Experiment No. 2

Designing an experiment to study an aspect of Population Ecology

Aim: To study the effect of competition on the population growth of two species of *Paramecium.*

Plan Of Action:

- Since we want to study competition between two species of *Paramecium*, we first need to obtain cultures of two different species. One of the species is already given to us by the lab. (*P. caudatum*)
- In order to obtain another species, we will collect various samples of stagnant/dirty water from across the campus.
- We will grow all the samples collected in a yeast medium and keep a look-out for any *Paramecium* that may be there.
- If we find a different species of *Paramecium* in any of the collected samples, we will then have to isolate it.
- After isolating it, we will grow both the species as separate cultures. (At 25 degrees Celsius)

Setting up of the Cultures: (Two replicates of each)

- Culture A: Species 1 (Total vol. 20 mL)
- Culture B: Species 2 (Total vol. 20 mL)

We will observe these cultures and plot a graph of the population density vs. time; in order to obtain the carrying capacity for each population.

- After this, we are ready to set up the culture to study the effect of competition on the populations of each species.

- Culture C: 5 mL of A + 5 mL of B + 10mL of media
- Again, plot a graph of population density vs. time for sp.1 and sp.2 separately.
- Using the Lotka-Volterra equations for competition, we will then analyze the data.

What really Happened:

- We collected samples of water from different parts of the nala, stagnant rain water from near AB, near Hostel 5, the ditch behind the Faculty Housing, the playground in front of ME and MJ Blocks, lab pond water.
- We grew all the samples in separate yeast cultures. We observed a few drops from each culture under the microscope a couple of days later.
- We found a different species of *Paramecium* only in one sample collected from the nala. This species was atleast 10X bigger in comparison to *P. caudatum.*
- We went back to the nala to collect more samples of water from the same place and grew them in yeast cultures.
- Again, we found the bigger species of *Paramecium.*
- We set up multiple yeast cultures from the samples collected from the nala.
- In the yeast cultures, we found that the big *Paramecium* did not grow very well.(number density ~ 1-2 per 50μL). So, on NGP's recommendation, we grew the samples in cultures of dog food and yeast.
- Their number density drastically increased!

- Now, we had to isolate this species from the various other organisms growing in the nala.

Isolation of the new species:

- We took 20µL drops and placed it on a glass slide.
- We diluted the drops with distilled water and then using a 0.5-2.5µL pippete we tried to suck only the big *Paramecium* into the tip of the pipette. We placed whatever was in the tip into a fresh dog food and yeast culture.
- We did this multiple times across 3 days.
- We were only partially successful in isolation as we were unable to get rid of *Spirulla* and some other tiny organism.

- In order to have a constant environment for both the species of *Paramecium* we introduced *Spirulla* and the tiny organism into dog food and yeast cultures of *P. caudatum*. (the lab given species)
- Now, we had two cultures of constant environment each having a different species of *Paramecium.* We set up replicates.
- We left the cultures to grow for a couple of days.
- When we came back to check on the cultures, we found that the number density of the big *Paramecium* culture had dropped drastically in some of the replicates and had vanished completely in the others.
- Using the original samples from the nala, we isolated the big *Paramecium* and grew it again in the dog food and yeast medium.
- Again after a couple of days, the number densities had dropped.
- We isolated the big *Paramecium* and grew it this time in only yeast medium.
- The number of densities dropped again.
- At this point, we decided to stop the experiment.