Determining the Effects of *Selenastrum capricornatum*, *Escherichia coli*, and *Saccharomyces a1* on the Population Growth of *Simocephalus serrulatus*.

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**Abstract**

This project was designed to measure the population growth of *Simocephalus serrulatus* based on the various food sources given. The population growth varied as exact quantities of *Saccharomyces a1*, *Selenastrum capricornatum*, and *Escherichia coli B* were fed to each of the containers containing *S. serrulatus* in each trial. By observing the growth in the population based off the food sources, the data has affirmed that the *S. a1* given to the populations of *S. serrulatus* will have the highest growth in population. The *E. coli B*, however, became a pollutant that was detrimental to growth of *S. serrulatus’s* population. *S. capricornatum* slowed down the population growth of *S. serrulatus*.

**Introduction**

*Daphnia sp.* are small planktonic crustaceans that feed off of various food sources such as green algae, yeast, and other bacteria. These organisms live in low-polluted, freshwater environments where they reproduce by parthenogenesis, in the spring until the end of summer (Krvutchkova 1969). The observance of which food source results in the highest population growth will allow the determinacy of pollution levels in an aquatic environment. Because *Daphnia sp.* are organisms that indicate areas of low pollution, the rapid rate of reproduction and the increasing population within an environment will signify that the pollutants in the aquatic environment are extensively low (McCaulley 1990). The purpose of the experiment is to test whether *S. capricornatum* *E. coli B* or *S. a1* has a greater effect on population growth of *S. serrulatus*.

**Materials and Methods**

Twenty glass containers each filled with 600 milliliters of filtered (120 micron mesh) Lake Waco Wetland water. The 20 containers were divided into five control trials, five *S. a1* trials, five *S. capricornatum* trials, and five *E. coli B* trials. Ten *S. serrulatus* were placed into each of the 20 containers. One centimeter of *S. a1*, *S. capricornatum*, *E. coli B* were inoculated and placed in each of their respective trial containers. All the containers were held at room temperature during the trial and placed on a 12/12 night and day cycle. The trial ran for a week. Afterwards, the *S. serrulatus* were counted to measure population growth.

**Results**

Figure 2 indicates the average population growth of *S. serrulatus*. Data recorded from this experiment suggests that algae given to a population of *S. serrulatus* will have a positive effect on the growth of the population. *E. coli B*, however, limited the growth of the population. *S. capricornatum* had a lower growth population than *S. a1* but still sustained the life of the *S. serrulatus*.

**Discussion and Conclusions**

The hypothesis stating that adding *S. a1* given as a food source will produce the largest increase in the growth of a population of *S. serrulatus*, was affirmed. Algae is present in the controlled conditions, Lake Waco Wetland water, and is the most viable food source because the *S. serrulatus* are already accustomed to feeding off algae. Research claims that yeast is also a viable food source for the organisms, however, with *S. serrulatus* collected from a nutrient rich environment, adapting to a laboratory environment and a new food source in just a few generations is not entirely possible (Krvutchkova 1969). Therefore, the results of *S. capricornatum* tested show a slight positive growth of population, and suggests that the *S. serrulatus* are able to sustain life with a *S. capricornatum* diet, but it is not the most viable food source for *S. serrulatus*. Due to the fact that *S. serrulatus* can feed off of various bacteria, *E. coli B* was also tested as being a viable food source (Bachrach 1983). However, *E. coli B* was observed to be detrimental to the population growth of *S. serrulatus*.

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**Literature**

