found to be 0.23, 0.23, 0.43, and 0.11, respectively. The observed and expected numbers of heterozygotes were also computed. The chi square analysis reveals that the two populations do not follow Hardy–Weinberg equilibrium ($p < 0.001$) indicating the role of some evolutionary forces on this locus.

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Larval competition among *D. melanogaster* and *D. ananassae.*

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Abstract:

Intra- and interspecific preadult competition observations were made using two commonly available *Drosophila* species, namely *D. melanogaster* and *D. ananassae*. Rate of development and viability were taken as fitness parameters in both observations at selected densities. There is an effect of density on developmental time and viability of *Drosophila* when observed at the larval stage. Key words: *Drosophila*, Competition, Rate of development, Viability, Fitness

Introduction

Any population is made up of interacting individuals with other organisms also (Emmel, 1976). Two species which vie for the same resource co-exist in the nature (Ayala, 1969). It is also true that two species depending on one niche cannot co-exist and results in competitive exclusion (Gause, 1934). To know the intra and interspecific competitive relation the present observation was carried out.

Materials and Methods

D. melanogaster and *D. ananassae* were collected from Jogimatti forest area of Chitradurga (Karnataka-India) and used in the present studies. In the experiments, rate of development and viability have been recorded in intra and interspecific competition. In intraspecific competition the larvae of same age (48 ± 4 hr) were distributed in four different densities of 50, 100, 150, and 200 per vial (3” × 1”). Similarly, in interspecific competition, the larvae of same age (48 ± 4 hr) of both the species in equal numbers were distributed in four above mentioned densities. For each density, ten replicates were maintained. The emergence of flies was recorded in both the cases at different densities. The experiment was carried at 25 ± 1°C and RH 60%. The obtained data were analyzed using chi-square test for statistical significance.

Results

The mean developmental rate and viability of *D. melanogaster* and *D. ananassae* at four different densities in intraspecific competition are shown in Table 1. It is observed that there is an effect of density on selected parameters. The developmental time is significantly prolonged along with decreased viability at densities of 150 and 200 larvae per vial. Similarly, in interspecific competition (Table.2) the same result is obtained. There are no significant differences in developmental time and viability between *D. melanogaster* and *D. ananassae* larvae at selected densities in both the cases.

Table 1. Mean developmental time and viability of *D. melanogaster* and *D. ananassae* larvae (48 ± 4hr) at different densities (Intraspecific competition).

Larvae density (Per each vial)	*D. melanogaster* (In days)	*D. ananassae* (In days)	% Viability of *D. melanogaster*	% Viability of *D. ananassae*
50	10.16 ± 0.02	9.86 ± 0.07	96	94
100	10.87 ± 0.06	10.14 ± 0.01	97	98
150	16.15 ± 0.03*	15.23 ± 0.08*	81*	83*
200	19.28 ± 0.02*	17.15 ± 0.06*	79*	82*

- Significant at 5% level.

Table 2. Mean developmental time and viability of *D. melanogaster* and *D. ananassae* larvae (48 ± 4hr) at different densities (Interspecific competition).

Larvae density (Per each vial)	*D. melanogaster* (In days)	*D. ananassae* (In days)	% Viability of *D. melanogaster*	% Viability of *D. ananassae*
50	9.03 ± 0.08	9.54 ± 0.03	98	97
100	9.14 ± 0.02	9.32 ± 0.05	95	93
150	18.22 ± 0.04*	19.10 ± 0.03*	85*	87*
200	25.16 ± 0.07*	23.59 ± 0.02*	82*	83*

- Significant at 5% level.

Discussion

The competitive principle has been tested in *Drosophila* (Merrell, 1951; Miller, 1954; Budnik and Brncic, 1972; Sevenster and Van Alphen, 1993; Joshi and Thompson, 1995; and Yadav and Singh, 2005). Coexistence of species is regulated by different components of the environment, and species co-exist if the competition is weak (Hardin 1960). In the present experiment it is shown that both species of *Drosophila* are co-existing, and there is an effect of high density on developmental time and viability of the same organisms when observed at 48 ± 4 hr larval stage.

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Variation in the induction of sexual isolation among populations of *Drosophila ananassae* subjected to different temperature and diet regimes.

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Abstract

Sexual isolation results from different mating success among individuals within a population and is recognized as a driving force behind intra-population evolution and speciation. Experiments were conducted to test behavioral isolation among populations of *Drosophila ananassae* raised in different temperature and diet regimes for fifteen generations to test the effect of these environmental variables on the induction of sexual isolation. Multiple choice technique was used, and matings were observed in Elens Wattiaux mating chamber. Results showed non-random mating between populations kept in different temperature and diet regimes though the effect of temperature on the induction of behavioural isolation was more pronounced. This study indicates that the populations have adapted to the different rearing conditions and that the genes involved in some aspects and mating behavior may be involved in the adaptation leading to the development and non-random mating among the populations adapted to the different environmental variables. Temperature may have a more pronounced effect on the mating behavior of the flies, which resulted in the development of sexual isolation among the populations.

Introduction

The early steps of animal speciation are thought to be the development of reproductive isolating mechanisms that act as barriers to gene flow between incipient species or populations. To gain insight about the early stages of species formation, we need to understand the basis of ethological isolating mechanisms causing speciation. Premating ethological isolating mechanisms are thought to precede the evolution of post-zygotic isolating mechanisms and is of more importance as occurrence of inferior hybrids is minimized or avoided. The evolution of reproductive isolation and speciation has recently received a great deal of attention, and one of the most pervasive conclusions is that speciation becomes more probable in allopatry as geographically distant populations are more likely to experience divergent selective conditions as well as a reduction in homogenizing gene flow, which is one of the greatest impediments to the evolution of isolating mechanisms (Dobzhansky 1937; Mayr 1942, 1963; Coyne and Orr 2004; Gavrilets 2004). The influence of rearing temperature on mating propensity was reported in *D. melanogaster* (Casares *et al*., 2005). The effect of diet on reproductive isolation was studied by Dodd (1989).