

One generation has successfully eclosed at room temperature ($\sim 23^{\circ}\text{C}$) in the lab. Larval development has been facilitated by providing a layer of instant media (Formula 4-24® Instant Medium, Carolina Biological Supply Company) over the standard sugar-yeast-agar media.

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Sexual behavioral plasticity of *D. melanogaster* of Chamundi hill.

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Drosophila is a widely used and well suited model system for studying evolutionary response to extreme temperature (Hoffmann and Parsons, 1991). Phenotypic plasticity is the ability of an organism to alter its physiology, morphology, and behavior in response to changes in its environment. The capacity of a given genotype to produce different phenotypes in different environments is of growing interest among evolutionary biologists (David *et al.*, 2006). This emphasizes the fact that phenotypic plasticity is also a target of natural selection. Different aspects of sexual behavior, such as courtship latency, mating latency, and copulation duration, are good estimates of reproductive fitness of both the sexes. These behavioral traits are also genetically determined. Hence the obvious question that arises is, like phenotypic traits, whether these behavioral traits are also influenced by temperature or not. The author has tried to address this question using *D. melanogaster* flies collected from natural conditions.

To study the effect of different temperatures on sexual behavior, natural populations of *D. melanogaster* collected at domestic locality Chamundi hill, Mysore, were used. The flies were collected by keeping the quarter pint milk bottles containing mashed banana in kitchen and stores of a few houses at the top of the Chamundi hill, Mysore. Then the flies were sexed, and the females were individually placed in vials containing food so as to develop isofemale lines. When progeny appeared, equal numbers of them from each isofemale line were separately distributed to different culture bottles and reared under different temperature regimes: 12°C , 22°C , and 32°C .

Sexual behavior acts, such as courtship latency, mating latency, and copulation duration, of 25 pairs involving each isofemale line were recorded (Hegde and Krishnamurthy, 1979). To identify the difference in sexual behavior at different temperatures, one way analysis of variance (ANOVA) followed by Duncan's multiple range test (DMRT) were used. The data on qualitative sexual activities, such as courtship latency, mating latency, and copulation duration of *D. melanogaster* at three different temperatures, is reported in Table 1. The courtship latency was highest at 12°C (119.2 ± 10.8). The courtship latency increased up to 22°C and then decreased with increasing temperature. Mean courtship latency, mating latency, and copulation duration at different temperatures, such as

12°C, 22°C, and 32°C, were statistically significant by one way ANOVA (F value = 28.63, 24.04, 35.45; $P < 0.001$; Table 1). Table 1 also shows that the mating latency was shortest at 22°C (7.20 ± 0.85) and longest at 12°C (16.64 ± 0.57). The mating latency at 22°C was significantly different when compared to other temperatures. In contrast to this, the copulation duration was lowest at 32°C (15.80 ± 1.84), which increased with the decreasing temperature. Thus the duration of copulation was longest at 12°C (34.44 ± 1.05), which was significantly different (by ANOVA and DMRT) from all other temperatures (Table 1).

Table 1. Qualitative sexual behavior of *D. melanogaster* at different temperatures (values are Means \pm SE).

Temperatures	Parameters		
	Courtship latency (in seconds)	Mating latency	Copulation duration
12 \pm 1°C	119.20 \pm 10.80 ^c	16.64 \pm 0.57 ^c	34.44 \pm 1.05 ^d
22 \pm 1°C	31.56 \pm 2.80 ^a	7.20 \pm 0.85 ^a	19.76 \pm 0.62 ^b
32 \pm 1°C	68.16 \pm 6.25 ^b	7.84 \pm 0.99 ^a	15.80 \pm 1.84 ^a
F value	28.63*	24.04*	35.45*

Same alphabet as superscript in each column (for temperatures) is non-significant by DMRT. * $P < 0.001$.

Sexually reproducing animals are endowed with special features, first to produce fertile offspring and second to adapt to a particular environment. The reproduction is preceded by a series of courtship acts, wherein males and females show unique rituals to attract each other, mate, and produce the offspring. The courtship and mating, although genetic, are also influenced by various factors.

In the present study an effort is made to study the effect of different temperatures on courtship and mating behavior of *D. melanogaster*. The courtship latency was shorter at 22°C, than either at high or low temperatures (Table 1). The differences in courtship latency at different temperatures were also statistically significant Table 1. It is the period during which the pairs acclimatize to the mating chamber and then start the courtship activities. It actually indicates the vigor of males (Eastwood and Burnet, 1977). The shorter courtship latency noticed at 22°C thus suggests that the males at this temperature have higher vigor and, therefore, are quickly attracted by the females (Markow, 1985).

The mating latency was also shorter at 22°C compared to high or low temperatures (Table 1). Shorter mating latency indicates both vigor of males and receptivity of females required for males and females to initiate copulation (Spieth, 1968). A male with high vigor has to perform the same courtship act more times to a non-receptive female than to a receptive female. If she is receptive, only a few courtship acts are performed, leading to quick pairing.

Courtship activity of the male or female culminates in copulation. During copulation, sperm from the male are transferred to the female reproductive tract, and therefore the duration of copulation has a lot of significance in an animal's life. In the present studies, the copulation duration was longest at 12°C than at other temperatures, and as temperature increased the copulation duration decreased. Thus, the copulation duration was shortest at 32°C. At higher temperature perhaps the sperm transfer occurs more quickly than at lower temperatures. Longer duration of copulation permits the transfer of more sperm by a male to the female (Hegde and Krishna, 1997). Therefore, extension of copulation duration enhances the fitness of the male. However, the courtship latency and mating latency are longer at this temperature. Therefore, it is unlikely that the longer copulation

duration could enhance the fitness at 12°C. Therefore, this confirms 22°C is the optimum temperature for sexual activity of *Drosophila* flies.

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Spontaneous melanic mutant found in a *Drosophila neocardini* natural population.

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Introduction

The *Drosophila cardini* group is a Neotropical polymorphic group of species of the genus *Drosophila* (Heed, 1962; Heed and Russell, 1971). This group consists of 16 species inhabiting different areas of the Neotropical Region (Heed, 1962; Heed and Russell, 1971; Vilela *et al.*, 2002; De Toni *et al.*, 2005). Seven of these species (*D. antillea*, *D. arawakana*, *D. belladunni*, *D. caribiana*, *D. dunni*, *D. nigrodunni*, and *D. similis*) belong to the *dunni* subgroup, distributed in the Caribbean islands, while the other nine species (*D. acutilabella*, *D. bedichecki*, *D. cardini*, *D. cardinoides*, *D. neocardini*, *D. neomorpha*, *D. parthenogenetica*, *D. polymorpha*, and *D. procardinoides*) belong to the *cardini* subgroup, and are observed in an area that starts in Mexico and stretches to south Brazil, covering also the north of Argentina and Chile (Heed and Russell, 1971; Vilela *et al.*, 2002; De Toni *et al.*, 2005).

A series of previous studies reported the monomorphic or the polymorphic abdominal pigmentation state of the species of the *D. cardini* group. All but one of the species of the *D. cardini* subgroup are characterized by a highly polymorphic intraspecific abdominal pigmentation pattern that varies from almost completely pigmented to nearly unpigmented flies (Da Cunha, 1949; Da Cunha *et al.*, 1953; Heed and Krishnamurthy, 1959; Heed and Blake, 1963; Martinez and Cordeiro, 1970). The exception is *D. procardinoides*, apparently restricted to the higher elevations in the Andes of Bolivia and Peru (Heed and Russell, 1971). The developmental control of abdominal pigmentation is variable in this subgroup as well (Da Cunha, 1949; Heed, 1963; Martinez and Cordeiro, 1970). *Drosophila neocardini* is one of the flies that displays this type of variation (Da Cunha, 1955). Its distribution covers Mexico, Panama, Colombia, Ecuador, Peru, and Brazil (Stalker, 1953; Heed and Russell, 1971), and occupies several kinds of environments with low abundance, except *cerrado* and *caatinga* Brazilian Biomes (Sene *et al.*, 1980). The abdominal pigmentation of *D. neocardini* is very similar to that of *D. neomorpha*, *D. parthenogenetica*, and *D. polymorpha*, but it is different in respect to the pattern of the abdominal black bands. In the middle of the sixth tergite