

## Topics

Readings are from Smith, R.L. and Smith, T.M. (2003) Ecology and Field Biology, 5<sup>th</sup> edition. Benjamin Cummings

### Global patterns that influence the ecology of organisms

1. Introduction. Identifying patterns is this first step in developing an understanding of ecological processes.

Chapt. 1

2. World-wide meteorological patterns.

These patterns govern the distribution of biomes and influence the types of stresses faced by the organisms living within them.

Chapts. 2, 3

3. Physiological ecology. Examines the ways in which organisms adapt to environments.

Carbon Chapt. 5

Water, Temperature, Photosynthesis

Chapts. 6, 7, 8

4. Energy and nutrient flow

The amount of energy and nutrients available places a limit on the number and types of organisms that can exist together. Thus energy cycles strongly influence community structure.

Chapts. 24, 25

## Factors that influence the size of populations made up of single species

### 5. The logistic model

This model examines how resource level and the efficiency with which organisms use resources affect their population size.

Chapt. 11

### 6. Demographic parameters

These parameters describe a species' patterns of birth, death and reproduction. By knowing this information can predict population growth rates through time.

Chapt. 10

### 7. Life history evolution

In turn, examination of demographic patterns provides information about why particular patterns of birth, death and fecundity (child-bearing) (i.e., of life history) evolve.

Chapt. 13

## Factors regulating the interactions between species

### 8. Competition

Describes the processes by which species exploit the same limiting resources and predicts the likelihood that two species can coexist within the same community. Competitive interactions occur between organisms occupying the same trophic level.

Chapt. 14

### 9. Predation

Describes the interactions between predator and prey, host and parasite or disease. Predatory interactions occur between organisms at different trophic levels.

Chapters. 15, 16

What regulates the number and type of species that can co-occur within a community?

10. Niche The niche is a biological concept that ties together information about physiological tolerances, resource utilization efficiency (K), competition and predation, to understand and predict which species can co-occur within a community through time.

Chapters. 20, 22

11. Island biogeography

Island systems have proven very valuable for extending our knowledge about controls on community structure and organization.

Chapt. 23

12. Succession

Although many of the topics that we cover above define features of organisms that permit or predict stable coexistence through time, most communities do not remain constant. Here we explore why this is so and consider the implications for management policies.

Chapt. 21

Two films: Cave toads: an unnatural history  
Hawaii: Born of Fire