 marginal bristles. Surtylus broad, with 6 stout black teeth arranged on outer margin, 6 small black teeth placed little behind and about 6-8 short stout setae at lower tip. Cerci pubescent, elongate, with about 15-16 long bristles above and 10 small bristles at lower tip. Phallic organs (Text-fig. 2A) : Aedeagus short and stout, apical portion directed ventrad and covered with fine setae. Basal apodeme of aedeagus short, about half the length of aedeagus. Anterior gonapophyses large with one apical sensilla. Posterior gonapophyses obscure. Novasternum with a number of small setae. Ventral fragma somewhat triangular. Egg-guides (Text-fig. 2E) : Lobe yellowish, narrowing proximally and broadly rounded distally, with about 15 marginal teeth. Basal isthmus narrow.

*Holotype* ♂ : INDIA : Uttar Pradesh : Garhwal Hills : Chamoli district; Pauna, 15. vii. 1984, Coll. B. K. Singh and N. S. Negi. Deposited in the Depart-



TEXT-FIGURE 2. *Drosophila paunii* Singh and Negi **A**, Phallic organs; **B**, Periphallic organs; **C**, Male fore leg; **D**, Wing and **E**, Egg-guide.

ment of Zoology, Kumaun University, Nainital. *Paratypes* : 4 ♂ and 3 ♀, same data as holotype. In the Department of Zoology, Kumaun University, Nainital and Department of Biology, Tokyo Metropolitan University, Tokyo, Japan.

*Distribution* : Uttar Pradesh : Garhwal, Chamoli.

*Relationship* : This species belongs to the subgenus *Drosophila* and resembles *Drosophila setitarsa* Gupta and Dwivedi (1980) particularly in having both first and second tarsal segments of male fore legs with a tuft of hairs, but it distinctly differs from *setitarsa* in the details of male genital structures, having no clouded posterior cross vein and in the shape of egg-guide.

Subgenus *Dorsilopha* Sturtevant

*Dorsilopha* Sturtevant, 1942, *Univ. Texas Publ.*, 4213 : 28. Type species : *Drosophila busckii* Coquillett, U.S.A.

14. *Drosophila busckii* Coquillett

*Drosophila busckii* Coquillett 1901, *Ent. News*, 12 : 18. Type locality : U.S.A.

*Specimens examined* : 105 ♂, 95 ♀ : INDIA : Uttar Pradesh ; Chamoli district,

Chamoli, 15. vii. 1984; 77 ♂, 75 ♀, Uttarkashi district, Uttarkashi, 25. viii. 1985, Coll. Singh and Negi.

*Distribution* : Cosmopolitan.

Subgenus *Scaptodrosophila* Duda

*Scaptodrosophila* Duda, 1923, *Annl. hist. nat. Mus. hung.*, **20** : 37. Type species : *Scaptodrosophila scaptomyzoidea*, New Guinea.

15. *Drosophila coracina* Kikkawa and Peng

*Drosophila coracina* Kikkawa and Peng, 1938, *Jap. J. Zool.*, **7** : 523.

*Specimens examined* : 62 ♂, 59 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 16. vii. 1986; 45 ♂, 40 ♀, Tehri district, Tehri, 28. vii. 1983, Coll. Singh and Negi.

*Distribution* : India, China, Japan and Borneo.

16. *Drosophila chandrabhiana* Gupta and Ray-Chaudhuri

*Drosophila chandrabhiana* Gupta and Ray-Chaudhuri, 1970, *Proc. Roy. ent. Soc. Lond. (B)*, **39** : 62.

*Specimens examined* : 110 ♂, 95 ♀ : INDIA : Uttar Pradesh : Dehra Dun district, Dehra Dun, 15. vii. 1984, 65 ♂, 61 ♀, Pauri district, Pauri, 10. viii. 1985, Coll. Singh and Negi.

*Distribution* : India.

Genus *Leucophenga* Mik

*Leucophenga* Mik, 1886, *Wien. ent. Ztd.*, **5** : 317. Type species : *Drosophila maculata* Dufour, Europe.

17. *Leucophenga (Leucophenga) interrupta* Duda

*Leucophenga interrupta* Duda, 1924, *Arch. Naturgesch.*, **90A** : 187. Type locality : Formosa.

*Specimens examined* : 11 ♂, 8 ♀ : INDIA : Uttar Pradesh : Chamoli district, Chamoli, 20. vii. 1985, Coll. Singh and Negi.

*Distribution* : Ceylon, Formosa, Java, Nepal, Japan and India.

Genus *Zaprionus* Coquillett

*Zaprionus* Coquillett, 1902, *Proc. U.S. natn. Mus.*, **24** : 31. Type species : *Zaprionus vittizer* Coquillett, Rhodesia, South Africa.

18. *Zaprionus indiana* Gupta

*Zaprionus indiana* Gupta, 1970. *Proc. Indian Acad. Sci.*, **36** : 63. Type locality : Allahpur, Badaun district, Uttar Pradesh, India.

*Specimens examined* : 150 ♂, 125 ♀ : INDIA : Uttar Pradesh : Dehra Dun district, Dehra Dun, 14.vii.1983; 85 ♂, 81 ♀, Uttarkashi district, Uttarkashi, 25.vii.1985, Coll. Singh and Negi.

*Distribution* : India.

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