



Introduction

Netlogo is a multi-agent based modeling environment developed by a professor at Northwestern University. It's available free on the internet at:

<http://ccl.northwestern.edu/netlogo/>

It has a huge library of free models available, with everything from modeling traffic jams to virus outbreaks, so if you enjoy playing with the model today, feel free to go online and check out more!

Start out by reading about the model. This one has two classes of "agents" (simulated individuals) that are interacting: a predator, a prey. It also includes another factor - a resource that the prey uses to get energy.

Define:

Your Predator: _____

Your Prey: _____

The Resource: _____

The model also has parameters, or rules that govern how the agents and resource can grow and interact.

List and Define 3 of the Parameters that are Interesting To You:

1.

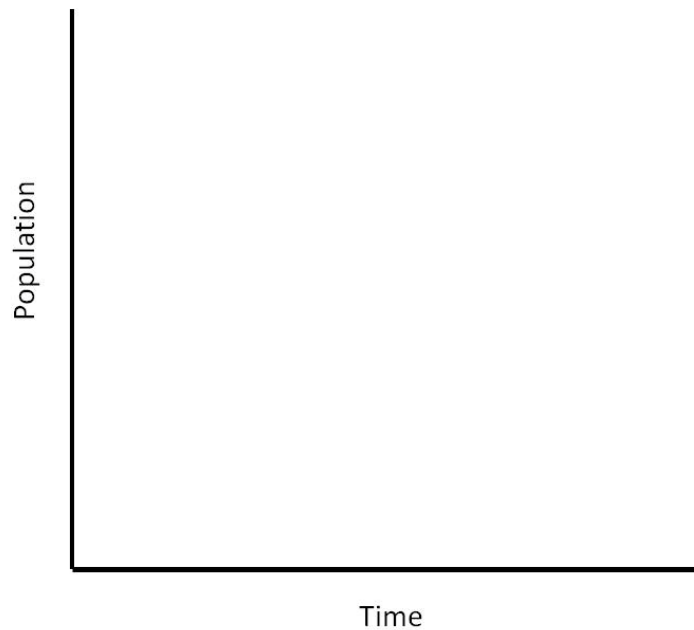
2.

3.

Experiment 1: No SOM Resource

1. Set the SOM to "Off"
2. Press the "Setup" Button to set up the model
3. Press "Go"

Draw What Happened (Include a Legend):



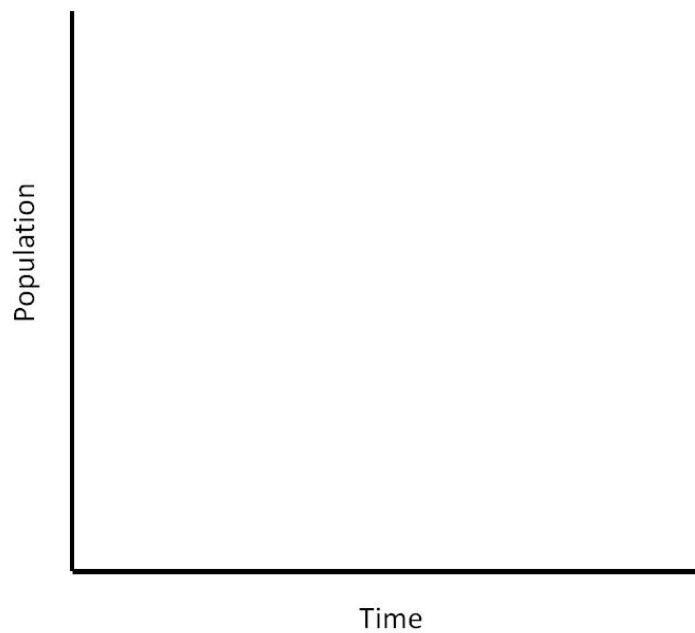
How did the predators and prey influence each other?

What eventually happened to both populations?

Experiment 2: With SOM Resource

1. Set the SOM button to “On”
2. Press the “Setup” Button to set up the model
3. Press “Go”
4. Allow the model to go for 1,000 time counts, then press “Go” again to stop.
5. Notice the grey line, which indicates SOM, has now been added to the graph.

Draw What Happened (Include a Legend):



How do the sizes of the three populations relate now? What is the explanation for this?

Further Experiments:

1. Try adjusting the parameters under various settings. How sensitive is the stability of the model to the particular parameters? Pick one parameter and describe the model's sensitivity to it.
2. Can you find any parameters that generate a stable ecosystem that includes only protozoa and bacteria? Explain.
3. Try setting SOM? to "On", but setting INITIAL-NUMBER-PROTOZOA to 0. This gives a stable ecosystem with only bacteria and SOM. Why might this be stable while the variation with only bacteria and protozoa is not?
4. Notice that under stable settings, the populations tend to fluctuate at a predictable pace. Can you find any parameters that will speed this up or slow it down?

5. Try changing the reproduction rules – for example, what would happen if reproduction depended on energy rather than being determined by a fixed probability?

6. Extending the model: If you click on the “Procedures” tab, you can see the code that generated this model. There are a number of ways to alter the model to include more factors, or ways to make it stable with only protozoa and bacteria. Some will require elements to be coded in or existing behaviors to be changed. In what ways would you alter the model? (If you’re interested in doing this, or making your own model, there is a great tutorial available on the website)