

Circadian Rhythm in Activity for *Drosophila serrata*



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Introduction

It has long been known that many biological functions rely on circadian rhythms. In *Drosophila* species, circadian dependant mechanisms are governed by specialized "clock cells" called oenocytes which govern dynamic biological systems. It was also recently demonstrated in *Drosophila melanogaster* that emitted hydrocarbon compounds of CHCs vary in a circadian pattern. The CHCs in *Drosophila serrata* are more characterized than *D. melanogaster* but there had been no work to describe the dynamics of the system or to determine how that relates to mating success. The first step in that research is was to develop a circadian activity profile for *D. serrata* which was the purpose of this project.

Questions

Part 1: Does *D. serrata* demonstrate a distinct circadian rhythm in activity?

Part 2: Is this circadian rhythm unique to this species?

Methods

Drosophila serrata flies were incubated under standard growth conditions for a 14 day life cycle. This species of flies stay virgin for 24 hours after emergence and so they were cleared during that window and separated by sex. On day four of their life cycle 46 female flies and 46 male flies were placed in the activity monitor.

This machine consisted of an array of narrow chambers and crossed a laser sensor. Each time that the fly crossed the laser that was recorded and the measurements were collected every 10 minutes. A few blanks were included in each array and measurements were taken for a 36 hour period in order to capture a few 24 hour cycle with minimal adaptation effect of the environment.

Predictions

Part 1: In a 24 hour cycle *Drosophila serrata* will have a definable pattern in their activity.

Part 2: This pattern will be specific to this species.

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Results

Figure 1, Activity levels for 92 *D. serrata* flies over a 36 hour period. This data was collected every 10 minutes and then plotted as a mean for both males and females.

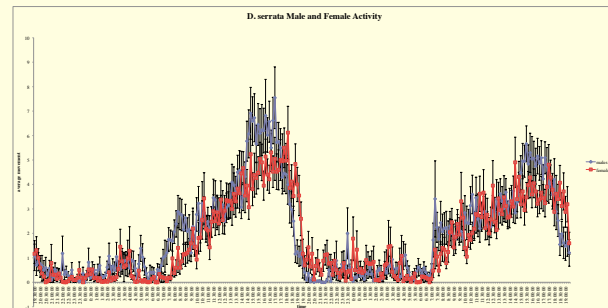
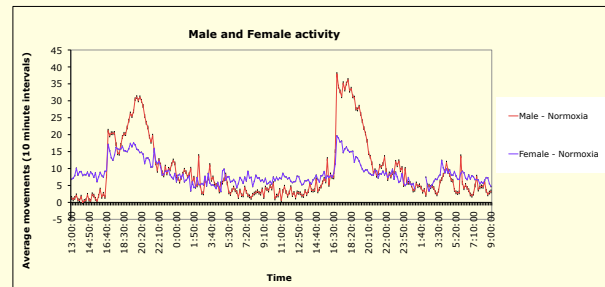


Figure 2. Activity data from an unpublished study of *D. melanogaster* collected by Mark Charette in the Rundle lab. The data was collected



Conclusions

D. serrata flies did demonstrate a definable activity pattern within an undisturbed twenty four hour cycle which leads the way for further characterizations of the dynamics of their circadian pattern in regards to CHCs and mating. In comparison to the *D. melanogaster* data there did appear to be a more gradual approach to peak activity at 4pm but there would need to be replicate experiments to achieve the same level of accuracy and demonstrate a significant difference.