

APES predator-prey simulation lab part 2

Full Names:

1 Pre-Lab

1.1 Goal

Part 2 will explore some more complicated parameters. Start by opening the simulation titled “fox-hen all parms.”

1.2 The other parameters

For each parameter we have not already explored, think about what the physical interpretation of that parameter is and what the result of increasing or decreasing it will be. If you don’t understand what a parameter is, feel free to ask me. You don’t need to write anything down yet.

2 Birth range

The birth range parameter is often physically unrealistic. When might it be physically realistic? Why might we want it set to something other than 0 in spite of its questionable physicality?

2.1 Kill efficiency

Consider the sliders “kill NumSuc” and “killRange”. Play with these a bit and watch what happens.

1. Why do you think that changing these sliders has such a dramatic impact on the system?
2. Set both of these parameters extremely high. Is there any way to make the system stable? (if you are wondering why some combinations appear to result in no hens even at the start, this is because the simulation starts at $t=2$, not $t=1$ since $t=1$ is needed for initialization)

2.2 Predator and Prey mobility

1. Create a hypothesis about the effect that extremely low predator mobility will have on the system. What about extremely low prey mobility? You should choose values for the rest of the sliders that result in reasonable stability for the default values of predator and prey mobility.

2.3 Starting populations

Find values for all sliders that result in stability for the default values of predator and prey starting population sizes. Now predict how setting very small or very large starting populations will affect results? Use the table below to collect data.

Fox and Hen Dynamics

[illegible]

2.4 Final Conclusion

Now that you have played with all parameters, what can you conclude overall about the stability of predator-prey systems? Are these conclusions in agreement with your initial ideas?