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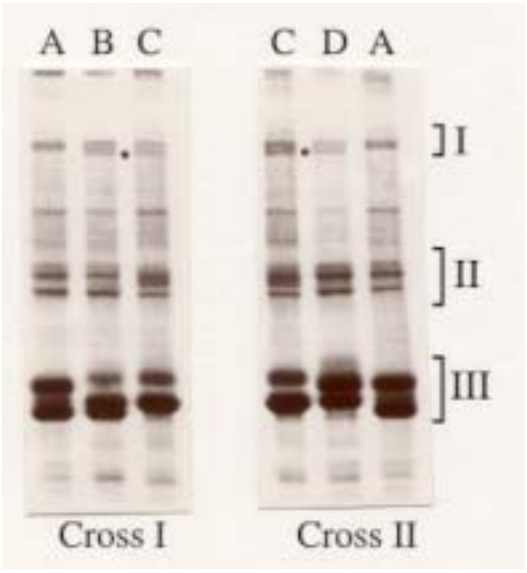
Group-I male accessory gland secretory protein fraction is coded by autosomal gene: a study on *Curly* mutant of *D. nasuta nasuta.*

Ashadevi, J.S., K. Ravi Ram, and S.R. Ramesh. Drosophila Stock Center, Department of Studies in Zoology, University of Mysore, Manasagangotri, Mysore 570006, India.

Male accessory glands of insects are well known to play a key role in reproduction. In *Drosophila*, the secretions of accessory gland play a primary role during mating, sperm transfer and their utilization in the mated female (Fowler, 1973).

The electrophoretic patterns of these secretions are highly species-specific (Chen, 1976; Chen *et al.*, 1985) and have been studied in different species of *Drosophila* such as *D. melanogaster, D. simulans, D. mauritiana, D. sechellia, D. funebris, D. suzukii* and in different members of the *D. immigrans* group (Chen, 1984; Coulthart and Singh, 1988; Chen and Balmer, 1989; Schmidt *et al.*, 1989; Ohashi *et al.*, 1991; Shivanna and Ramesh, 1995; Wolfner *et al.*, 1997; Ravi Ram and Ramesh, 1999, 2001).

By SDS-PAGE analysis, Stumm-Zollinger and Chen (1985) have shown that the accessory gland secretions in *D. melanogaster* consist of 40 fractions, while SDS-PAGE analysis of these proteins in various members of *immigrans* group of *Drosophila* have revealed that the patterns in these species are much simpler than the pattern in *D. melanogaster* and they could be categorized into three groups with high molecular weight fractions falling into group-I and low molecular weight fractions into group-III (Ravi Ram and Ramesh, 1999). Further, Ravi Ram and Ramesh (2001) have reported that the secretions consist of eight major fractions in *D. n. nasuta* and seven major fractions in *D. n. albomicans.* All the studies listed here are confined only to the wild type strains. However, such an analysis has not been carried out in the mutants of any *Drosophila* species. When the pattern of accessory gland secretory proteins was analyzed in case of "*Curly*" of *D. n. nasuta,* an extra fraction (92 kD) was detected in addition to regular 94 kD in group-I. In the wild type of *D. n. nasuta* the 92 kD fraction was found to be polymorphic while only 94 kD fraction was detected in group-I of *D. n. albomicans* (Ravi Ram and Ramesh, 2001). Hence, the present investigations were undertaken to analyze the pattern of inheritance of 92 kD accessory gland secretory protein fraction in "*Curly*" of *D. n. nasuta* by taking advantage of differential protein patterns in group-I fractions and cross fertility between the mutant and *D. n. albomicans*. In the present study, we have used a wild type strain of *D. n. albomicans* (Okinawa, Japan, Stock No. 202.001, obtained from Drosophila Stock Center, Dept. of Studies in Zoology, University of Mysore, Mysore, India) and a dominant wing mutant *"Curly"* (induced mutant of Mysore strain of *D. n. nasuta*, provided by Prof. Dr. W.-E. Kalisch, Institut für Genetik, Ruhr Universität Bochum, Bochum, Germany). These stocks were maintained at 22 ± 1ºC on standard wheat cream agar medium seeded with yeast. Males and females were isolated within 4 hr of their eclosion from the pupal case. After aging them for 5 days, reciprocal crosses were conducted between *"Curly"* of *D. n. nasuta* and *D. n. albomicans* (wild type) to get F_1 generation. The accessory gland secretory protein samples from parental as well as F_1 males were prepared and SDS-PAGE patterns were analyzed following the standardized procedure (Ravi Ram and Ramesh, 2001).



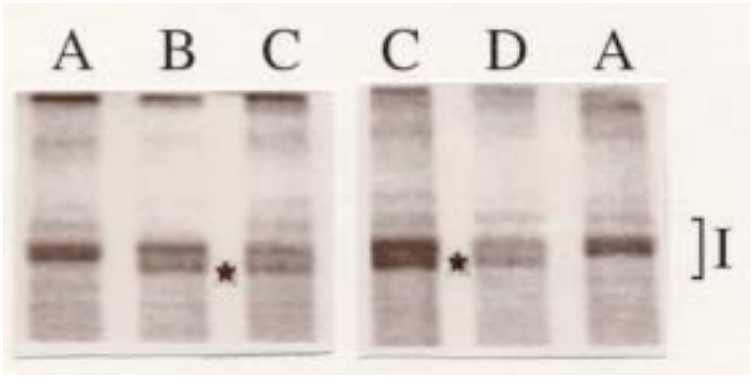


Figure 1a. Group I fractions-enlarged. * = Autosomal fraction (92 kD)

Figure 1. Patterns of major accessory gland secretory protein fractions in wild type strain of *D. n. albomicans*, *Cy/Cy* of *D. n. nasuta* as well as evidence for autosomal linkage of a major fraction in *Cy/Cy* by CBB staining; (A) *D. n. albomicans*, (B) F_1 male from a *D. n. albomicans* mother and *Cy/Cy* father {Cross-I}, (C) *Cy/Cy*, Cross-II (D) F_1 male from a *D. n. albomicans* father and *Cy/Cy* mother{Cross-II}.

In *D. melanogaster* the genes concerned with the accessory gland protein synthesis are located in autosomes and none of them are in the X-chromosome (Whalen and Wilson, 1986; Wolfner *et al*., 1997). However, Ravi Ram and Ramesh (2001) have shown that the 40 kD fraction of group-II in the case of *D. n. nasuta* and *D. n. albomicans* and a 25 kD fraction of group-III in *D. n. albomicans* follow an X-linked pattern of inheritance, while a 26 kD fraction of group-III in *D. n. nasuta* shows autosomal inheritance. When the protein patterns of F_1 males of both reciprocal crosses were compared with the patterns of parental males, it was found that F_1 males of both the crosses inherit 94 and 92 kD fractions (Figure 1) which otherwise will not be encountered if the fractions are X-linked. This clearly shows that the 92 kD fraction of *"Curly"* follows an autosomal pattern of inheritance.

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