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Male remounting in three species of *Drosophila montium* subgroup.

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Species of *Drosophila* exhibit elaborate courtship followed by mating. Although genus *Drosophila* consists of more than 2250 species, the sexual behavior of about 250 species has been studied so far. The mean copulation duration in these species varies from just 60 seconds to several hours. During this time the male transfers the sperm to the female. Male mating another female or male remating is a common feature in mass cultures of many *Drosophila*. Female remating is not as frequent as that of male remating, but yet it is reported in a few species. When copulation is complete, generally the male will not mount the same female again. Here we report the males of three species of *montium* subgroup remounting the same female. Four species of *montium* subgroup viz, *D. agumbensis*, *D. gangotrii*, *D. jambulina* and *D. nagarholensis* collected from University Garden, Manasagangotri, Mysore, India were used. Virgin females and bachelor males were collected from progeny of wild-caught females. One male and one female were aspirated into an Elens-Wattiaux mating chamber (observation chamber), and observed for two hours. If there was no mating within two hours, then the pairs were discarded. Among flies which paired, the copulation duration was recorded. The pairs were allowed to stay together, and the remounting if any was also noted along with the copulation duration of a second mount and subsequent mounts.

Table 1. Showing courtship latency, mating latency and copulation duration of the different species of *Drosophila* (values are in seconds).

Species	No. of pairs observed	Courtship latency	Mating latency	Copulation duration (seconds) (No. of pairs mated is given in parenthesis)			
				1 st mount	2 nd mount	3 rd mount	4 th mount
<i>D. agumbensis</i>	20	120 ± 12.2	2866 ± 42.4	127 ± 23.2 (00)			
<i>D. gangotrii</i>	20	149 ± 34.3	76 ± 18.7	231 ± 120.6 (19)	23 ± 8.0 (9)		
<i>D. jambulina</i>	20	165 ± 20.4	198 ± 23.2	187 ± 32.9 (18)	73 ± 0.2 (11)	27 ± 0.6 (7)	
<i>D. nagarholensis</i>	20	70 ± 10.7	83 ± 12.9	607 ± 60.1 (18)	19 ± 3.0 (5)	17 ± 0.7 (5)	10 ± 2.1 (3)

The duration of mounting (copulation) as well as remounting is shown in Table 1. The courtship latency and mating latency is also shown in the table. It was interesting to note that *D. agumbensis* did not show remounting. The males of the remaining three species viz, *D. gangotrii*, *D. jambulina* and *D. nagarholensis* remounted the same female immediately after first mount. There was no relation between courtship latency or mating latency or with copulation duration (first mount).

However, the duration of second and subsequent mounts gradually shortened. The incomplete sperm transfer in the first mount must have been the cause for second and subsequent mounts.

Acknowledgments: The authors are grateful to the Chairman, Department of Studies in Zoology, University of Mysore, Manasagangotri, Mysore – 570006, India for facilities and University Grants Commission, New Delhi for financial support.



Esterase loci differences, specificities, and body expression patterns in species of the *Drosophila guarani* group (Diptera; Drosophilidae).

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Abstract

The level of genetic differentiation within populations has received considerable attention as it can indicate the vitality and the potentiality of the population to respond to environmental changes. Several works have combined morphological, isoenzymes, and DNA sequencing to produce better and more complete results about the evolutionary history and genetic structure of populations and species. Thus, the aim of this work was to evaluate the esterase loci differences, specificities, and body expression patterns in two species of *Drosophila guarani* group, in order to obtain a tool for future studies using a combined analysis of isoenzymes, DNA, and morphology. Our esterase loci analysis showed that there are genetic composition differences between species and that these markers could be used in studies of natural populations' genetic variability. However, to obtain better results for *D. maculifrons*, the individual sample should not have the body cut in parts, such as head, thorax and abdomen, because there is head specific locus.

Introduction

Isoenzyme electrophoresis has been used in population and evolutionary researches since 1966 as a way to evaluate populational genetic variability through the direct product of gene expression (Mateus *et al.*, 2005). Esterases in *Drosophila* form a polymorphic group of isoenzymes (Johnson, 1974) and can be related with several body functions, such as juvenile hormone levels regulation, digestive processes, reproductive behavior, and insecticide degradation. These enzymes have been detected in all life phases and in many tissues of this group of organisms, which demonstrates the importance of this class of enzymes in the insect normal development (Karotam *et al.*, 1993; Gu and Zera, 1994; Feyereisen *et al.*, 1995).

The *D. guarani* group belongs to the quinaria-tripunctata section of the *Drosophila* subgenus and has 16 neotropical species (Bächli, 2009). According to Gottschalk *et al.* (2008), six of these species have been recorded in the Brazilian territory: *D. alexandrei*, *D. guaru*, *D. ornatifrons*, *D. griseolineata*, *D. guaraja*, and *D. maculifrons*. Like other Brazilian species, the *D. guarani* group has been poorly studied, and the data on ecology, systematics, genetics, and evolution its species are scarce. Therefore, much more work related to these aspects should be done.