



Description of two new species of *montium* subgroup of *Drosophila* (Diptera: Drosophilidae) from South India

S. N. Hegde*, V. Vasudev, M. S. Krishna and V. Shakunthala

Drosophila Stock Centre, Department of Studies in Zoology, University of Mysore,
Manasagangotri, Mysore, Karnataka 570006, India

1999

ABSTRACT: This study describes two new species, *D. palniensis* collected from Palni hills and *D. neolacteicornis*, from Nilgiri hills, India. Their taxonomic status and relationships are discussed. © 1999 Association for Advancement of Entomology

KEYWORDS: *D. palniensis*, *D. neolacteicornis*, Palni hills, Nilgiri hills

INTRODUCTION

The Indian sub-continent with its tropical climate and varied physiographic conditions offers a variety of insect fauna. The genus *Drosophila* is one such group of insects that has about 2240 biologically valid species (Wheeler, 1986).

The study of Indian *Drosophilids* was started by Bezzi (Sturtevant, 1921). Much of our present knowledge on *Drosophila* fauna has been acquired only after 1964. The species collected in the Indian sub-continent up to 1974 is enlisted by Gupta (1974). After 1974 about 40 new species have been added to the list from India including Andaman Islands. In spite of the above information, many areas of the Indian sub-continent still remain unexplored. Hence the present survey was undertaken to explore new species of *Drosophila*.

MATERIALS AND METHODS

Collections of *Drosophila* from Palni and Nilgiri hills, Tamil Nadu were made in hill ranges using net sweeping as well as bottle trapping methods from 11 different altitudes (350, 475, 800, 950, 1050, 1150, 1450, 1650, 1750, 1800, and 2300 m above sea level). This collection resulted in the finding of two new species; one from Palni hills and another from Nilgiri hills which are described here.

RESULTS AND DISCUSSION

The description of the two species is as follows.

*Corresponding author

TABLE 1. Wing Indices of *D. palniensis*

Sex	Costal index	4 C index	4 V index	5 V index
Male	2.01	1.00	1.62	0.56
Female	2.14	1.07	1.69	1.62

***Drosophila palniensis*, Hegde and Shakunthala sp. nov.**

Males and Females: Brownish yellow, females are larger than males.

Head: Arista with 5/3 branches excluding terminal fork in females. In male, arista with 4/3 branches including terminal fork.

Antenna: Yellow, palpi with bristles and another with thin bristle; carina narrow, vibrissae with two anterior prominent bristles and two thin small posterior bristles. Anterior and middle orbitals are of same size but posterior orbitals longer than anterior and middle. Anterior orbitals proclinate whereas posterior orbitals reclinate. Anterior verticals large and directed inwards; posterior verticals directed outwards. Ocellar triangle with a pair of bristles. Eyes are red.

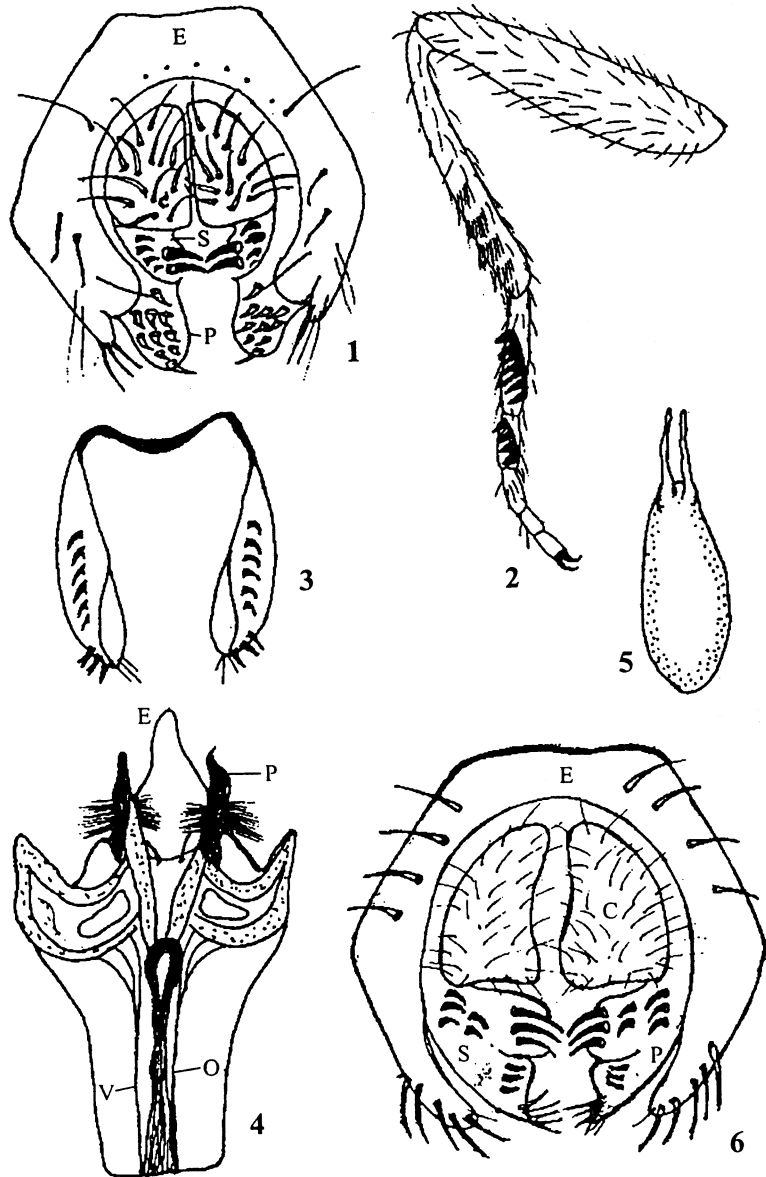
Thorax: Brownish yellow. Acrostichal hairs in eight rows. Anterior dorsocentrals are shorter than posterior dorsocentrals, posterior dorsocentrals convergent. Anterior scutellars convergent and posterior scutellar convergent and crossed. Both anterior and posterior scutellars are of equal length. Both anterior and posterior alars are equal in length and directed downwards. There are 5 sternopleural bristles out of which 4 are smaller and fifth one is dark and prominent. Halteres translucent.

Wings: Smoky and hyaline. Wing length; male: 2.4 mm; female 2.45 mm. The wing indices are calculated following the formula of Okada (1956) and presented in Table 1.

Legs (Fig. 2): First tarsal segment of the forelegs in male carries two sets of sexcombs. Proximal set with 7 short and thick teeth and the distal set with 4 short and thick teeth. In femur a row of thick bristles present in the fore leg of male. This is absent in the females. Preapicals on tibia.

Abdomen: Bright yellow, tergites darkely pigmented at apical margins. Pigmentation broader on the mid dorsal portion of the tergites and narrowed laterally, Further intensity of pigmentation is more in male. Posterior part of males abdomen is shiny black.

Egg (Fig. 5): Egg with two filaments. They are short and pointed at the tip.



FIGURES 1-6. 1: Periphallallic organ: E-Epandrium; C-Anal cercus; P-Primary surstylus; S-Secondary surstylus; 2: Sexcomb; 3: Egg guide; 4: Phallic organ: E-Aedeagus; P-Posterior gonapophyses; A-Anterior gonapophyses; O-Apodeme; V-Ventral fragma; 5: Egg. 6: Periphallallic organ; E-Epandrium; C-Anal cercus; P-Primary surstylus; S-Secondary surstylus;

Internal Structures: Ovary with eight ovarioles, testis yellow with 3 coils.

Egg guide (Fig. 3): Brown with 6–9 teeth.

Phallic organ (Fig. 4): Yellowish brown, aedeagus large curved dorsally with hairy sensilla, basal apodeme projecting beyond fragma. Anterior gonopophysis are short and triangular. Posterior gonopophysis long slender and non serrate.

Periphallalic organ (Fig. 1): Epandrium broad dorsally and laterally, toe long and round with 6 bristles, primary and secondary surstylus present. Primary surstylus with 11 bristles arranged in 3–4 rows. Secondary surstylus is continuous with cerci and carries two large, black bristles directed downwards. In addition to that a row of 3 small bristles arranged laterally with 18–20 bristles.

Holotype: 2 ♂♂, India, Tamil Nadu Palni hills, 9 vii 1997. coll. S. N. Hegde, V. Vasudev, M. S. Krishna, V. Shakunthala and K. Raviram.

Allotype: 2 ♀♀ same as above,

Paratype: 2 ♂♂ and 2 ♀♀, India, Tamil Nadu, Palni hills, coll. S. N. Hegde and others.

Relationships: The species under description belongs to subgenus *Sophophora* and *melanogaster* species group in having shiny black abdomen in males, long coiled ventral receptacle, coiled testis, sexcomb, eggs with two filaments etc., The males have yellowish abdominal tergites with distinct apical bands, prominent sexcomb in two sets, genital arch not constricted above, secondary surstylus fused to analcerus two prominent curved teeth on secondary surstylus, aedeagus hirsute, anterior parameres large. Therefore this species has been included under *montium* subgroup.

The species resembles *D. serrata* (Bock and Wheeler, 1972) in having two prominent large teeth on the secondary surstylus, but differs from it significantly in sex comb pattern. The new species has prominent sexcomb with seven and four teeth each, which are not fused. Therefore the species is considered as new and named as *D. palniensis*. This new species belongs to *montium* subgroup and it is related to *Drosophila serrata*.

***Drosophila neolacteicornis*, Hegde and Krishna sp.nov**

Males and females: Light grey color, females are larger than males.

Head: Arista with 4/2 branches excluding terminal fork. Antenna yellowish grey, palpi with bristles, carina narrow, vibrissae with two anterior and posterior prominent bristles. Anterior and middle orbitals are small and reclinate. The posterior orbitals are longer than the middle and shorter than anterior. Anterior verticals are large

TABLE 2. Wing indices of *D. neolacteicornis*

Sex	Costal index	4 C index	4 V index	5 V index
Male	1.41	0.73	1.14	0.38
Female	1.48	0.82	1.24	0.46

and directed inwards whereas posterior verticals are convergent and crossed. Ocellar triangle with a pair of dark bristles. Eyes dark red.

Thorax: Greyish yellow, Achrostichals are in eight rows, anterior dorsocentrals shorter than posterior. Anterior scutellar bristles convergent whereas the posterior scutellars convergent and crossed. Anterior scutellars are smaller than posterior. The anterior and posterior alars are equal in length and directed downwards. There are five sternopleural bristles out of which three are small, two are prominent and dark. Halteres translucent.

Wing: Transparent, smoky and hyaline. Wing length, male: 1.19 mm, female: 1.68 mm. The wing indices are calculated following the formula of Okada (1956) and presented in Table 2.

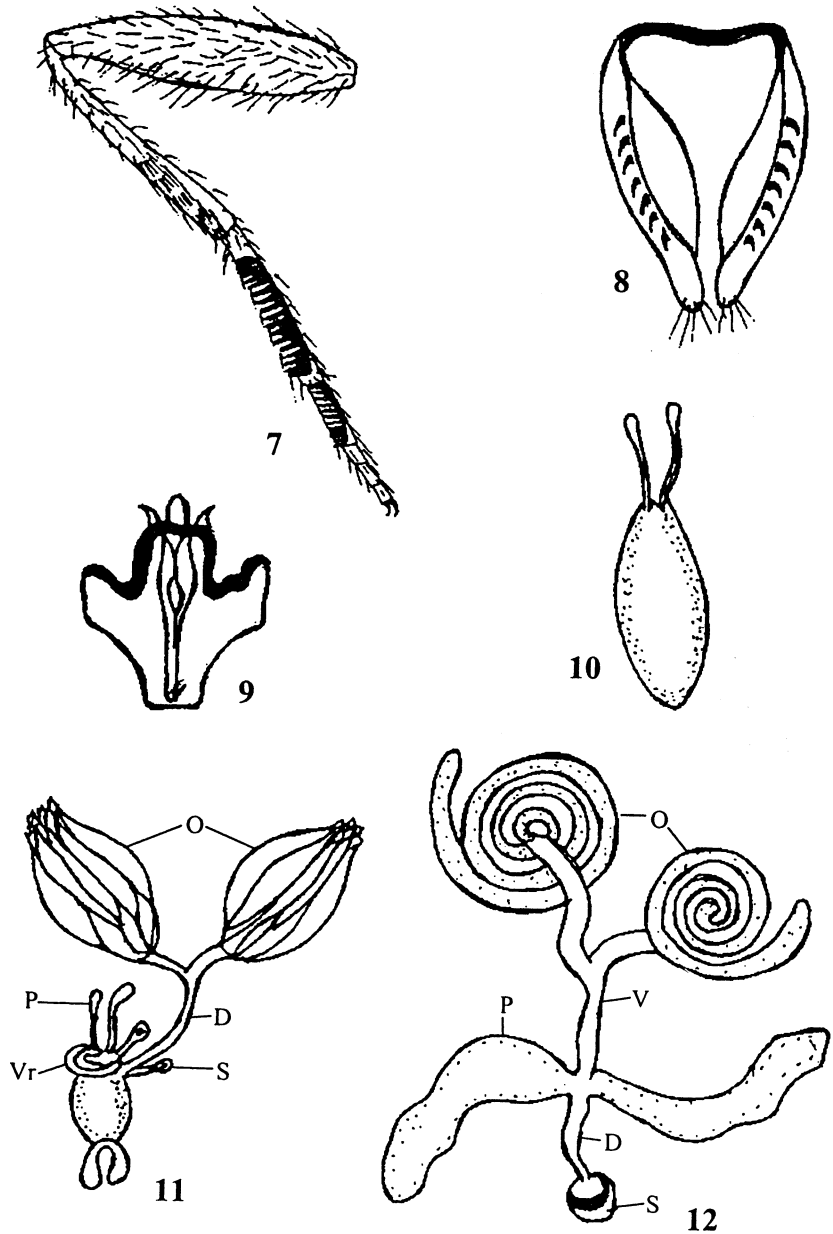
Legs: The first tarsal segment in males carries 2 sets of sex comb (Fig. 7). Proximal set with 17–22 teeth and the distal set with 12–14 teeth, few anterior teeth of the proximal set and few posterior teeth of distal set are united. Preapicals on all tibia.

Abdomen: Bright yellow, tergites darkly pigmented at posterior margins when compared to anterior margins. Further the intensity of pigmentation is more in male when compared to female. Posterior abdomen of males are darkly pigmented.

Pupa: Yellow with eight spiracular filaments, at the posterior end there are five pairs of projections of which two are lateral, two are dorsal and one pair is ventral in position.

Egg (Fig. 10): Egg with two filaments. They are slender and slightly flattened apically.

Periphallallic organs (Fig. 6): Epandrium broad, apically narrow and concave, heel constricted, toe rounded with 6–7 bristles and curved inwards. Both primary and secondary surstylus are present, primary surstylus with a set of 3 short teeth arranged in a row and 8–10 irregularly arranged teeth at the proximal end. Secondary surstylus continuous with analcercus. A set of three dark teeth are present on the inner margin of the secondary surstylus of which posterior one is short. In addition there are also two additional sets of teeth are found. The median set has two teeth and outer one has three.



FIGURES 7-12. 7: Sex comb; 8: Egg guide; 9: Phallic organ: E-Aedeagus; P-Posterior gonapophyses; A-Anterior gonapophyses; O-Apodeme; V-Ventral fragma; 10: Egg; 11: Female reproductive system: D-Oviduct; O-Ovary; P-Paragonia; S-Spermathecae; Vr-Ventral receptacle; 12: Male reproductive system; D-Anterior ejaculatory duct; P-Accessory gland; S-Ejaculatory bulb; T-Testis; V-Vas deferens.

Egg guide (Fig. 8): Brown with 6–8 teeth.

Phallic organ (Fig. 9): Aedeagus brownish yellow, long and broad basally, Anterior gonopophysis are small with few apical sensilla. Posterior gonopophysis are large with a chitinous spine which is directed posteriorly. Ejaculatory apodeme long, ventral fragma broad dorsally and laterally.

Internal structure (Fig. 11 & 12): Ovary with 8–10 ovarioles. Ventral receptacle is tightly coiled, spermatheca small. Testis yellow with 4–5 coils. paragonia relatively smaller than testis.

Holotype: 2 ♂♂, India, Tamil Nadu, Nilgiri hills, 14. xi 1996. coll. L. Siddaveeregowda, H. A. Ranganath, S. N. Hegde, S. R. Ramesh and N. B. Ramachandra.

Allotype: 2 ♀♀: same as above

Paratype: 5 ♂♂ and 2 ♀♀, India, Tamil Nadu, Nilgiri hills, coll. L. Siddaveere Gowda, H. A. Ranganath, S. N. Hegde, S. R. Ramesh and N. B. Ramachandra.

Relationships: Most of the character pointed out in *Drosophila palniensis* for *melanogaster* species group of *Sophophora* and *montium* subgroup were also seen in this species. This species resembles *D. lacteicornis* (Okada, 1965) in having three curved teeth on the secondary surstylus of which lower one is smaller than the other two, but it is significantly different from *D. lacteicornis* in having lateral row of three pointed teeth on primary surstylus and on the secondary surstylus besides three curved black teeth, two pointed small teeth are found medianly. Hence this species is considered as new and named as *Drosophila neolacteicornis*. This new species seems to be related to *D. lacteicornis*.

Key for identification: In view of the description of two new species of *montium* subgroup, the existing key for identification of the new species (Gupta, 1974) may be modified as follows.

1. Dark bands of abdominal tergites when present not medianly interrupted. Eggs with two filaments (*Sophophora*) 2.
2. Yellowish abdominal tergites with distinct apical bands, prominent sexcomb in two sets, genital arch not constricted above, secondary surstylus fused to analcerus, aedeagus hirsute, anterior parameres large (*montium* subgroup) ... 3.
- 3a. Two prominent large teeth on the secondary surstylus 4.
- b. Three curved teeth on the secondary surstylus of which lower one is smaller than the other two 5.
- 4a. Prominent sexcomb with seven and four teeth each *D. palniensis*
- b. Sexcomb with teeth on upper portion of metatarsus and on entire second tarsal segment, fine, densely packed, contiguous *D. serrata*

- 5a. Lateral row of three pointed teeth on primary surstylus and on the secondary surstylus besides three curved black teeth, two pointed small teeth are found medianly *D. neolacticornis*
- b. Total five teeth on the secondary surstylus of which three are lateral and curved while remaining two are smaller and vertical in position *D. lacticornis*.

ACKNOWLEDGEMENTS

The authors are grateful to Prof. H. A. Ranganath, Chairman Department of Studies in Zoology, University of Mysore for providing facilities and constant encouragement. We also thank L. Siddaveeregowda, S. R. Ramesh, N. B. Ramachandra and K. Raviram for their help during collection trip.

REFERENCES

- Bock, I. R. and Wheeler, M. R. (1972) The *Drosophila melanogaster* species group, *Univ. Texas Publ.* 7213: 1-102.
- Gupta, J. P. (1974) The Family Drosophilidae in India, *Indian Biologist* 5(3): 7-30.
- Okada, T. (1956) *Systematic study of Drosophilidae and Allied Families of Japan*, Gihodo Co. Ltd.: Tokyo, Japan.
- Okada, T. (1965) Drosophilidae of the Okinawa Islands, *Kontyu* 33: 327-350.
- Sturtevant, A. M. (1921) The North American species of *Drosophila*, *Carn. Inst. Wash. Publ.* 301: 1-141.
- Wheeler, M. R. (1986) Additions to the catalog of the world's Drosophilidae, In: *The Genetics and Biology of Drosophila*, Vol. 3e. Asburner, M., Carson, H. L. and Thompson, Jr., J. N.: (Editors). Academic Press: London, 395-409.

(Received in February 1998; revised and accepted in March 1999)