

# **Roles in Ecosystems & Competition**



# *How does competition arise?*

- Occurs naturally, whenever two or more organisms come close together in the environment and rely on the same resources
- Competition is a good thing because it serves to remove weaker organisms and therefore strengthens populations
- In food webs, you can easily find out which species may be competing for the same resources

# Ecological Niche

- Each organism has its own place within an ecosystem
- Ecological niche: organism's place in the food web, its habitat, breeding area, and the time of day it is most active; includes everything an organism does to survive and reproduce
- Each species in an ecosystem tends to have a different niche, a different role; this helps reduce competition between species for the same territory and resources

# Video : exotic species

<http://www.youtube.com/watch?v=rEfviq9t6kY>

# Competition for Niches

- When a new species enters an ecosystem, it causes a disturbance (comes into competition with one or more species already there)
- **Exotic species**: a new species in an ecosystem, not native to the area
- Sometimes species are introduced naturally: Animals are mobile and can move easily between ecosystems, plant seeds are carried by wind/animals
- Humans are often responsible for the introduction of exotic species into an area; unfortunately this can have disastrous consequences.

# Intentional Introductions

- The intentional introduction of an exotic species is often done for economic reasons. The introduction of such exotic species may or may not be successful; economically or otherwise.
- Successful example: In NF, shrews were introduced in 1958 to control an insect called the sawfly, which causes damage to larch and spruce trees.

## Non-successful example:

- In 1957, wild African bees were imported by Brazil to try and increase honey production. They produced more honey, but caused an overall decrease in the honey production. This occurred because the aggressive African bees displaced the native species.
- These bees today are called “killer bees” due to a tendency to swarm and attack threatening animals. Their population has grown and spread, unchecked by any natural predators. By 1986, they had moved as far as Mexico, killing over 150 people. By 1994, they had colonies in the southern US. They do not do well in cold climates, so Canada is safe.

# Accidental Introductions

- Good example - introduction of Zebra mussels into Lake Erie in the early 1990's. It is a native of the Caspian Sea in Western Asia. It's believed to have entered through bilge water discharged from ships. They have spread throughout the Great Lakes and into numerous interconnected waterways.
- By 1995, they had moved through the Ohio River to the Mississippi, and could be found all the way to the Gulf of Mexico. (page 42, fig. 5)

# Zebra Mussels

- The pearly mussels have hard shells which the zebra mussels attached themselves to preventing the native mussels from moving to obtain food, thus causing the decline pearly mussels.
- They attached themselves to hard surfaces such as water intake pipes which is choking the water supply to many industries costing millions of dollars.
- They reduced the amount of algae in the water thus increasing the temperature of the water. Warm water holds less oxygen thus having a hugh affects on fish such as trout in the lake.

# Zebra Mussels



# Symbiosis

Symbiosis— the living together of two different species; allows them to interact so that at least one of the organisms benefits.

The benefits an organism might get by interacting with another include *food, shelter, protection, and aids in reproduction.*

Symbiotic relationships help maintain stability within the ecosystem

# Video: Symbiosis

[http://video.nationalgeographic.com/video/player/animals/bugs-animals/ants-and-termites/ant\\_caterpillarsymbiosis.html](http://video.nationalgeographic.com/video/player/animals/bugs-animals/ants-and-termites/ant_caterpillarsymbiosis.html)

## Three types of symbiotic relationships:

- **Mutualism** - a symbiotic relationship between two species of organisms in which *both benefit* from the association (+/+)

Examples include:

- cows and microorganisms
- algal and fungal cells in lichens
- Anemones and clownfish



# Parasitism

- Parasitism - a symbiotic relationship between organisms of different species where one organism, the parasite, benefits at the expense of the host (+/-). Examples include:
  - tapeworms and dogs
  - fleas and cats
  - influenza virus and humans



# Commensalism

- Commensalism - a type of symbiotic relationship between two organisms where one organism benefits but the other is unaffected (+/0). Examples include:
  - pilotfish and sharks
  - barnacles and whales
  - fish and beaver
  - Remora fish on sharks

