CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J0908

Project Title
The Receding Night: The Effect of Artificial Light on the Migration Pattern of Daphnia

Abstract

Objectives/Goals
The objective is to determine if artificial light has an effect on the migration pattern of Daphnia in a simple laboratory experiment, in a simulation of a pond habitat, and in their natural pond environment.

Methods/Materials
The experiment had to be done in two phases. First, the Daphnia's natural migration pattern was observed. Then the effect of artificial light on these patterns was studied and compared to the original migration pattern. Daphnia were observed in test tubes and then in 3-foot columns of water and in their natural pond environment during the day and at night. Five different artificial light sources were introduced and the Daphnia were observed.

Results
The study revealed that the Daphnia did migrate in open areas of the pond, but hovered in the top and middle layers of the pond both day and night in areas where they were protected from sunlight and had a food source. When artificial light was introduced in test tube experiment, the Daphnia were not bothered by halogen, florescent or incandescent light as much as by sunlight and UV light, but attracted to sodium light. Sodium and incandescent lights, the most common outdoor lights, were used for experiments on a simulated pond habitat and the pond. The results showed that the Daphnia were attracted to both the sodium and incandescent light, but much more to the sodium light. The pond study showed swarms of Daphnia were attracted to both lights at all levels of the pond, wherever the light reached.

Conclusions/Discussion
Artificial light affects the migration pattern of Daphnia by attracting them towards the light at night. Future work would examine the migration (is it horizontal, not vertical) of zooplankton in a natural wetland that has a lot of light pollution and compare it to a wetland protected from artificial light.

Summary Statement
The project determines the effect of artificial light on the mighration pattern of Daphnia in laboratory experiments and in their natural habitat.

Help Received
My mother found the sodium light, drove me to the pond, helped me sample,and helped me get my data into data tables. I looked on the Internet and found Howard Webb who photographed Daphnia. He gave me encouragement (see emails) and after my project was completed, took the pictures of my Daphnia.