

Male frons dimorphism: *Chrysomya bezziana* Villeneuve (Diptera, Calliphoridae) and *Myospila argentata* Walker (Diptera, Muscidae)

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Abstract

Dimorphism, the condition of a trait having two distinct morphs. Differences may include colouration, ornamentation, secondary sexual characters, body shape, and size. Generally, such disparity is very commonly seen in various organisms between the sexes. But within the same sex, it is very rare and only a few numbers of species show such a peculiar phenomenon. Frons dimorphism among male individuals of a particular species of families Muscidae and Calliphoridae has not been reported before. The study aims to document frons dimorphism in male individuals of two distinct calyptate flies, namely *Chrysomya bezziana* Villeneuve (Diptera: Calliphoridae) and *Myospila argentata* Walker (Diptera: Muscidae), highlighting an unusual phenomenon in their head capsules.

Frons, in calyptate flies, constitutes the structural part of the head capsule between two compound eyes, from the upper edge of the occiput to the margin of the frontal suture and have a significant role in species and sex recognition (Senior-White et al., 1940). In many Diptera species, both male and female flies exhibit a significant dimorphism in their frons with features including shape, size, number of bristles, colouration, width, length etc. and provide a way to distinguish them without examining their genitalia (Deeming, 1981). Insect orders other than Diptera, such as Coleoptera and Lepidoptera, have also been found to exhibit this type of morphological polymorphism (Deeming, 1981; Anderbrant and Schlyter, 1987). Most of the males of families Muscidae and Calliphoridae typically have thin or reduced frons along with holoptic or sub-holoptic compound eyes. In contrast, females have an open or broad frons and dichoptic compound eyes (Senior-White et al., 1940; Emden, 1965). Despite such variations, previous studies have focused on male eye dimorphism in certain calyptate flies, and described patterns of incongruities (Fan, 1965; Kurahashi, 1982; Wells et al., 1994). But still,

there is no study on male frons dimorphism within the Muscidae and Calliphoridae families. The present study addresses the occurrence of frons dimorphism among male individuals in two calyptate flies *viz.*, *Chrysomya bezziana* Villeneuve and *Myospila argentata* Walker.

Materials and Methods

The examined flies, *M. argentata* were obtained through field collection at forest sites as part of the Muscidae project in West Bengal, India (23° 43' 49.9152" N 88° 31' 51.8124" E; altitude 21.00m). Males *C. bezziana* were obtained from laboratory culture colony. Both species (*C. bezziana* and *M. argentata*) were identified in the laboratory under a stereoscopic microscope (SYS-45ETR) by studying their morphology and chaetotaxy with corresponding taxonomical keys and descriptions following Senior-White et al. (1940) and Emden (1965). The photographs of head capsule were captured using a camera (38MP FHD) attached to microscope (SYS-45ETR).

Results

In laboratory examinations, a remarkable frons

dimorphism was found among male individuals of two distinct calyprate flies viz., *C. bezziana* and *M. argentata*. Based on their morphological anomaly, we categorized them into normal frons and open frons (Figs 1A-D). In the normal frons, parafrontal plates are closely positioned and the median frontal vitta is not visible (Figs 1A and 1C). On the other hand, open frons exhibit somewhat separated parafrontal plates and a distinct frontal vitta (Figs 1B and 1D).

Discussion

In taxonomy studies, a single character sometimes leads to a new species from their closely related members. Since in this context, it is very difficult for us to consider flies having variations in their frons as the same species or two different species. Although thorough examinations of morphological features, including chaetotaxy and terminalia among male individuals of normal and open frons in both *C. bezziana* and *M. argentata*, revealed no significant differences between them. Kukuk (1996) studied male polymorphism in *Lasioglossum (Chilalictus) hemichalceum* and suggests that their alternative morph between males is primarily environmentally influenced. However, herein exact cause of such variations remains unclear to us and there is no supporting published reports on such type of phenotypical discrepancy worldwide. Our documentation is preliminary, further observation and more evolutionary and genetic research work are needed to understand such variations.

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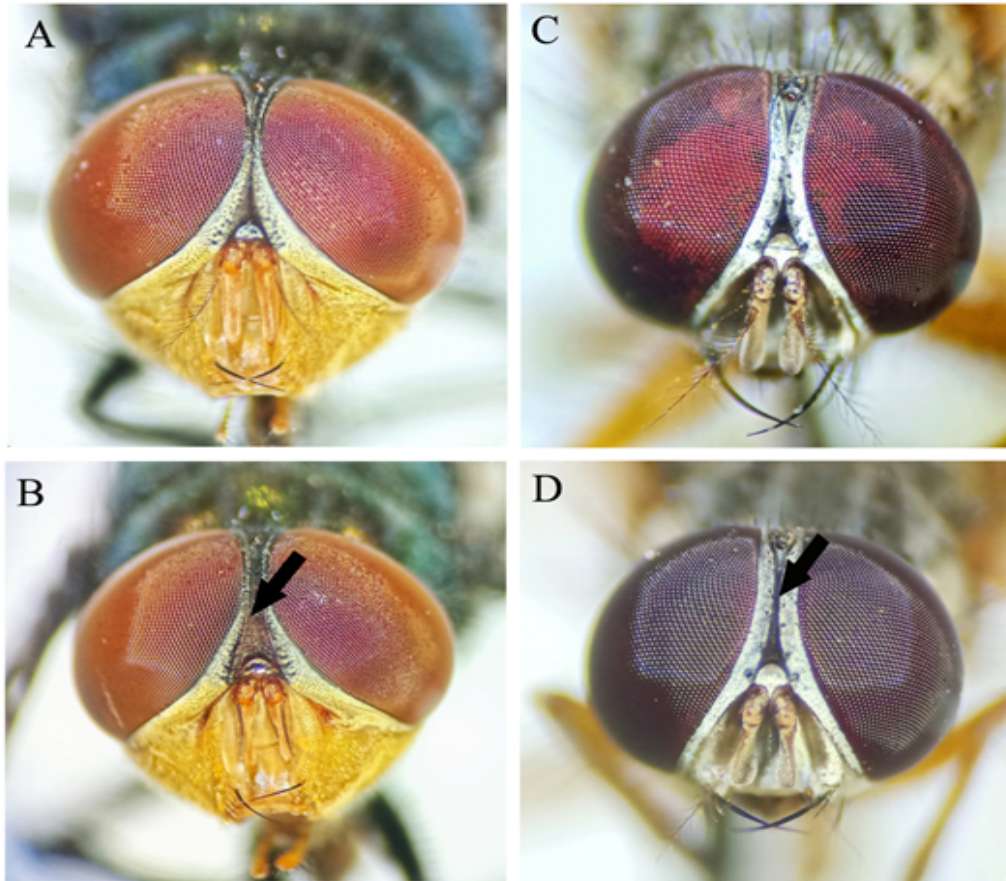


Fig. 1. Head capsules of male *Chrysomya bezziana* and *Myospila argentata*. A. Male *C. bezziana* head capsule with normal frons; B. Male *C. bezziana* head capsule with open frons; C. Male *M. argentata* head capsule with normal frons; D. Male *M. argentata* head capsule with open frons.

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