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The Effects of Larval Population Density and Social Interactions on Adult Fecundity in Drosophila melanogaster

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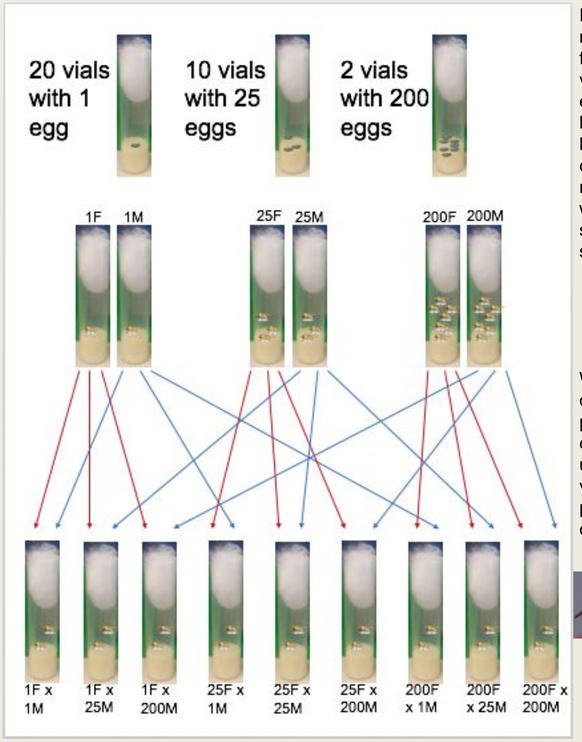
Eva Batenhorst, Maria Franco Ramos, & Nick Wanderscheid

Introduction

- *Drosophila melanogaster* has been used as a model organism to study social interactions and sexual behaviors.
- Previous studies have suggested that fecundity in flies may be affected by larval population density. [1,2]
- Other studies suggest that larvae raised in isolation have impaired visual and olfactory development which can lead to low fecundity. [3,4]
- We crossed females and males raised in isolation (low density), medium density, and high density larval population densities.
- We hope to gain insight on whether adult fecundity is affected by larval population density in fruit flies.

Methods



Flies were removed from the vials as they eclosed, before having a chance to mate, and were separated by sex.

We set up 9 different pairwise crosses using the virgin flies previously collected.

- Vials were kept in a 25 C incubator in a 12-hour light/dark cycle to grow.
- Food was provided as to not be a limiting factor for both fly parents and offspring.
- Parent flies (Gen 0) were allowed to mate for five days before they were removed, frozen, and measured by wing vein length to obtain overall size measurement.
- In following days, we observed each vial and counted adult offspring until no eclosion was observed.

Results

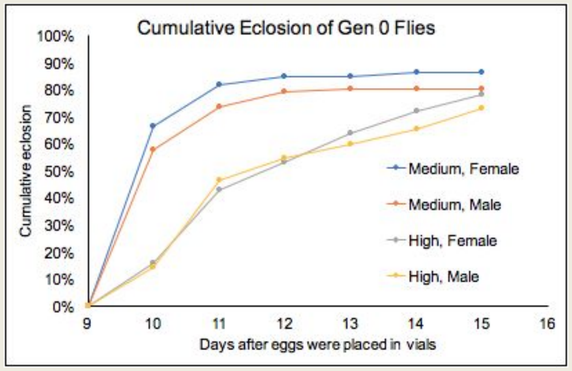


Figure 1: Eclosion rates of the parent (Gen 0) flies raised in the medium and high densities.

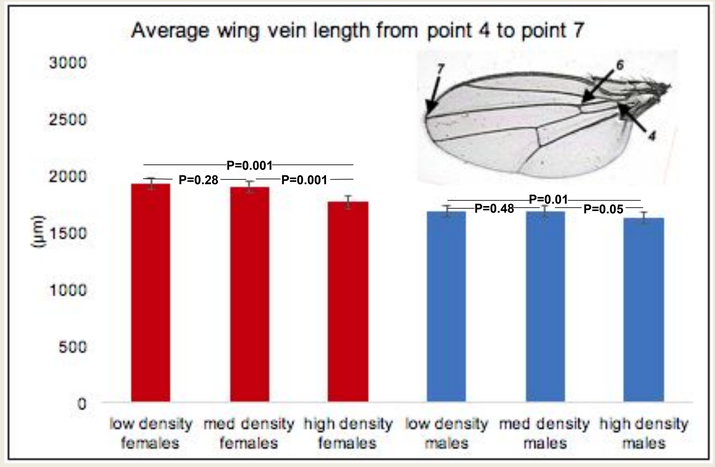


Figure 2: Length of wing veins from point 4 to point 7 and from point 6 to point 7 of parent flies. Measurements of wing length correlate to fly size. n=56.

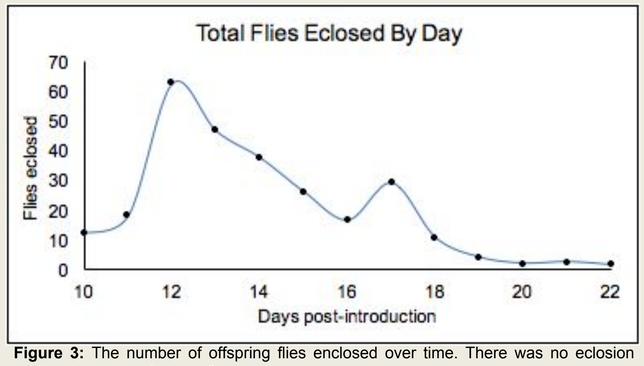


Figure 3: The number of offspring flies enclosed over time. There was no eclosion observed previous to day 10.

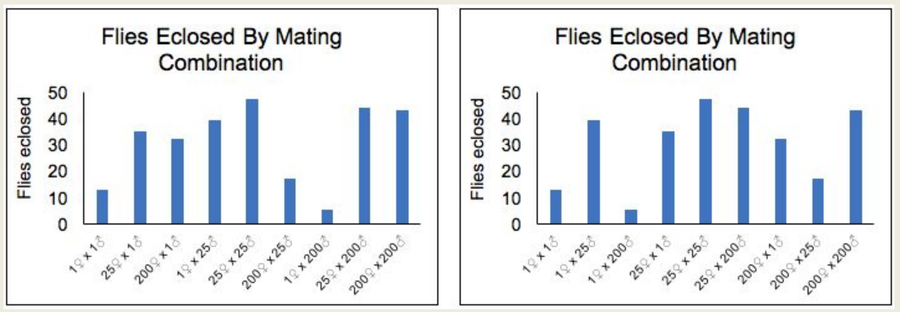


Figure 4: The number of offspring enclosed from each pairwise cross of parent flies. Then left graph show data arranged by females grown in differing densities. The right graph show data arranged by males grown in differing densities

Conclusions

- Preliminary data suggest that medium density flies eclose at a faster rate than high density flies, and a greater percentage of eggs develop into adults (Figures 1,3,4).
- Wing length data suggests that larvae raised in isolation tend to be larger, while larvae raised in high population density tend to be smaller (Figure 2).
- We will continue to run this experiment for a total of 10 replicates of each mating combination.
- When complete, this research will contribute to our knowledge about the effects of larval population density and social interactions on adult *Drosophila* fecundity.

References

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Acknowledgments

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