Exploitation

Lecture outline

- Types of exploitation
- Herbivory
- Predator-prey cycles
- Importance of immigration and refuges
- Overall importance

Some types of exploitation

- Living food
- National Geographic-type of predation
- Cannibalism
- Herbivory
- Parasitoidism

Herbivory in streams

- A persuasive pattern

How do you figure out if a consumer is important?

A picture is worth a thousand words (or at least one graph)
Predator-prey cycles
- 9-10 yr snowshoe hare and lynx cycles
- Are they linked?

Hare-lynx (1)
- A closer look
- But, still just a pattern

One BIG experiment
- Fence around 1 km² plot in the Yukon, which eliminates predatory mammals

Hare-lynx (2)
- 8-yr experiment

Results for Lotka-Volterra predator-prey equations

Theory meets reality
Refuges and immigration in action

- Huffaker’s oranges (1958)

Fig. 14.20

Predatory mite

Prey: six-spotted mite

A complex array of 130 oranges with permanent barriers to predator jellies and adults.

Within the complex array, herbivorous mites and their predators produced three full population oscillations.

Predation on cicadas

- Periodical cicadas
- 13 or 17 yr cycles

Fig. 14.22

Cicada emerging from ground caught by emergence traps.

Wings indicate host predation.

Whole cicada indicate mortality due to other causes.

What’s the refuge?

Fig. 14.23

Live cicadas (per 1,000 m²)

Cicada density

Percentage killed by predators

May

June

Why effective?

Fig. 7.22

The three curves differ mainly in how food limits the consumer changes at low food densities.

All three curves level off at maximum high prey density.

One last refuge

Fig. 14.24

Do predators regulate prey?

Fig. 14.24

WOLVES

Moose

YEAR

WOLVES

MOOSE
Landscape of fear

- What happens if you glue a spider’s mouthparts shut? Are they still a predator?
- Trait-mediated indirect interactions (TMII)

Trait-mediated indirect interactions (TMII)

Schmitz et al. (1997)

Predator-prey adaptations

Batesian (+, -) or Müllerian (-, -) mimicry?

Photo: Bob Handelman

Swimming