

Lecture 18 – Predation

READINGS:

- Gilg O, I Hanski and B Sittler. 2003. Cyclic dynamics in a simple vertebrate predator-prey community. *Science*. **302**:866.
- Turchin P, L Oksanen, *et al.* 2000. Are lemmings prey or predators? *Nature*. **405**:562.
- Tilman D. 2000. Causes, consequences and ethics of biodiversity. *Nature*. **405**:208.
- Ranta E. 2003. Making sense of complex population cycles. *Science*. **301**:171.

Outline for today:

I. Predation

- a. Lotka-Volterra
- b. Rosenweig-MacArthur
- c. Functional Response Curves -- Holling

II. Guest Speaker, Aladdine Joroff ('00)

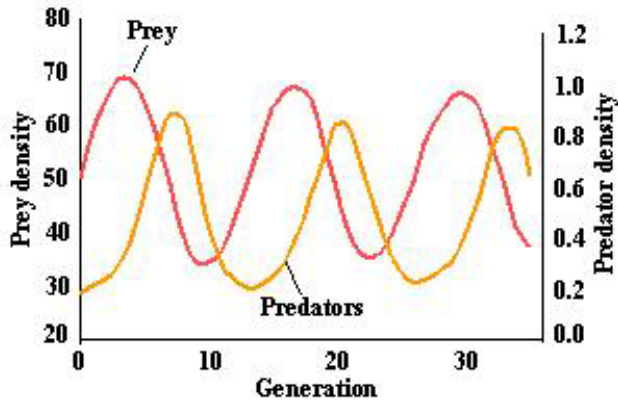
Lemmings: Predator or Prey?

Study Questions

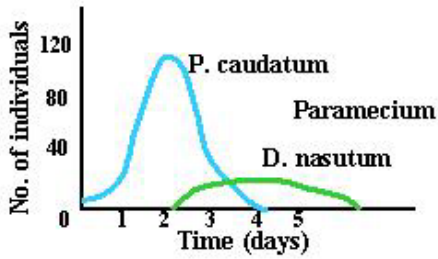
- What is unrealistic about Lotka-Volterra's approach to modeling predator-prey interactions? What other shapes can the isoclines assume?
- What situations are stable and unstable in Rosenweig-MacArthur's approach? What changes might make stable interactions unstable?
- Sketch the Type I, II and III Functional Response Curves and describe what the shapes of the curves mean.
- According to Tilman, how does competition among members of a single trophic level serve to stabilize communities? What are the requirements for coexistence?
- Compare the findings of Gilg *et al.* and Turchin *et al.* Are their findings compatible with each other?
- In the Gilg *et al.* paper, what type of function response curves do the predators exhibit with respect to lemming density?

Creating Stable Oscillations in Lab Settings

Adapted from Krebs Fig. 13.2

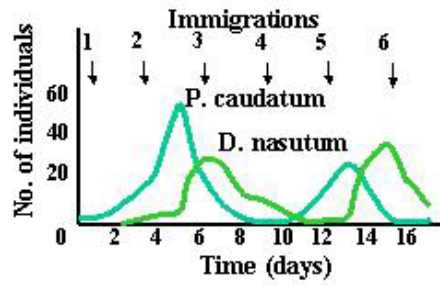
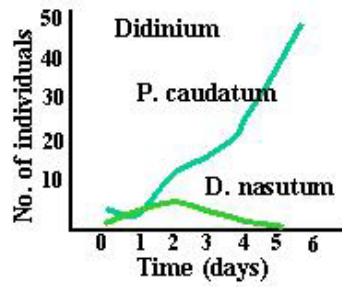


Adapted from Krebs Fig. 13.7



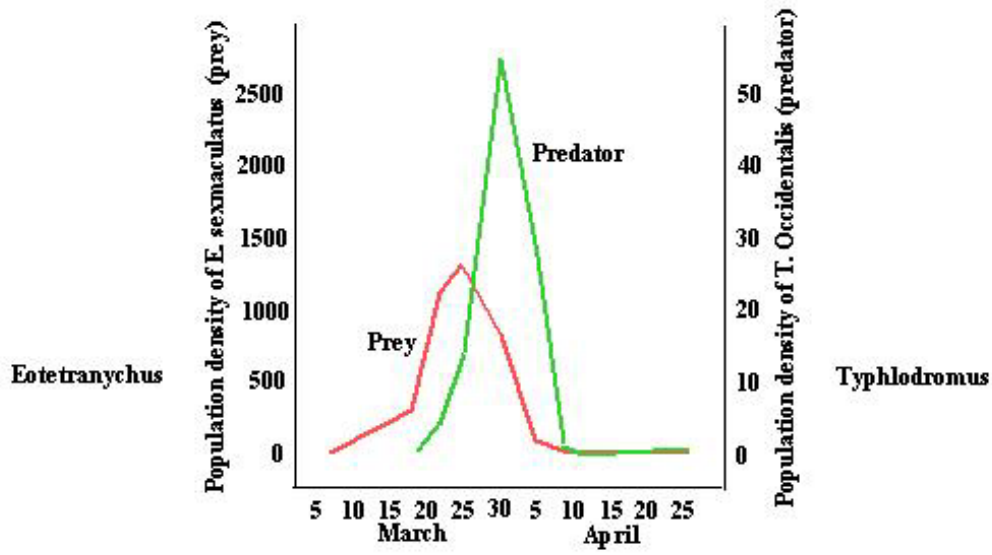
Gause 1934

Classic Experiments

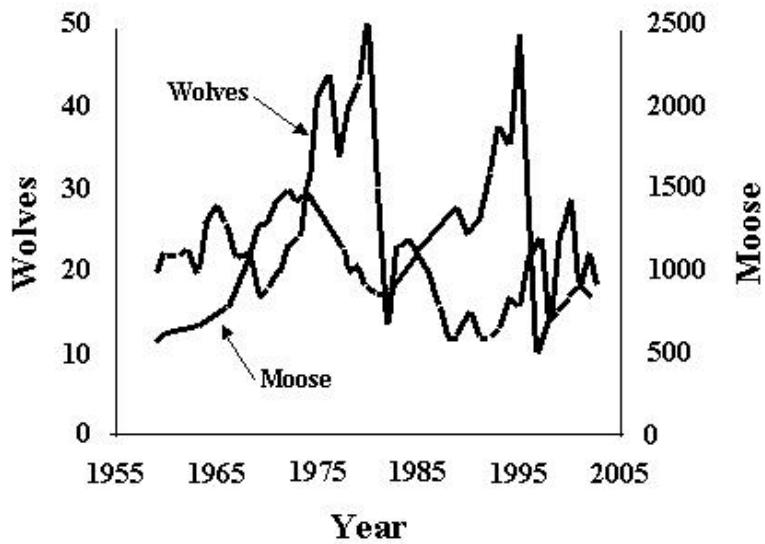


Huffaker

Adapted from Krebs Fig. 13.8



Oscillations in Natural Settings



Functional Responses:

Type II

Adapted from Krebs Fig. 13.17

