



## First report of *D. polychaeta* Patterson and Stone from India.

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### Abstract

*Drosophila* flies were collected from different localities of Dharwad district of Karnataka state, India. The present report is on collection, identification, and description of *D. polychaeta* Patterson and Stone for the first time. The species was found at vegetable fields of Naval Gund taluk in Dharwad district. A few morphological characters of the species are discussed.

### Introduction

*Drosophila* is used as a model organism in many fields of biology. Taxonomy and biodiversity of this genus play a vital role in analyzing the faunal composition in an ecosystem. At present in the family of Drosophilidae there are 4217 species described, which consist of 77 genera. In genus *Drosophila* there are 1178 species among which 751 species belong to subgenus *Drosophila*, whereas 335 species belong to subgenus *Sophophora* (Bachli, 2014). Taxonomic studies on Drosophilidae were reviewed by Gupta on the Indian subcontinent during 1974. Kandpal and Singh (2010a) reported a total of 319 species of Drosophilids from India, of which 148 species belong to genus *Drosophila*. In South India there are only 50 species (Hegde *et al.*, 2001). Most of the species reported from India mainly belonged to *melanogaster* species group of subgenus *Sophophora* (Bock and Wheeler, 1972; Hegde *et al.*, 2001), or else belonged to *immigrans* and *repleta* subgroups of subgenus *Drosophila* and many other genera, such as *Zaprionus* of family Drosophilidae (Fartyal *et al.*, 2014). In South India most of the faunal studies were concentrated in and around Mysore and Western Ghats (Hegde *et al.*, 2001). Srinath and Shivanna (2012, 2013, and 2014a) did a complete survey of *Drosophila* fauna of Dharwad district. Two rare species belonging to the subgroup of *Polychaeta* under subgenus *Drosophila*, *D. daruma* Okada and *D. latifshahi* Gupta and Ray-Chaudhari, were recorded from Dharwad district (Srinath and Shivanna, 2012, 2014b). The frequent survey is required to keep the data updated regarding the richness of species and diversity; hence the survey was continued and new rare species were recorded.

### Materials and Methods

*Drosophila* were collected from different vegetable fields in Naval Gund taluk of Dharwad district using Bottle trapping and net sweeping methods (Hegde *et al.*, 2001). The collected flies were brought to the laboratory and were separated according to their respective sexes. The males were directly used for identification whereas the females were cultured in separate vials consisting of wheat cream agar medium. Later the males were used for identification of species (Hsu, 1949; Bock and Wheeler, 1972; Markow and O'Grady, 2006).

### Results

The morphological characters of *D. polychaeta* collected from Dharwad district, Karnataka, India are given below.

Length of the imago: male: 2.7 to 2.9 mm (Figure 1a); female: 3.2 to 3.5 mm (Figure 1b).

Head: Arista with 5 branches above and 3 below.

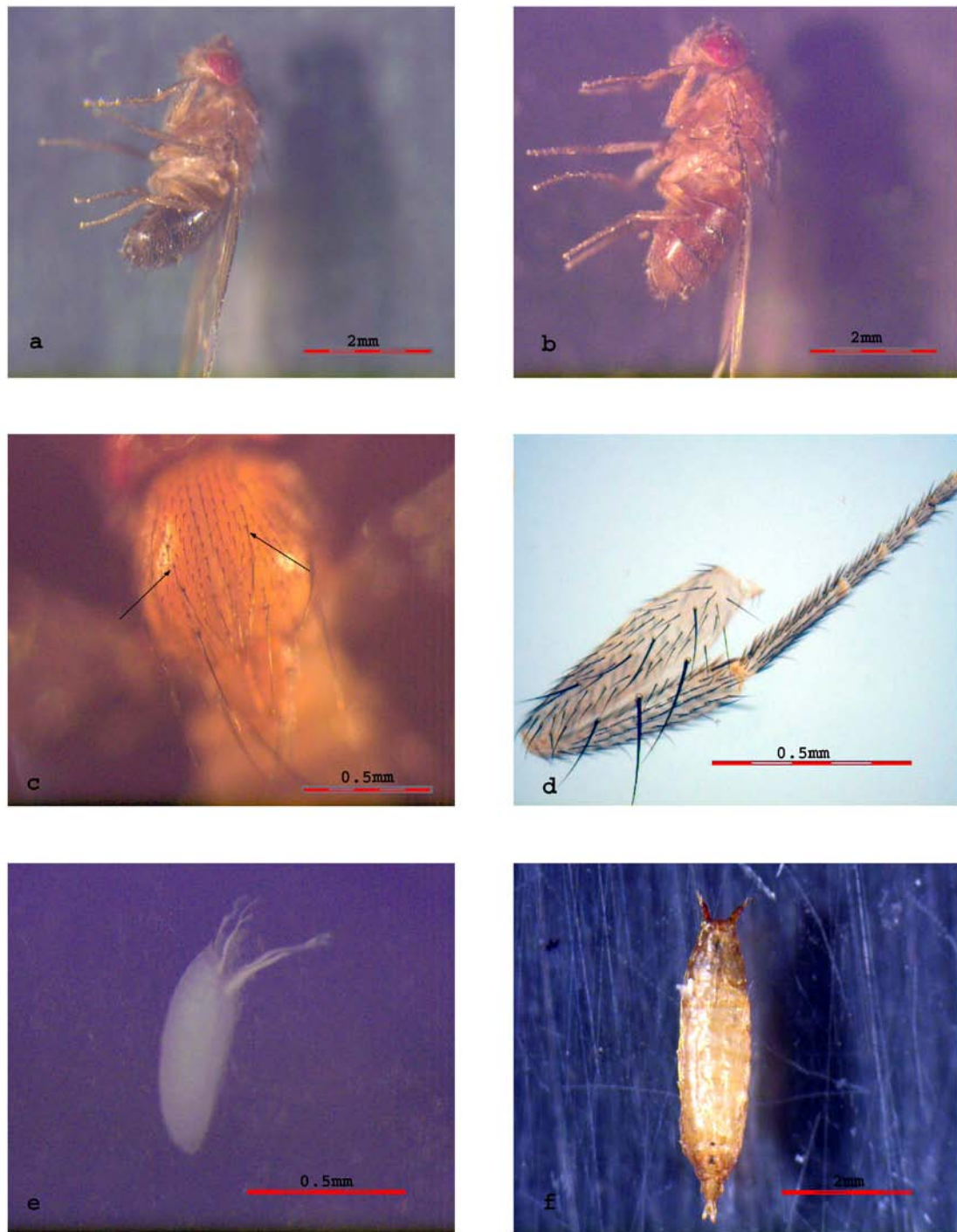


Figure 1. *D. polychaeta* lateral view of male, 1a; female, 1b; thorax, 1c; foreleg of male, 1d; egg, 1e; pupa, 1f. Arrow indicates the presence of extra pair of dorso-central setulae.

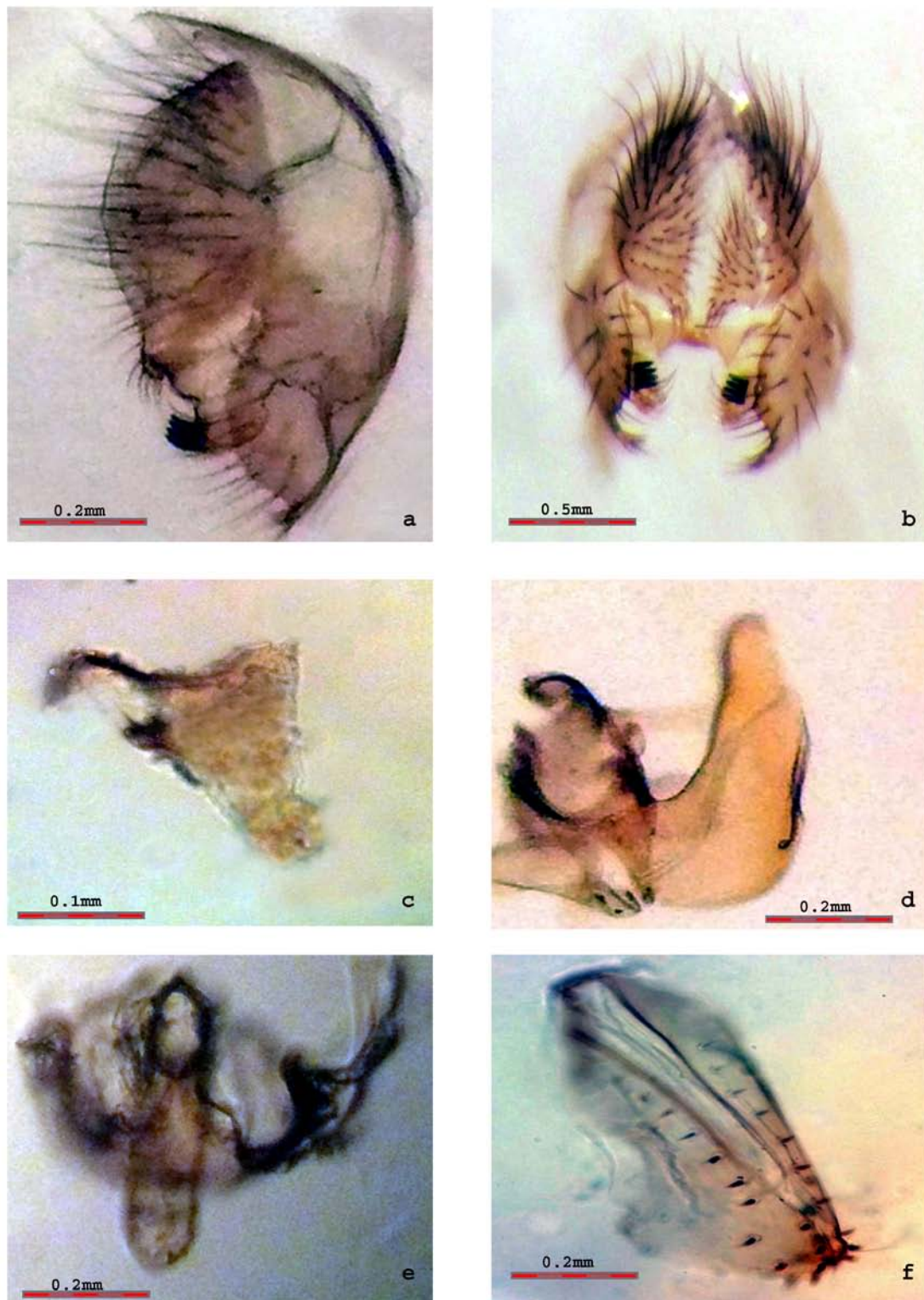


Figure 2. *D. polychaeta*Periphallid organ lateral view, 2a; whole view, 2b; Decasternum, 2c; Phallic organ lateral view, 2d; Phallic organ ventral view, 2e; egg guide, 2f.

Antenna: Dark yellowish color; carina uniformly shaped and sulcate; cheek broad. At the base of cheek 3 rows of bristles were present; 1<sup>st</sup> row with 7 bristles, 2<sup>nd</sup> row with 8 bristles, and 3<sup>rd</sup> row with 5 bristles.

Anterior orbital bristle proclinate and larger than middle orbital bristle and almost equal to posterior orbital bristle; middle and posterior orbital bristle reclinate; post vertical bristles present; vertical bristles present and reclinate; eyes are red in color and oval in shape with females having broader eyes and looks quadrate in shape; ocellar triangle present and pointed anteriorly.

Thorax: Yellowish in color; a dark median stripe present internally; acrostichal hairs are in 7 irregular rows; dorsocentrally an extra pair is present (Figure 1c); anterior dorsocentral is smaller than posterior dorsocentral; pre-scutellar setulae absent; anterior scutellar bristle longer than posterior scutellar; posterior scutellar crossed. Sterno – index is 0.6 in females and 0.82 in males.

Legs: Sex-combs absent in tarsal region of forelegs; femur consists of three prominent bristles (Figure 1d).

Egg with four filaments and pupa with 2 distinct anterior spiracles and two elongated and partially fused posterior spiracles (Figures 1e and f).

Wing: Wings hyaline and its venation clear; subcostal break prominent; halteres yellowish. Wing indices calculated according to Okada (1956).

	C-index	4V-index	4C-index	5X-index
Male	1.99	2.24	1.38	1.60
Female	2.05	2.30	1.40	1.56

Abdomen: First abdominal tergite is yellowish at anterior and dark at posterior, whereas other abdominal tergites are tannish at anterior and completely dark at the posterior. Sternites brownish; on ventral view female looks lighter in color except the sternite, whereas the males are orange because of color of testis.

Periphallic organ: Genital arch brown, broad, and pubescent; about 24 to 25 bristles present on lower half. Toe pointed and heel absent; surstylus looks attached to the anal plate and upper region is broad and pubescent in nature, whereas lower region consists of 4-5 primary teeth with about 2 to 3 bristles on the distal margin and 5 to 6 on caudoventral region. Anal plate attached to genital arch at the center and has a convex shape when viewed from lateral side and has a pointed end; it consists of approximately 49 to 50 bristles; the pointed end has approximately 6 to 7 bristles (Figures 2a, 2b). Decasternum triangular in shape (Figure 2c).

Phallic organ: Aedeagus pointed at distal end and broad at proximal end. Aedeagal apodeme small. Anterior paramere without sensilla; posterior paramere absent. Novasternum slipper shaped (Figure 2 d, e).

Egg guide: Lobe of ovipositor pale yellow with 21 teeth surrounding the internal margin (Figure 2f).

Specimens examined: 2 ♂, 2 ♀, INDIA: Karnataka, Navalgund; Dharwad. Coll: Shweta K.

Distribution: Neotropics, Micronesia, Hawaii, North America, Europe, China, India (n. loc.): Navalgund.

## Discussion

The coloration and the presence of an extra-pair of dorsocentral bristles confirm the species belonging to the *polychaeta* species group (Okada, 1956; Toda and Peng, 1989; Watabe *et al.*, 1990; Markow and O'Grady, 2006). The present species differs from earlier description made by Hsu (1949) in the shape of genital

plates. Hsu (1949) mentions that the anal plate is fused with genital arch at the upper half and the number of teeth present on the primary clasper region is 5-6 and they are not similar in size. Whereas the present species has anal plate fused with genital arch at the center and lower side and the number of teeth present on the primary clasper is 4-5 and they are equal in their size (Figure 2b). The collected *D. polychaeta* is very much similar to the characters mentioned by Watabe *et al.* (1990). Species belonging to *polychaeta* species group are rarely reported by *Drosophila* taxonomists across India. *D. daruma* was first reported by Vaidya and Godbole (1976) from Poona and surrounding regions. Similarly, *D. latifshahi* was reported by Gupta and Raychaudhuri (1970) from Chakia forest in North India, but they categorised this species under subgenus *Scaptodrosophila*. Later Toda and Peng (1989) reclassified this species under *polychaeta* species group. These species were reported for the first time from South India by Srinath and Shivanna (2012, 2014) from Dharwad and surrounding areas. *D. polychaeta* is reported for the first time from the Indian subcontinent. Hence this species is the third addition to the present list of species under *polychaeta* species group reported from India.

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### **Interaction of chlorophyllin with radiation-induced autosomal recessive lethals.**

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### **Abstract**

Chlorophyllin (SCC), sodium copper chlorophyll, presents protective action against damage induced by different physical and chemical agents. In *Drosophila melanogaster*, this effect has been reported for somatic cells. However, on germ cells for sex chromosomes, the inhibitory effect was not found. We are interested in the lethal induced effect on the second chromosome of this species. Canton-S males were given a 24-hour pre-treatment with and without 69 mM of SCC and later exposed or not to 40 Gy of gamma radiation. Those males were screened with the Cy L /Pm technique for detection of recessive lethal genes. Results showed the SCC pre-treatment did not produce significant changes in frequency for recessive lethal genes in the second chromosome, due to 40 Gy gamma radiation. In order to evaluate the effects of chlorophyllin on damage done by radiation, we considered the presence of autosomal lethals and semi-lethals. We observed that, even with radiation, the frequency of semi-lethals did decrease when chlorophyllin is applied but not significantly. For lethals, either with or without radiation, the frequency slightly increased. **Keywords:** chlorophyllin, radiation, lethal genes, *Drosophila*