Chapter 8 Understanding Populations

Section 2: How Species Interact with Each Other

Preview

- **Objectives**
- **An Organism's Niche**
- **Ways in Which Species Interact**
- **Competition**
- **Indirect Competition**
- **Adaptations to Competition**
- **Predation**
- **Parasitism**
- **Mutualism**
- **Commensalism**
- **Symbiosis and Coevolution**

Objectives

- **Explain the difference between niche and habitat.**
- **Give examples of parts of a niche.**
- **Describe the five major types of interactions between species.**
- **Explain the difference between parasitism and predation.**
- **Explain how symbiotic relationships may evolve.**

An Organism's Niche

- **These categories are based on whether each species causes benefit or harm to the other species in a given relationships in terms of total effects over time.**
- **Other types of interactions are possible.**
- **Many interactions between species are indirect, some interactions do not fit in a category clearly, and other types seem possible but are rarely found. Therefore, many interactions are neither categorized nor well studied.**

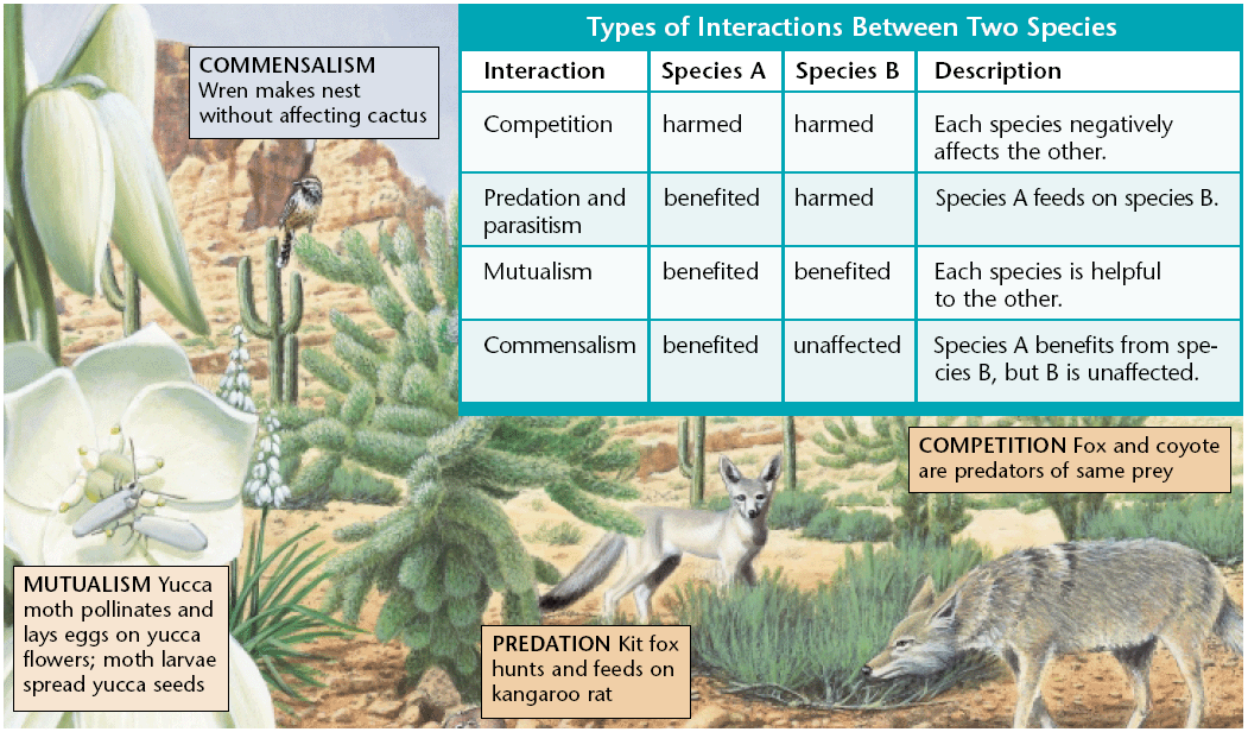
Symbiosis and Coevolution

- **Symbiosis is a relationship in which two different organisms live in close association with each other.**
- **Symbiosis is most often used to describe a relationship in which at least one species benefits.**
- **Overtime, species in close relationships may *coevolve*. These species may evolve adaptations that reduce the harm or improve the benefit of the relationship.**

Ways in Which Species Interact

- **Interactions between species are categorized at the level where one population interacts with another.**
- **The five major types of species interactions are:**
  - **Competition**
  - **Predation**
  - **Parasitism**
  - **Mutualism**
  - **Commensalism**

Species Interactions



Types of Interactions Between Two Species

Interaction	Species A	Species B	Description
Competition	harmed	harmed	Each species negatively affects the other.
Predation and parasitism	benefited	harmed	Species A feeds on species B.
Mutualism	benefited	benefited	Each species is helpful to the other.
Commensalism	benefited	unaffected	Species A benefits from species B, but B is unaffected.

Ways in Which Species Interact

- **These categories are based on whether each species causes benefit or harm to the other species in a given relationships in terms of total effects over time.**
- **Other types of interactions are possible.**

Ways in Which Species Interact cont.

- **Many interactions between species are indirect, some interactions do not fit in a category clearly, and other types seem possible but are rarely found. Therefore, many interactions are neither categorized nor well studied.**

Competition

- **Competition is the relationship between two species (or individuals) in which both species (or individuals) attempt to use the same limited resource such that both are negatively affected by the relationship.**
- **Members of the same species must compete with each other because they require the same resources because they occupy the same niche. When members of different species compete, we say that their niches overlap, which means that each species uses some of the same resources in a habitat.**

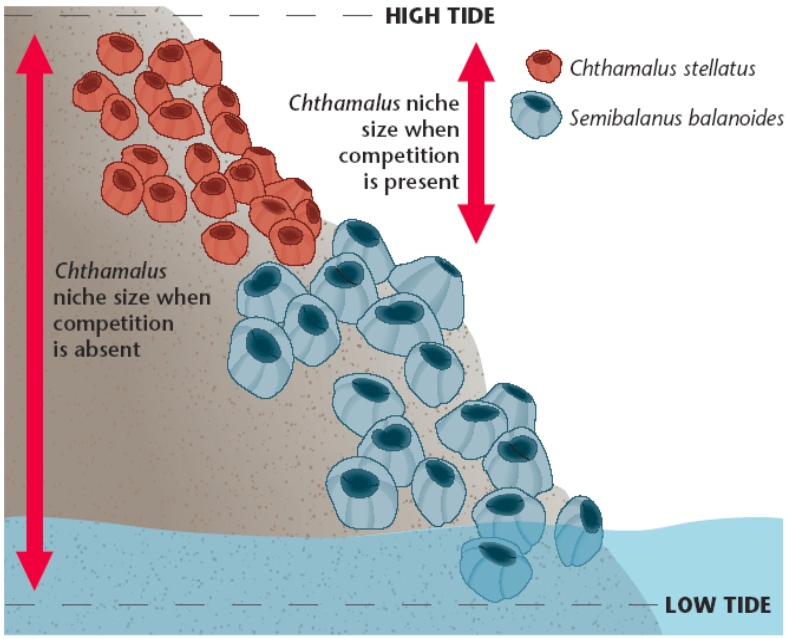
Indirect Competition

- **Species can compete even if they never come into direct contact with each other.**
- **For example, suppose that one insect feeds on a certain plant during they day and that another species feeds on the same plant during the night. Because they use the same food source, the two species are indirect competitors.**
- **Humans rarely interact with the insects that eat our food crops, but those insects are still competing with us for food.**

Adaptations to Competition

- **When two species with similar niches are placed together in the same ecosystem, we might expect one species to be more successful than the other.**
- **But in the course of evolution, adaptations that decrease competition will also be advantageous for species whose niches overlap.**
- **One way competition can be reduced between species is by dividing up the niche in time or space.**
- **Niche restriction is when each species uses less of the niche than they are capable of using. It is observed in closely related species that use the same resources within a habitat.**
- **For example, *Chthamalus stellatus,* a barnacle species, is found only in the upper level of the intertidal zone when another barnacle species is present. When the other species is removed, *C. stellatus* can be found at deeper levels.**
- **The actual niche used by a species may be smaller than the potential niche.**

Adaptations to Competition cont.

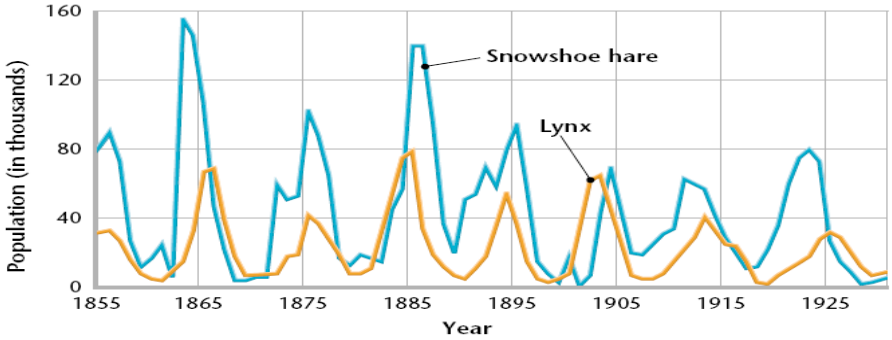


Predation

- **Predation is an interaction between two species in which one species, the predator, feeds on the other species, the prey.**
- **In complex food webs, a predator may also be the prey of another species.**
- **Most organisms have evolved some mechanisms to avoid or defend against predators.**

Predators

- **Some predators eat only specific types of prey. In this kind of close relationship, the sizes of each population tend to increase and decrease in linked patterns, as shown below.**



Parasitism

- **An organism that lives in or on another organism and feeds on the other organism is a *parasite.* Examples**

include ticks, fleas, tapeworms, heartworms, and bloodsucking leeches.

- **The organisms the parasite takes its nourishment from is known as the *host*.**
- **Parasitism is a relationship between two species, the parasite, benefits from the other species, the host, and usually harms the host.**

Parasitism cont.

- **The differences between a parasite and a predator are that a parasite spends some of its life in or on the host, and that the parasites do not usually kill their hosts.**
- **In fact, the parasite has an evolutionary advantage if it allows its host to live longer.**
- **However, the host is often weakened or exposed to disease by the parasite.**

Mutualism

- **Many species depend on another species for survival. In some cases, neither organism can survive alone.**
- **Mutualism is a relationship between two species in which both species benefit.**
- **Certain species of bacteria in your intestines form a mutualistic relationship with you. These bacteria help break down food that you cannot digest. In return, you give the bacteria a warm, food-rich habitat.**

Commensalism

- **Commensalism is a relationship between two organisms in which one organism benefits and the other in unaffected.**
- **An example is the relationship between sharks and a type of fish called remoras. Remoras attach themselves to sharks and feed on scraps of food left over from the shark's meals.**

- **Even seemingly harmless activity, however, might have an effect on another species.**