



To, Prof. T. Okada
with author's
best compliments
T. Gupta

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THE FAMILY DROSOPHILIDAE IN INDIA

By

J. P. Gupta

Genetics Laboratory, Department of Zoology, Banaras Hindu University,
Varanasi, India

Introduction

The flies of the family Drosophilidae still occupy a very important place among the organisms which are used as material in the studies of evolution, mutation, isolating mechanisms, comparative cytology and phylogeny etc. The fact that evolution is a gradual and continual process is perhaps nowhere better illustrated than in the genus *Drosophila*. Despite the prominent position which the members of Drosophilidae have long occupied in genetic investigations, however, studies with respect to the members of this family inhabiting India have been largely neglected.

Recent work on the systematics of Drosophilidae has accumulated large data on Indian species. However, a wide area of great ecological interest still awaits exploration. Unfortunately every paper so far published has dealt either with the description of one or more species and none provides a complete information regarding native Indian Drosophilids.

With this perspective in view an attempt has been made by the present author to provide a comprehensive review of the informations particularly regarding type locality and geographical distribution of the species so far described and recorded from India. It is believed that this will not only stimulate future workers but also facilitate those who are presently engaged in making use of native *Drosophila* species in the studies of population genetics, speciation and ecological genetics etc.

Historical Review Pertaining to the Studies of Drosophilidae in India

Studies on the systematics of *Drosophila* species in the subcontinent of India was made as early as in 1920. Bezzi (Sturtevant, 1921) was the first man in this field who reported *Drosophila repleta* from Calcutta. Brunetti (1923) for the first time described a new species, *D. prashadi* from

Calcutta, while in the same year Duda (1923) described *D. bipectinata* from Darjeeling. Malloch (1924) described one new species, *D. biarmipes* and recorded one more species, *Gitonides perspicax* from Coimbatore. Sturtevant (1927) studied four species, *D. melanogaster*, *D. ananassae*, *D. montium* and *D. tristipennis* collected from Nungambaukam, Madras. Ray-Chaudhuri and Mukherjee (1941) added two more new species, *D. emulata* and *D. brunettii* from Calcutta.

After lapse of about two decades workers showed their renewed interest in this field. Parshad and Paika (1964) reported eleven species belonging to the subgenus *Sophophora* of the genus *Drosophila* from Punjab, of which three were new species and a single new subspecies namely, *D. malerkotliana*, *D. punjabiensis*, *D. jambulina* and *D. suzukii indicus*, while others were *D. melanogaster*, *D. bifasciata*, *D. takahashii*, *D. nepalensis*, *D. ananassae*, *D. kikkawai* and *D. rufa*. Parshad and Duggal (1965, 1966) made a survey of three places, Srinagar, Pahalgam and Gulmarg of Kashmir Valley and collected twenty species of Drosophilidae, viz., *Scaptomyza pallida*, *S. graminum*, *D. busckii*, *D. sp. of helvetica*, *D. bifasciata*, *D. melanogaster*, *D. suzukii indicus*, *D. pulchrella*, *D. ananassae*, *D. kikkawai*, *D. rufa*, *D. jambulina*, *D. brachynephros*, *D. testacea*, *D. sp. of curviceps*, *D. immigrans*, *D. ebonata*, *D. epiobscura*, and *D. pentaspina*, of these latter three were new species.

Gupta (1968, 1969) under the able guidance of Prof. S. P. Ray-Chaudhuri conducted extensive survey of Drosophilid fauna of Eastern Uttar Pradesh and reported one new species, *D. raychaudhurii* from Chakia forest, Varanasi. Reddy and Krishnamurthy (1968) described a new species, *D. rajasekari* from Mysore. Rahman and Singh (1969) made a preliminary survey of Bhagalpur population of *Drosophila* and a total of nine species were recorded namely, *D. ananassae*, *D. bipectinata*, *D. busckii*, *D. kikkawai*, *D. melanogaster*, *D. malerkotliana*, *D. sp. of montium*, *D. immigrans* and *Chaetodrosophilella quadrilineata*.

Gupta and Ray-Chaudhuri (1970 a, b, c) and Gupta (1970, 1971) made numerous surveys of many wild and domestic localities including Andaman and Nicobar Islands. A total of twenty nine species of Drosophilidae were recorded, of which eight were new to science namely, *Zaprionus indiana*, *D. pentavittata*, *D. chandraprabhiana*, *D. silvalineata*, *D. paratriangulata*, *D. latifshahi*, *D. andamanensis* and *D. bambuphila*, while others were *Scatomyza pallida*, *Leucophenga albicincta*, *L. guttiventris*,

Cacoxenus punctatus, *D. melanogaster*, *D. ananassae*, *D. bipectinata*, *D. malerkotliana*, *D. kikkawai*, *D. seguyi*, *D. nepalensis*, *D. eugracilis*, *D. raychaudhurii*, *D. takahashii*, *D. immigrans*, *D. nasuta*, *D. lacertosa*, *D. trisetosa*, *D. busckii*, *D. ficusphila* and *D. bryani*.

Singh (1970) also made collections of *Drosophila* species at South Andamans and he recorded *D. eugracilis*, *D. bipectinata*, *D. malerkotliana*, *D. ananassae*, *D. truncata*, *D. nasuta* and a species of *Microdrosophila* from there. Besides these above species he also claimed to have collected three more new species, but no description of these supposedly new species has however been published so far. Reddy and Krishnamurthy (1970, 1971) concentrated their studies at Mysore and its adjoining areas particularly Nilgiris and Kodaikanal ranges. They recorded one species, *D. mysorensis* and twelve other species, viz., *Paraleucophenga invicta*, *D. takahashi*, *D. melanogaster*, *D. ananassae*, *D. malerkotliana*, *D. kikkawai*, *D. repleta*, *D. immigrans*, *D. busckii*, *D. sp.* like *hoozani* and two more new species, but no names were given to them.

Jha, Misra and Singh (1971) recorded seven species, *D. bipectinata*, *D. ananassae*, *D. melanogaster*, *D. kikkawai*, *D. busckii*, *D. malerkotliana* and *Chaetodrosophilella quadrilineata* in their preliminary survey at Darjeeling. Vaidya and Godbole (1971), Godbole and Vaidya (1972 a, b) exploited Poona and its neighbouring areas for *Drosophilid* fauna. They recorded *D. biarmipes* (= *rajasekari*), *D. takahashii*, *D. melanogaster*, *D. ananassae*, *D. malerkotliana*, *D. kikkawai*, *D. jambulina*, *D. nasuta*, *D. repleta*, *D. paratriangulata* and *Zaprionus paravitiger* from there and of which last one was a new species.

Nirmala Sajjan and Krishnamurthy (1972), Ranganath and Krishnamurthy (1972 a, b) and Siddaveere Gowda and Krishnamurthy (1972) made a thorough survey of Mysore and its adjoining localities for *Drosophila* population recording five new species namely, *D. neonasuta*, *D. chamundinsis*, *D. neotruncata*, *D. mundagensis* and *D. charmadensis*. Sympatric with these species were *D. malerkotliana*, *D. bipectinata*, *D. nasuta*, *D. jambulina*, *D. mysorensis*, *D. rajasekari*, *D. brindavani*, *D. varietas*, *D. nigra*, *D. immigrans*, *D. takahashii*, *D. eugracilis*, *D. pseudoananassae*, *D. anomelani*, *D. busckii* and *D. albomicans*. Singh (1972) examined six species of *Drosophila* from Assam which were *D. bipectinata*, *D. ananassae*, *D. malerkotliana*, *D. kikkawai*, *D. punjabiensis* and *D. immigrans*,

Recently Gupta (1972, 1973) had an opportunity to examine *Drosophila* species from Orissa and Manipur which revealed a single new species, *D. orissaensis* and thirteen other known species which were *D. malerkotliana*, *D. bipectinata*, *D. seguyi*, *D. ficusphila*, *D. eugracilis*, *D. nasuta*, *D. immigrans*, *D. busckii*, *D. kikkawai*, *D. nepalensis*, *D. takahashi*, *D. melanogaster* and *D. bambuphila*. Besides these above species Varanasi population had added one more new species, *Hypselothyrea varanasiensis* and two other species, *Leucophenga subpollinosa*, *Mycodrosophila gratiosa* to the list of Indian Drosophilids. The latter two are newly recorded from India (Gupta, Unpublished).

A list of species of Drosophilidae so far described and recorded from India

Genus *Chaetodrosophilella* Duda

1. *quadrilineata* (de Meijere, 1911)

Genus *Cacoxenus* Loew

2. *punctatus* Duda, 1924

Genus *Gitonides* Knab

3. *perspicax* Knab, 1914

Genus *Hypselothyrea* de Meijere

4. *varanasiensis* Gupta, Unpublished

Genus *Leucophenga* Mik

5. *albicincta* de Meijere, 1908
6. *guttiventris* (de Meijere, 1911)
7. *subpollinosa* (de Meijere, 1914)

Genus *Mycodrosophila* Oldenberg

8. *gratiosa* (de Meijere, 1911)

Genus *Paraleucophenga* Hendel

9. *invicta* (Walker, 1857)

Genus *Scaptomyza* Hardy

10. *graminum* Fallen, 1823
11. *pallida* (Zetterstedt, 1847)

Genus *Zaprionus* Coquillett

12. *indiana* Gupta, 1970
13. *paravittiger* Godbole and Vaidya, 1972

Genus *Drosophila* Fallen

14. *albomicans* Duda, 1924
15. *ananassae* Doleschall, 1858
16. *andamanensis* Gupta and Ray-Chaudhuri, 1970
17. *anomelani* Reddy and Krishnamurthy, 1973
18. *bambuphila* Gupta, 1971
19. *biarmipes* Malloch, 1924
20. *bifasciata* Pomini, 1940
21. *bipectinata* Duda, 1923
22. *brachynephros* Okada, 1956
23. *brindavani* Unpublished
24. *brunettii* Ray-Chaudhuri and Mukherjee, 1941
25. *bryani* Malloch, 1934
26. *busckii* Coquillett, 1901
27. *chandraprabhiana* Gupta and Ray-Chaudhuri, 1970
28. *chamundiensis* Unpublished
29. *charmadensis* Unpublished
30. *coonorensis* Reddy and Krishnamurthy, 1973
31. *curviceps* Okada and Kurokawa, 1957
32. *ebonata* Parshad and Duggal, 1966
33. *emulata* Ray-Chaudhuri and Mukherjee, 1941
34. *epiobscura* Parshad and Duggal, 1966
35. *eugracilis* Bock and Wheeler, 1972
36. *ficuspshila* Kikkawa and Peng, 1938
37. *helvetica* Burla, 1948
38. *hoozani* No record available *Puda 1923*
39. *immigrans* Sturtevant, 1921
40. *jambulina* Parshad and Paika, 1964
41. *kikkawai* Burla, 1954
42. *lacertosa* Okada, 1956
43. *malerkotliana* Parshad and Paika, 1964
44. *latifshahi* Gupta and Ray-Chaudhuri, 1970
45. *melanogaster* Meigen, 1830
46. *montium* de Meijere, 1916 *not Indian*

- 3 Only one sternopleural bristle present and post vertical bristles absent
 — — — — — *Hypselothyrea*.
- Normally three sternopleural bristles present and postvertical bristles
 also present — — — — — 4.
- 4 Arista bare or pubescent — — — — —
Gitonides.
- Arista plumose, with long branches — — — — — 5.
- 5 Two pairs of dorsocentral bristles usually present — — — — —
 — — — — — 6.
- More pairs of dorsocentral bristles usually present — — — — —
 — — — — — *Chaetodrosophilella*.
- 6 Acrostichal hairs in 2-4 rows. Body some what slender — — —
 — — — — — — *Scaptomyza*.
- Acrostichal hairs in more rows. Body not slender — — — 7.
- 7 All three orbitals strong. Posterior reclinate typically nearer to inner
 vertical than to proclinate — — — — — 8.
- All three orbitals not strong. Posterior reclinate nearer proclinate than
 to inner vertical — — — — —
 — — — — — *Drosophila*.
- 8 Third costal section without thorn-like spines — — — — —
 — — — — — *Leucophenga*.
- Third costal section without thorn-like spines — — — — —
 — — — — — *Paraleucophenga*.

Genus *Hypselothyrea* de Meijere

Hypselothyrea de Meijere, 1906. Ann. Mus. Nat. Hung. 4 : 193
 (type species : *Hypselothyrea dimidiata* de Meijere ; New Guinea).

***Hypselothyrea varanasiensis* Gupta**

H. varanasiensis Gupta (Unpublished) 1975. J. Ent (B) 43(2) : 213.
 Type locality : Varanasi, Uttar Pradesh, India.
 Distribution : India

Genus *Chaetodrosophilella* Duda

Chaetodrosophilella Duda, 1923. Ann. Mus. Nat. Hung. 20 : 40
 (type species : *Drosophila quadrilineata* de Meijere ; Java)
Chaetodrosophila Duda, 1924. Arch. Naturg. 90 (3A) : 180.
Drosophila (*Chaetodrosophilella*) Sturtevant, 1927.
 Philipp. J. Sci. 32 : 367.

Chaetodrosophilella quadrilineata (de Meijere)

D. quadrilineata de Meijere, 1911. Tijd. Ent. 54 : 396.

Type locality : Java.

Indian locality : Bhagalpur, Bihar.

Distribution : Java, Philippines, Solomon Is., Admiralty Is., Mariana Is. and India.

Genus *Scaptomyza* Hardy

Scaptomyza Hardy, 1849. Berwickshire Nat. Club, Proc. : 361

(type species : *Drosophila graminum* Fallen ; Europe).

Scaptomyza graminum Fallen

D. graminum Fallen, 1823. Dipt. Suec. Geomyz. : 8.

Type locality : Europe.

Indian locality : Gulmarg, Kashmir.

Distribution : Europe, Canary Is., Hawaii, Canada, Lebanon, Japan and India.

Scaptomyza pallida (Zetterstedt)

D. pallida Zetterstedt, 1847. Dipt. Scandinaviae 6 : 2571.

Type locality : Europe.

Indian localities : Gulmarg, Nainital and Varanasi.

Distribution : Worldwide.

Genus *Mycodrosophila* Oldenberg

Mycodrosophila Oldenberg, 1914. Arch. Naturg. 80

(2A) : 4 (type species : *Amiota poecilogastra* Loew ; Europe).

Mycodrosophila gratiosa (de Meijere)

D. Gratiiosa de Meijere, 1911. Tijd. Ent. 54 : 404.

Mycodrosophila gratiosa Sturtevant, 1918. Am. Mus. Nat. Hist. Bull. 38 : 442.

Type locality : Java.

Indian locality : Varanasi.

Distribution : Indonesia, Fiji, Samoa, Solomon Is., Micronesia and India.

Genus *Gitonides* Knab

Gitonides Knab, 1914. Insec. Inscit. Menstr. 2 : 165 (type species : *Gitonides perspicax* Knab ; Pacific area).

***Gitonides perspicax* Knab**

G. perspicax Knab, 1914. Insec. Inscit. Menstr. 2 : 165.
= *Cacoxenus punctatus* Duda, 1924. Arch. Naturg. 90(3A) : 225
(Formosa). SYN.

Type locality : Pacific area

Indian localities : Coimbatore and Chandraprabha.

Distribution : Hawaii, Formosa and India.

Genus *Zaprionus* Coquillett

Zaprionus Coquillett, 1902.

Stegena obscuricornis de Meijere, 1915. Tijd. Ent. 58 (Suppl.) : 94 (Java).

Drosophila obscuricornis Duda, 1924. Arch. Naturg. 90 (2A) : 221 (Java).

Zaprionus obscuricornis (de Meijere, 1915) n. comb.

***Zaprionus indiana* Gupta**

Z. indiana Gupta, 1970. Proc. Indian Nation. Sci. Acad. 36 : 63.

Type locality : Allahpur, Badaun district, Uttar Pradesh, India.

Distribution : India.

***Zaprionus paravittiger* Godbole and Vaidya**

Z. paravittiger Godbole and Vaidya, 1972. Drosophila Inform. Serv. 48 : 135.

Type locality : Poona, Maharashtra, India.

Distribution : India.

Genus *Leucophenga* Mik

Leucophenga Mik, 1886. Wiener Ent. Zeitung 5 : 317 (type species ;

Drosophila maculata Dufour ; Europe).

Leucophenga albicincta de Meijere

L. albicincta de Meijere, 1908. Tijd. Ent. 15 : 156.

Type locality : Java

Indian localities : Chandraprabha and Sirsi.

Distribution : Java, Africa, New Guinea and India.

Leucophenga guttiventris de Meijere

Drosophila guttiventris de Meijere, 1911. Tijd. Ent. 54 : 414.

Leucophenga guttiventris Sturtevant, 1921. Carn. Inst. Publ. 301 : 131.

Type locality : Java.

Indian localities : Chandraprabha and Varanasi.

Distribution : Java, Formosa, Japan, Fiji, Africa, Nepal and India.

Leucophenga subpollinosa de Meijere

Drosophila subpollinosa de Meijere, 1914. Tijd. Ent. 57 : 263.

Leucophenga subpollinosa Duda, 1923. Ann. Mus. Nat. Hung. 20 : 28.

Type locality : Java.

Indian localities : Varanasi and Sirsi.

Distribution : Java, Sumatra, Japan, Taiwan, Africa, Vietnam, Formosa, Nepal, Micronesia and India.

Genus *Paraleucophenga* Hendel

Paraleucophenga Hendel, 1914. Suppl. Ent. 3 : 14.

(type species : *Helomyza invicta* Walker, as *Paraleucophenga triseta* Hendel).

= *Trichiaspiphenga* Duda, 1924. Arch. Naturg. 90 (3A) : 185

(type species : *Helomyza invicta* Walker).

Paraleucophenga invicta (Walker)

Helomyza invicta Walker, 1857. Proc. Linn. Soc. London : 130.

Paraleucophenga triseta Hendel, 1914, Suppl. Ent. III : 90-117.

Leucophenga (Trichiaspiphenga) invicta Duda, 1924. Arch. Naturg. 90 (3A) : 185.

Paraleucophenga invicta Hennig, 1941. Ent. Beihefte 8(25) : 150.

Type locality : Borneo

Indian locality : Kodaikanal, Mysore.

Distribution : Borneo, Taiwan, Java, Nepal and India.

Genus *DROSOPHILA* Fallen

Drosophila Fallen, 1823 Dipt. Suec. Geomyz. 2 : 4 (type species : *Musca funebris* Fabricius ; Sweden).

KEY TO INDIAN SUBGENERA OF THE GENUS *DROSOPHILA*

1. Antennal third segment large, with unusually long hairs — : — — —
Hirtodrosophilla.
- Antennal third segment normal, without unusually long hairs — — 2.
2. The longest axis of eye considerably oblique to body axis — — — —
Dorsiphila *Loph*.
- The longest axis of eye nearly rectangular to body axis — — — 3.
- 3 Prescutellar bristles well differentiated — — — — — — — —
Scaptodrosophila.
- Prescutellar bristles not differentiated — — — — — — — 4.
- 4 Dark bands of abdominal tergites when present not medianly interrupted. Eggs with two filaments — — — — — — — —
Sophophora.
- Dark bands of abdominal tergites when present medianly interrupted atleast on basal segments. Eggs usually with four filaments — — — — — — — —
Drosophila.

Subgenus *SOPHOPHORA* Sturtevant

Sophophora Sturtevant, 1939. Proc Nat. Acad. Sci. 25 : 139 (type species : *Drosophila melanogaster* Meigen).

Drosophila ananassae Doleschall

D. ananassae Doleschall, 1858. Nat. Tijd. Ned. Ind. 17 : 128.

Type locality : Ambon Is , Indonesia.

Indian localities : Madras, Kulu, Srinagar, Bhagalpur, Andaman and Nicobar Islands, Mysore, Darjeeling, Chakia forest, Varanasi, Calcutta, Agartala, Poona and Assam.

Distribution : Wide spread in tropical and subtropical regions of the world.

Drosophila andamanensis Gupta and Ray-Chaudhuri

D. andamanensis Gupta and Ray-Chaudhuri, 1970. Oriental Insects 4 : 171.

Type locality : Andaman Is., India.

Distribution ; India.

Drosophila anomelani **Reddy and Krishnamurthy**

D. anomelani Reddy and Krishnamurthy, 1973. Oriental Insects 7 : 259.
 Type locality : Merupalyam, Nilgiris, India.
 Indian localities : Madras and Mysore.
 Distribution : India

Drosophila biarmipes **Malloch**

D. biarmipes Malloch, 1924. Mem. Dept. Agric. India 8 : 64.
 Type locality : Coimbatore, India.
 Distribution : India.

Drosophila bifasciata **Pomini**

D. bifasciata Pomini, 1940. Boll. Ent. R. Univ. Bologna 12 : 155.
 Type locality : Italy.
 Indian localities : Chandigarh, Manimajra, and Kashmir.
 Distribution : Europe, Japan and India.

Drosophila bipectinata **Duda**

D. bipectinata Duda, 1923. Ann. Mus. Nat. Hung. 20 : 52.
 Type locality : Darjeeling, India.
 Indian localities : Chakia forest, Andaman and Nicobar Islands, Bhagalpur, Varanasi, Mysore, Assam, Orissa and Manipur.
 Distribution : Japan, Formosa, India, Nepal, Borneo, Thailand, Philippine, New Guinea, Micronesia, Fiji, Samoa, Taiwan, Sumatra.

Drosophila brunettii **Ray-Chaudhuri and Mukherjee**

D. brunettii Ray-Chaudhuri and Mukherjee, 1941. Ind. J. Ent. New Delhi 3 : 216.
 Type locality : Calcutta, India.
 Distribution : India.

Drosophila coonorensis **Reddy and Krishnamurthy**

D. coonorensis Reddy and Krishnamurthy, 1973. Oriental Insects 7 : 262.
 Type locality : Coonor, Nilgiris, Madras, India.
 Distribution : India.

Drosophila epiobscura Parshad and Duggal

D. epiobscura Parshad and Duggal, 1966. Res. Bull. Panjab Univ. 17 : 277.
 Type locality : Pahalgam, Kashmir, India.
 Indian locality : Gulmarg.
 Distribution : India.

Drosophila eugracilis Bock and Wheeler

Tanygastrella gracilis Duda, 1924. Arch. Naturg. 90(3A) : 253.
Drosophila (Tanygastrella) gracilis Duda, 1926. Suppl. Entomol 14 : 99.
 Type locality : Java.
 Not=*Drosophila gracilis* Walker, 1853. Ins. Brit. Dipt. 2 : 239.
Drosophila (Sophophora) eugracilis Bock and Wheeler, 1972. Univ. Texas Publ. 7213 : 1-102.
 Indian localities : Andaman and Nicobar Islands, Gorakhpur, Varanasi, Orissa and Manipur.
 Distribution : Java, Sumatra, Borneo, Seychelles, Formosa, Moluccas, New Guinea, Fiji, Hawaii, Thailand, Cambodia, Philippines, Australia and India.

Drosophila ficusphila Kikkawa and Peng

D. ficusphila Kikkawa and Peng, 1938. Jap. J. Zool. 7 : 531.
 Type locality : Central Honshu, Japan.
 Indian localities : Andaman and Nicobar Islands and Orissa.
 Distribution : Japan, Korea, Taiwan and India.

Drosophila helvetica Burla

D. helvetica Burla, 1948. Rev. Suisse Zool. 55 : 276.
 Type locality : Switzerland.
 Indian localities : Gulmarg and Pahalgam, Kashmir.
 Distribution : Switzerland, Japan and India.

Drosophila jambulina Parshad and Paika

D. jambulina Parshad and Paika, 1964. Res. Bull. Panjab Univ. 15 : 240.
 Type locality : Chandigarh and Malerkotla, India.
 Indian localities : Srinagar, Poona and Mysore.
 Distribution : India and Cambodia.

Drosophila kikkawai **Burla**

D. kikkawai Burla, 1954. Rev. Brasil. Biol. 14 : 47.

Type locality : Rio de Janeiro, Brazil.

Indian localities : Chakia forest, Panjab, Bhagalpur, Darjeeling, Mysore, Orissa, Assam and Manipur.

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

Drosophila malerkotliana **Parshad and Paika**

D. malerkotliana Parshad and Paika, 1964. Res. Bull. Panjab Univ. 15: 235.

Type locality : Chandigarh, Pinjore and Malerkotla, India.

Indian localities : Panjab, Chakia forest, Bhagalpur, Andaman and Nicobar Islands, Darjeeling, Varanasi, Mysore, Poona, Assam and Manipur.

Distribution : India, Philippines, Malaya, Borneo, Thailand.

Drosophila melanogaster **Meigen**

D. melanogaster Meigen, 1830. Syst. Besch. 6 : 85.

Type locality : Europe.

=*emulata* Ray-Chaudhuri and Mukherjee, 1941. Ind. J. Ent. New Delhi 3 : 216 SYN.

Indian localities : Madras, Calcutta, Panjab, Bhagalpur, Varanasi, Andaman and Nicobar Islands, Chakia forest, Mysore, Darjeeling and Poona.

Distribution : Worldwide.

Drosophila montium **de Meijere**

D. montium de Meijere, 1916. Tijd. Ent. 69 : 205.

Type locality : Java.

Indian locality : Madras.

Distribution : Java (records from other places including India are doubtful).

Drosophila mysorensis **Reddy and Krishnamurthy**

D. mysorensis Reddy and Krishnamurthy, 1970. J. Biol. Sci. 13 : 24.

Type locality : Mysore and Mercara, India.

Indian localities : Mysore and Biligirirangana Hills

Distribution : India.

Drosophila nepalensis Okada

D. nepalensis Okada, 1955. Flora and Fauna Nepal Himalaya 1 : 388.
 Type locality : Nepal.
 Indian localities : Chandigarh, Srinagar, Pahalgam, Nainital and Manipur.
 Distribution : Nepal and India.

Drosophila pulchrella Tan, Hsu and Sheng

D. pulchrella Tan, Hsu and Sheng, 1949. Univ. Texas Publ. 4920 : 198.
 Type locality : Meitan, China.
 Indian locality : Pahalgam.
 Distribution : China, Japan, Nepal, Taiwan and India.

Drosophila punjabiensis Parshad and Paika

D. punjabiensis Parshad and Paika, 1964. Res. Bull. Panjab Univ. 15 : 241.
 Type locality : Kulu Valley and Chandigarh, India.
 Indian locality : Assam.
 Distribution : India.

Drosophila prashadi Brunetti

D. prashadi Brunetti, 1923. Rec. Ind. Mus. Calcutta 25 : 303.
 Type locality : Calcutta, India.
 Distribution : India.

Drosophila pseudoananassae Bock

D. pseudoananassae Bock, 1971. Univ. Texas Publ. 7103 : 274.
 Type locality : Cairns, Australia.
 Indian locality : Biligirirangana Hills.
 Distribution : Australia, Gew Guinea, Borneo, Philippines, Malaya, Thailand and India.

Drosophila rajasekari Reddy and Krishnamurthy

D. rajasekari Reddy and Krishnamurthy, 1968. Proc. Indian Acad. Sci. 68 : 202.
 Type locality : Mysore, India
 = *raychaudhunii* Gupta, 1968. Abs. 55th Indian Sci. Congr. Varanasi ;469 :
 Gupta, 1969. Proc. Zool. Soc. Calcutta 22 : 54. SYN
 Indian localities : Chandraprabha, Naini, Digha Sea beach, Mysore,
 Biligirirangana Hills and Poona.
 Distribution : India, Cambodia and Thailand.

Drosophila rufa Kikkawa and Peng

D. rufa Kikkawa and Peng, 1938. Jap. J. Zool. 7 : 529.
 Type locality : Honshu and Kyushu, Japan.
 Indian localities : Chandigarh, Gulmarg and Pahalgam
 Distribution : Japan, China, Korea and India.

Drosophila seguyi Smart

D. seguyi Smart, 1945. Proc. Roy. Ent. Soc. London 14 : 56.
 Type locality : Kenya, Africa.
 Indian localities : Chandraprabha, Varanasi, Nainital, Sirsi, Burdwan and Orissa.
 Distribution : Tanganyika Territory, India, Salisbury and Rhodesia.

Drosophila suzukii indicus Parshad and Paika

D. suzukii indicus Parshad and Paika, 1964. Res. Bull. Panjab Univ. 15 : 230
 Type locality : Chandigarh and Manimajra, India
 Indian localities : Srinagar, Pahalgam and Gulmarg.
 Distribution : India.

Drosophila takahashii Sturtevant

D. takahashii Sturtevant. 1927. Philippine J. Sci. 32 : 371.
 Type locality : Taihoku, Taiwan.
 Indian localities : Chandraprabha, Chandigarh, Mysore, Poona, Varanasi and Manipur.
 Distribution : Taiwan, Japan, Korea, Manchuria, China, Nepal, India, Thailand, Borneo, Philippines and Micronesia.

Drosophila tristipennis Duda

D. tristipennis Duda, 1924. Arch. Naturg. 90(3A) : 215, 247.
 Type locality : Taiwan.
 Indian locality : Madras.
 Distribution : Taiwan, India and Nepal.

Drosophila truncata Okada

D. truncata Okada, 1964. Nature and Life in South East Asia 3 : 455.
 Type locality : Amo, Brunei, Borneo.
 Indian localities : South Andamans and Calcutta.
 Distribution : Borneo and India.

Subgenus SCAPTODROSOPHILA Duda

Scaptodrosophila Duda, 1923. Mus. Nat. Hung. Ann. 20 : 37 (type : *Scaptodrosophila scaptomyzoidea* Duda ; New Guinea).

***Drosophila bambuphila* Gupta**

D. bambuphila Gupta, 1971. American Midl. Naturalist 86 : 494.

Type locality : Varanasi, India.

Distribution : India.

***Drosophila bryani* Malloch**

D. bryani Malloch, 1934. Insects of Samoa 6 (8) : 310.

Type locality : Samoa.

Indian locality : Varanasi.

Distribution : Samoa, Australia, Philippines, Japan, Micronesia and India.

***Drosophila chandraprabhiana* Gupta and Ray-Chaudhuri**

D. chandraprabhiana Gupta and Ray-Chaudhuri, 1970. Proc. Roy. Ent. Soc. London 39 : 62.

Type locality : Chandraprabha, Chakia forest, India.

Indian localities : Chakia forest and Sirsi.

Distribution : India.

***Drosophila ebonata* Parshad and Duggal**

D. ebonata Parshad and Duggal, 1966. Res. Bull. Panjab Univ. 17 : 279.

Type locality : Srinagar and Pahalgam, India.

Distribution : India.

***Drosophila latifshahi* Gupta and Ray-Chaudhuri**

D. latifshahi Gupta and Ray-Chaudhuri, 1970. Proc. Roy. Ent. Soc. London 39 : 67.

Type locality : Chandraprabha and Latifshah, Chakia forest, India.

Indian locality : River bank colony, Lucknow.

Distribution : India.

Drosophila paratriangulata Gupta and Ray-Chaudhuri

D. paratriangulata Gupta and Ray-Chaudhuri, 1970. Proc. Roy. Ent. Soc. London 39 : 66.

Type locality : Chandraprabha and Sirsi, India.

Indian localities : Varanasi and Poona.

Distribution : India.

Drosophila silvalineata Gupta and Ray-Chaudhuri

D. silvalineata Gupta and Ray-Chaudhuri, 1970. Proc. Roy. Ent. Soc. London 39 : 64.

Type locality : Chandraprabha, India.

Distribution : India.

Subgenus *DROSOPHILA* Fallen

Drosophila Fallen, 1923. Diptera Sueciae Geomyz. 2 : 4 (type *Musca funebris* Fabricius, 1787 : 345).

Drosophila brachynephros Okada

D. brachynephros Okada, 1956. Syst. St. Drosophilidae Allied Fam. Japan : 126.

Type locality : Morioka, Iwate Pref., Japan.

Indian locality : Pahalgam.

Distribution : Japan and India.

Drosophila curviceps Okada and Kurokawa

D. curviceps Okada and Kurokawa, 1957. Kontyu : 8.

Type locality : Setagaya, Tokyo, Japan.

Indian locality : Pahalgam.

Distribution : Japan and India.

Drosophila immigrans Sturtevant

D. immigrans Sturtevant, 1921. Carn. Inst. Wash, Publ. 301 : 83.

Type locality : New York, U. S. A.

Indian localities : Nainital, Srinagar, Pahalgam, Mysore, Biligirirangana Hills, Assam and Manipur.

Distribution : Cosmopolitan.

Drosophila lacertosa **Okada**

D. lacertosa Okada, 1956. Syst. St. Drosophilidae Allied Fam. Japan : 158.

Type locality : Hakamoriyama, Iwate Pref., Japan.

Indian localities : Nainital and Kashmir.

Distribution : Japan, Korea, Nepal and India.

Drosophila nasuta **Lamb**

D. nasuta Lamb, 1914. Trans. Linn. Soc. 16 : 346.

Type locality : Seychelles, Formosa.

= *albomicans* Duda, 1924. Arch. Nat. 90 (2A) : 209 ; 3:245. SYN.

Indian localities : Chandraprabha, Varanasi, Mysore, Poona, Biligirirangana Hills, Orissa and Manipur.

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

Drosophila nigra **Grimshaw**

D. nigra Grimshaw, 1901. Faun. Haw. 3:62.

Type locality : Hawaiian Islands.

Indian locality : Biligirirangana Hills.

Distribution : Hawaii and India.

Drosophila neonasuta **Nirmala Sajjan and Krishnamurthy**

D. neonasuta Nirmala Sajjan and Krishnamurthy, 1973. Oriental Insects 7 : 267.

Type locality : Sewage farm, Mysore, India.

Distribution : India.

Drosophila orissaensis **Gupta**

D. orissaensis Gupta, 1972. Oriental Insects 6 : 561.

Type locality : Jatili near Padmapur, Berhampur, Orissa, India.

Distribution : India.

Drosophila pentaspina Parshad and Duggal

D. pentaspina Parshad and Duggal, 1966. Res. Bull. Panjab Univ. 17 : 289.
 Type locality : Srinagar, Kashmir, India.
 Indian locality : Pahalgam.
 Distribution : India.

Drosophila repleta Wollaston

D. repleta Wollaston, 1858. Ann. Mag. Nat. Hist. 41 : 117.
 Type locality : Madeira.
 Indian localities : Calcutta, Mysore, Poona, Digha Sea-beach and Keral.
 Distribution : Cosmopolitan.

Drosophila testacea Van Roser

D. testacea Van Roser, 1840. Wurtz, Corrb. 62.
 Type locality : Pahalgam.
 Distribution : Europe, North America and India.

Drosophila trisetosa Okada

D. trisetosa Okada, 1966. Bull. Br. Mus. (Nat. Hist) Ent. Suppl. 6 : 99.
 Type locality : Arun Valley, East Nepal.
 Indian locality : Chandraprabha.
 Distribution : Nepal and India.

Subgenus *HIRTODROSOPHILA* Duda

Hirtodrosophila Duda, 1973. Mus. Nat. Hung. 20 : 41 (type : *Drosophila latifrontata* Frota—Pessoa ; Taiwan).

Drosophila pentavittata Gupta and Ray Chaudhuri

D. pentavittata Gupta and Ray-Chaudhuri, 1970. Proc. Roy. Ent. Soc. London 39 : 61.
 Type locality : Digha Sea-beach, West Bengal, India.
 Distribution : India.

Subgenus *DORSILOPHA* Sturtevant

Dorsilopha Sturtevant, 1942. Univ. Texas Publ. 4213 : 28 (type : *Drosophila busckii* Coquillett ; U.S.A.)

Drosophila busckii Coquillett

D. busckii Coquillett, 1901. Ent. News 12 : 16.

Type locality : U.S.A.

Indian localities : Pahalgam, Chandraprabha, Orissa, Mysore, Darjeeling and Manipur.

Distribution : Cosmopolitan.

Discussion

A total of 74 species representing ten genera of the family Drosophilidae have been described and recorded from the subcontinent of India to date and of which the description of one new species refers to the generic characters only, another species is probably misreported, four species are found to be synonyms and seven species are reported by their names and no taxonomic account of these species has been published so far. Some observable comments of various workers regarding these Indian species have been suitably presented below.

Drosophila prashadi Brunetti was described as a new species from Calcutta in the year 1923. As pointed out by Ray-Chaudhuri and Mukherjee (1941) that the description of this species is inadequate and refers mostly to generic characters. Besides, the holotype deposited with the Indian Museum, Calcutta is also lost. It is therefore impossible now to recognize this species.

Sturtevant (1927) studied four species of *Drosophila* including *montium* de Meijere from Madras. Burla (1954) and Bock and Wheeler (1972) have pointed out that *montium* is likely to be endemical to Java or that part of oriental region. The type specimens of *montium* is shown not to be identical with the well known *montium* of its time which was later given the name of *D. kikkawai*. The present author thus believes that

montium which was reported by Sturtevant from India may also be representing *kikkawai*.

D. emulata Ray-Chaudhuri and Mukherjee although differs from *melanogaster* Meigen in wing vein-indices, proportion of lengths of wing and body but in many other taxonomic characters it is allied to *melanogaster*. Parshad, Narda and Paika (1964) are of the opinion that *emulata* is a strain of *melanogaster* which has become differentiated in some morphological characters. This notion stands as such since we do not have type specimens of *emulata* to uncover the reality.

Bock and Wheeler (1972) have recently indicated that *D. raychaudhurii* Gupta is a Synonym of *D. raiasekari* Reddy and Krishnamurthy. The present author believes that both *raychaudhurii* and *raiasekari* are synonyms of *D. biarmipes* Malloch. The details of it will be discussed elsewhere.

Gitonides perspicax Knab and *Cacoxenus punctatus* Duda both have been reported from India. More recently *punctatus* has been considered as synonym of *perspicax* by Mc Alpine (1968) after studying 3 syntypes of *punctatus* from Berlin Museum (personal communication from Prof. M. R. Wheeler, Texas University to the author). Similarly *D. nasuta* Lamb and *D. albomicans* Duda both have been reported from India as two different species. As pointed out by Patterson and Wheeler (1949) that *albomicans* is a true synonym of *nasuta*.

Although the names of seven species as *D. chamundiensis*, *D. brindavani*, *D. hoozani*, *D. neotruncata*, *D. varietas*, *D. charmadensis* and *D. mundagensis* have been included in the list, but no taxonomic details have been published so far. Furthermore, Singh (1970) claimed three more new species of *Drosophila* without mentioning their names from South Andamans, but no account of these supposedly new species has however been published.

Based on the results of present studies on the systematics of Drosophilidae the author has no illusion as the incompleteness of this work. There is no doubt that the number of Drosophilid species inhabiting India is several times greater than the number recorded till now. Therefore this work is in no sense a monograph on the subject, but it is still hoped that further attempts in this direction will add many more interesting new species to the list of Indian Drosophilidae.

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