

## Interactions

- What is a community? How do the members of a community interact?
- Interactions
  - competition
  - predator-prey
  - symbiosis

## Dining In

- Wasps and *Pieris* caterpillars form an unusual three-step food chain
- The wasp *Apanteles glomeratus* stabs through the skin of a *Pieris rapae* caterpillar and lays her eggs
  - The caterpillar will be destroyed from within as the wasp larvae hatch and nourish themselves on its internal organs



- Ichneumon wasps can detect when a *Pieris* caterpillar contains *Apanteles* larvae

- A female ichneumon will pierce the caterpillar and deposit her own eggs inside of the *Apanteles* larvae



- Finally, yet another wasp, a chalcid, may lay its eggs inside the ichneumon larvae
- Usually, only the chalcids will emerge from the dead husk of the caterpillar



## Community

- All organisms in an area make up a community
- Factors
  - Biodiversity
  - Major form of vegetation
  - Trophic structure (feeding relationships)



Figure 36.1

## Interactions - competition

- **Competition** occurs between two populations if both use same limited resource
- A population's **niche** is its role in the community
  - The sum total of its use of the biotic and abiotic resources of its habitat

- Competitive exclusion principle

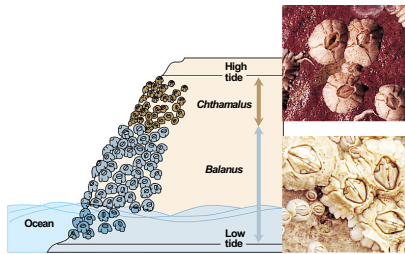
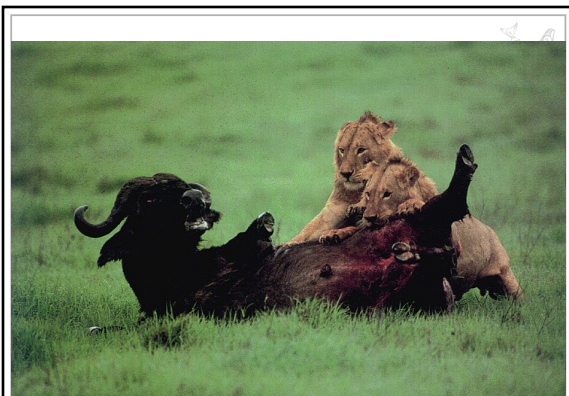
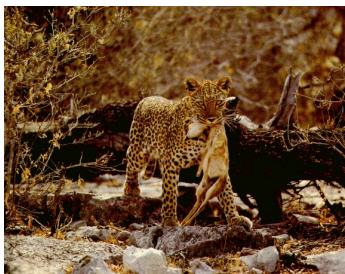


Figure 36.2

## Interactions - predator-prey

- Predation is an interaction where one species eats another



- Coevolution

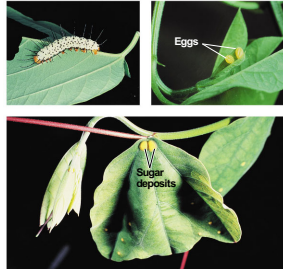


Figure 36.3A

### Defense mechanisms

- Mechanical
- What are some examples?

Echidna



African crested porcupine



Sea star



- Chemical defenses

- Animals with effective chemical defenses are often brightly colored to warn predators
- Example: the poison-arrow frog



Figure 36.3B



- Camouflage

- Example: the gray tree frog



Figure 36.3C

- Batesian mimicry occurs when a harmless species mimics a harmful one

- The mimicry can even involve behavior
- This hawkmoth larva puffs up its head to mimic the head of a snake



Figure 36.3D

- Müllerian mimicry is when two unpalatable species that inhabit the same community mimic each other

- Example: the cuckoo bee and the yellow jacket



Figure 36.3E

### Predation can maintain diversity in a community

- A keystone predator may maintain diversity by reducing the numbers of the strongest competitors

- This sea star is a keystone predator



Figure 36.4A

- Predation by killer whales on sea otters, allowing sea urchins to overgraze on kelp

- Sea otters represent the keystone species

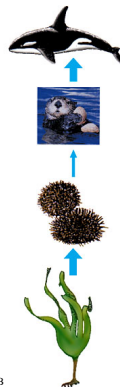


Figure 36.4B

### Interactions: symbiosis

- Interaction between two or more species that live together in direct contact
- Three types:
  - Parasitism
  - Commensalism
  - Mutualism



- Parasitism is a kind of predator-prey relationship

- The parasite benefits and the host is harmed in this symbiotic relationship
- A parasite obtains food at the expense of its host
- Parasites are typically smaller than their hosts



- In the 1940s, Australia was overrun by hundreds of millions of European rabbits

- The rabbits destroyed huge expanses of Australia
- They threatened the sheep and cattle industries

- In 1950, a parasite that infects rabbits (myxoma virus) was deliberately introduced to control the rabbit population



Figure 36.5A



- Commensalism: one partner benefits and the other is unaffected

- Examples:

- Algae that grow on the shells of sea turtles
- Barnacles that attach to whales
- Birds that feed on insects flushed out of the grass by grazing cattle



- Mutualism: both partners benefit

- Examples:

- Nitrogen-fixing bacteria and legumes
- Acacia trees and the ants of the genus *Pseudomyrmex*



## pollination



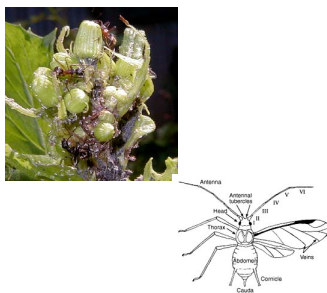
## seed dispersal



## coral reefs



## Ants and aphids



## Anemone fish

