Results and Discussion

By P element transposition, a novel insertion line, *GMR-Gal4^{H1}*, has been generated. This line displays a rough eye phenotype at 25°C as a hemizygote with and without the presence of a *UAS*-controlled responder transgene (Figure 1).

Without a responding transgene, the eyes of *GMR-Gal4^{12}*/+ appear to be relatively normal, with a regular hexagonal array of ommatidia and interommatidial bristles (Figure 1A). With many fused ommatidia and reduced bristles, *GMR-Gal4^{HI}*/+ produces a "roughened" eye (Figure 1B). In the presence of the *UAS-lacZ* transgene, the eyes of *GMR-Gal4^{12}/UAS-lacZ* appear to be fairly normal (Figure 1C), while the eyes of *GMR-Gal4^{HI}/UAS-lacZ* are more severely compromised than in the absence of a responder (Figure 1D). With such an obvious developmental defect, the *GMR-Gal4^{H1}* line provides the opportunity to both suppress and enhance a phenotype that can be readily analysed through biometric means. Often utilised as control for the expression of genes of interest under any of a number of circumstances, the *UAS-lacZ* gene is usually considered to be benign in the developing eye under the control the *Gal4* transgenic drivers. Clearly, this does not seem to hold true under these conditions. Overall, the new insertion line *GMR-Gal4^{H1}* can produce striking phenotypes that seem ideal for further investigation of the toxic effects of *Gal4* expression.

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Relationship between gender difference in longevity and oxidative stress response in *Drosophila melanogaster.*

Niveditha, S., S. Deepashree, S.R. Ramesh, and T. Shivanandappa*. Department of Studies in Zoology, University of Mysore, Manasagangotri, Mysore – 570006, Karnataka, India; *Corresponding author. Tel. +91 8212511885; E-mail: tshivanandappa@yahoo.com.

Females have longer life expectancies than males across many species including humans, laboratory rats, and *Drosophila*. It is not clearly understood as to what genetic or environmental factors are responsible for the gender difference in longevity. According to free radical theory of aging, lifespan appears to be limited by the cumulative effects of oxidative damage from reactive oxygen species (Harman, 1959). However, there is evidence implicating the role of free radical-induced oxidative stress in aging. Previous studies in mammalian systems suggest that shorter lived males express lower levels of antioxidant defenses such as superoxide dismutase, catalase, and consequently suffers higher levels of oxidative stress than females (Ede *et al*., 2002; Tomas-Zapico *et al*., 2006).

Drosophila melanogaster offers a good model system to study the sex difference in longevity since females live significantly longer than males. Ethanol is known to induce free radical-mediated oxidative stress, and sex difference in acute ethanol responses have been reported in *Drosophila* (Das and Vasudevan, 2007; Devineni and Heberlein, 2012). However, differential susceptibility of the sexes to ethanol-induced oxidative stress in relation to their antioxidant status has not been studied in *Drosophila*. Therefore, we have investigated the differential susceptibility to ethanol induced oxidative stress in male and female *D. melanogaster* in relation to the antioxidant enzymes, superoxide dismutase, catalase.

D. melanogaster (Oregon K) flies were obtained from the *Drosophila* Stock Centre, University of Mysore, Karnataka, India. For lifespan studies, newly-eclosed male and female flies were housed separately

in vials supplemented with standard wheat cream-agar medium. Flies were transferred to vials with fresh diet once every 5 days and mortality was recorded at different time intervals till the end of the experiment. The vials containing male and female flies were subjected to oxidative stress using exposure to ethanol. For mortality studies, a group of 10 flies each were transferred to the parafilm sealed vials containing filter paper soaked with 5% sucrose solution containing various concentrations of ethanol (8%, 10%, and 12%), whereas the control group received only 5% sucrose solution (Montooth *et al.*, 2006). Flies were maintained at 22°C throughout the experiments. The number of dead flies was recorded for 24 hours and expressed as percentage mortality. The whole body homogenate of the flies was prepared in respective assay buffer. Reactive oxygen species, glutathione, activity of the antioxidant enzymes, acetylcholinesterase, and alcohol dehydrogenase were determined using standard protocols (Vallee and Hoch, 1955; Ellman, 1959; Ellman *et* al., 1961; Marklund and Marklund, 1974; Aebi, 1983; Cathcart *et al*., 1983).

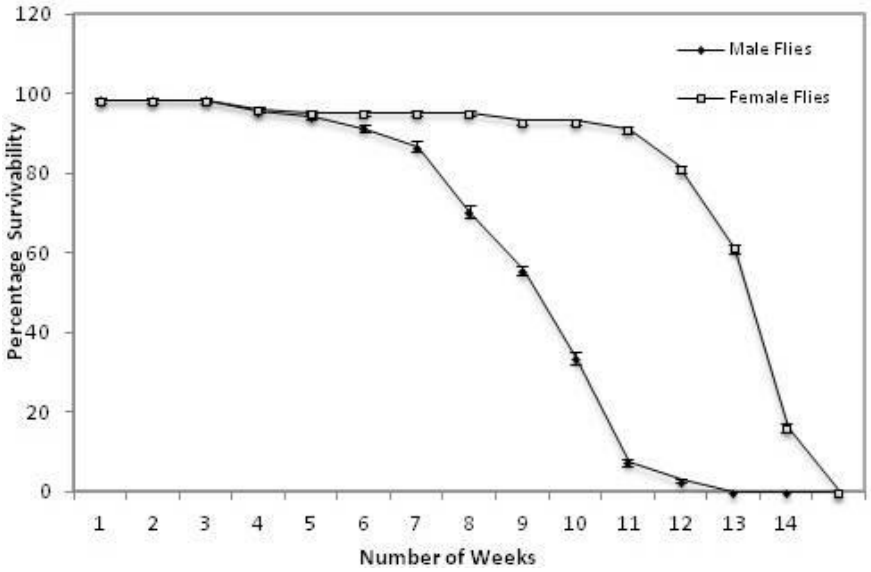

Figure 1. Mean lifespan of male and female *D. melanogaster*.

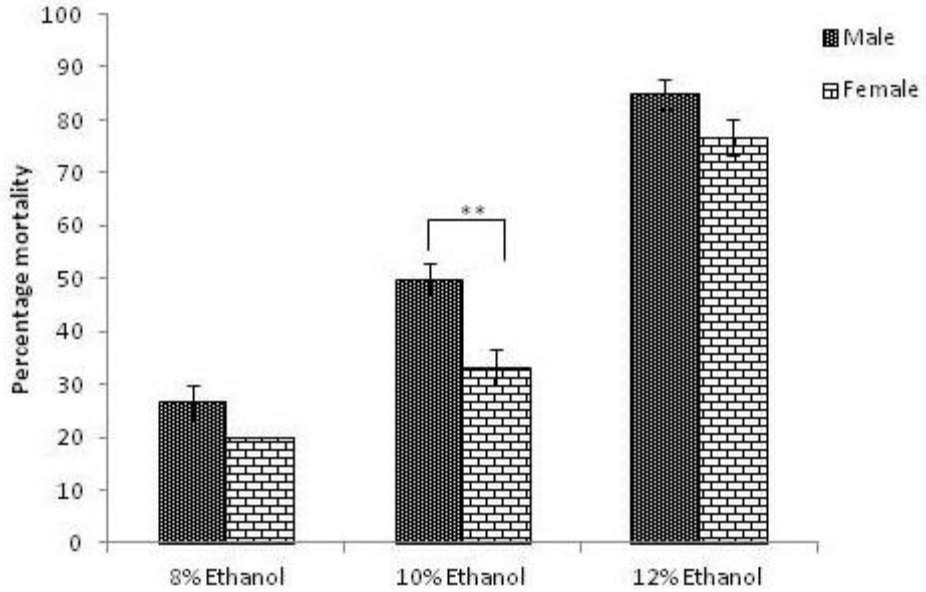

Figure 2. Gender difference in mortality of *D. melanogaster* exposed to ethanol. Values are expressed as Mean ± S.E. Data were analyzed by t-test (*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$).

Figure 1 shows the marked difference in the survivability of male and female *D. melanogaster*. There was a significant difference in the susceptibility of flies to ethanol-induced toxicity and oxidative stress

between the sexes. Females, the longer lived sex, showed greater resistance to ethanol-induced mortality when compared with that of males (Figure 2). Ethanol-induced differential oxidative stress correlates with that of antioxidant status in the sexes (detailed results will be published elsewhere). Our results strongly point out the marked sex difference in ethanol-induced mortality which positively correlates with the antioxidant defense mechanisms in the sexes. Our study presents evidence for the possible role of oxidative stress in the gender difference in longevity of *D. melanogaster*.

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Age based male mate preference in *Phorticella straita.*

Krishna, M.S. Drosophila Stock Center, Department of Studies in Zoology, University of Mysore, Manasagangotri, Mysore 570006, Karnataka State, India; Email: drosokrish@gmail.com.

Introduction

Studies of sexual selection have largely concentrated on females, as they are often the selective sex that chooses from among males (Milinski, 2001). Although female-biased empirical evidence were more in the literature, males are also likely to demonstrate mate choice under some conditions (Dewsbury, 1982). Therefore, male mate choice is also expected in systems where males allocate valuable resources to their partner, in response to variations in female quality, or where the costs of mate searching and/or assessment are low (Bounduriansky, 2001).

It was found that there are now growing numbers of observations of male choice seen in a wide range of taxa, and it has been reported in 58 insect species distributed among 11 orders and 37 families (Bonduriansky, 2001; Byrne and Rice, 2006), birds (Jones and Hunter, 1993), and fish (Amundsen and Forsgren, 2001). Studies of male mate choice in these organisms is predicted to be adaptive when variance in female fitness is large and males experience costs of mating such that they cannot inseminate all females encountered (Burley, 1977; Parker, 1983; Owens and Thompson, 1994; Johnstone *et al.*, 1996; Kokko and Monaghan, 2001). However, the empirical evidence is limited.

It was also suggested that unlike females, males also use characters in females such as virginity, body size, age, and gravid status (Bonduriansky, 2001; Prathibha and Krishna, 2010; Somashekar and Krishna, 2011). However, the most obvious character influencing the reproductive value of a female is her fecundity (Bonduriansky, 2001). If mating opportunities are constrained, of males then he shows a preference for more-fecund females to obtain direct benefit by increasing the number of offspring they produce (Katvala and Kaitala, 2001).

The most-compelling studies of male choice suggest that female mating success is often associated with traits that are correlated with female fecundity (Bonduriansky, 2001; Byrne and Rice, 2006), while in