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Biology/IDS
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Microorganism Population Lab

Problem Statement:

How does the population of microorganisms in a cup with finite resources vary over time.

Hypothesis:

Populations in the cup will increase while resources are available and fall back down after resources become too scarce to sustain the population of organisms. The population of organisms will exceed the carrying capacity, and, in turn, decrease the carrying capacity.

Materials:

250-300 ml Beaker
50.0 ml Green Grass
Soil
1.0 mm Dropper
125-150 ml Distilled Water
Microscope
Cover Slips

Diagram:

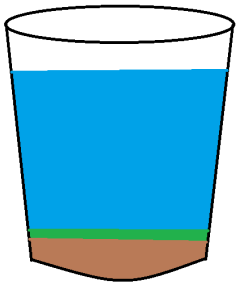

Figure 1. Population Measurements

Figure 1 above shows the relationship between the day of observation and the average population for that day.

Procedure:

1. Fill a Solo cup with the dirt, grass, and water.

2. Let it sit for a day.

3. Use a dropper to get some water from the cup, a little bit above where the dirt is, for the highest concentration of organisms.

4. Put a couple of drops of water onto a glass microscope slide.

5. Cover the water with a cover slide. (It should not overflow)

6. Put under a microscope and count the number of organisms. (Separate protista motility and genus type)

7. Repeat 4 times and record data in a notebook.

8. Dry the cover slip and slide.

9. Put the cup under a fume hood.

10. Repeat this process daily.

Data and Observations:

Table 1
Population Measurements

Date Observed	Protista Motility	Specimen A	Didinium
9-14	Ciliophora	0	0
9-15	Ciliophora	0	1
9-16	Ciliophora	0	2
9-17	Ciliophora	10	11
9-18	Ciliophora	0	0
9-19	Ciliophora	0	0
9-20	Ciliophora	103	13
9-21	Ciliophora	124	3
9-22	Ciliophora	126	34
9-23	Ciliophora	169	1
9-24	Ciliophora	40	3
9-25	Ciliophora	0	0

Date Observed	Protista Motility	Specimen A	Didinium
9-26	Ciliophora	0	0
9-27	Ciliophora	23	2
9-28	Ciliophora	23	3
9-29	Ciliophora	33	2
9-30	Ciliophora	74	3
10-1	Ciliophora	3	5

As time goes on, we see the populations of the organisms rising, and after reaching an unsustainable population, the carrying capacity drops down and we see the population begin to steady at a fraction of the peak population.

Data Analysis and Interpretation:

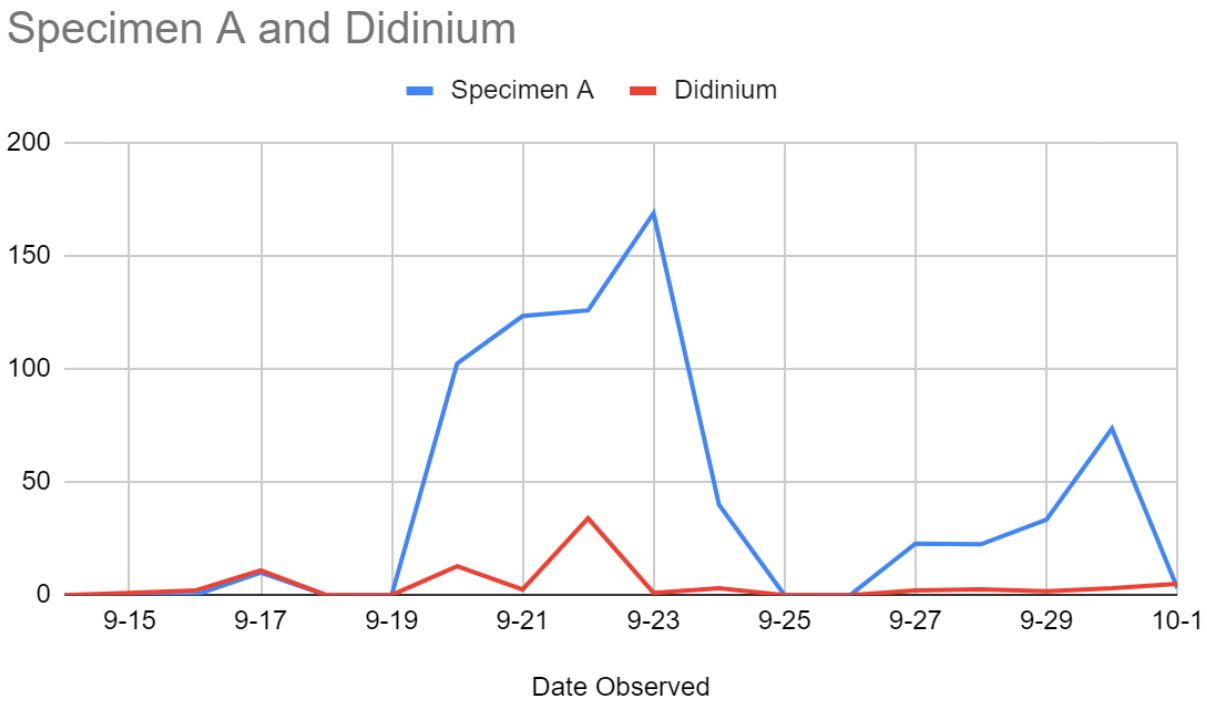

Figure 2. Population Measurements

Figure 2 above shows the relationship between the day of observation and the average population for that day.

Conclusion:

The populations observed in the experiment match the pattern of an exponential and exponential death curve. The populations started off low, then started to grow exponentially. Once they reached a population which was not sustainable, exceeding the carrying capacity, which caused the resources to deplete, exponential death began to occur in the population. The original carrying capacity falls to a decreased amount, called the adjusted carrying capacity. The population began to recover, but the experiment ended by then. Our hypothesis proved to be correct.