

## **Ecology Notes – Part II**

### **Diversity Benefits Ecosystem Stability**

**Species:** a group of organisms that share many common characteristics, are able to mate and produce fertile offspring.

**Limiting Factors:** factors in the environment that can limit the size of a given population. This includes:

- ◆ **Abiotic** factors such as availability of water, oxygen, intensity of sunlight, pH of soil, temperature range, minerals present
- ◆ **Biotic** factors such as types and number of predators, overpopulation of any one species, disease, types and numbers of other organisms living in the ecosystem

**Competition:** the struggle among organisms for limited resources

- ◆ **Interspecies competition:** struggle among organisms of different species
- ◆ **Intraspecies competition:** competition among organisms of the same species for limited resources
- ◆ **Limited resources include:** food, water, shelter, opportunities to reproduce, space

**Niche:** the role the organism has in its ecosystem (the way it relates to and uses the environment in which it lives).

- ◆ **Only one species at a time can occupy the same niche.** Multiple species can occupy the same habitat as long as their niches are different.
- ◆ If two species attempt to fill the same role in the environment, competition will occur.
- ◆ For example, blue birds and starlings compete for the same reproductive sites (in the same trees and among the higher branches). Only one bird species (either starlings or blue jays) can live in trees where they nest.

**Carrying Capacity:** the number of organisms of any single species that an ecosystem can support. Can be affected by:

- ◆ **Abiotic** factors such as available energy, water, oxygen, and minerals
- ◆ **Biotic** factors such as the types and number of other species living in the same ecosystem.

**Biodiversity (short for biological diversity):** the measure of the degree to which species vary within an ecosystem.

- ◆ Biodiversity can be considered on three different levels which include:
  - ✓ **Genetic Diversity:** the variations among inherited biological traits (found in the DNA) of each species.
    - maintaining genetic diversity among organisms of any species is very important for the survival of that species. The more genetic variations among organisms in a given species, the better chance that the species will adapt and survive when changes occur in their environment.
    - for example, populations of a given species who have little genetic diversity, will be very vulnerable to outbreaks of disease or pest infestations.
  - ✓ **Species Diversity:** The greater the biodiversity of a given ecosystem, the more stable that ecosystem is.
    - Species diversity serves as a barrier to the spread of disease.** By having a

large number of diverse species, it is harder for the agents of infection (disease causing organisms) to spread quickly through the ecosystem.  
--The loss of biodiversity in terms of numbers and types of species upsets the stability of the ecosystem.

- ✓ **Ecosystem Diversity:** occurs in natural communities in a given area or region that is made up of interacting groups of living organisms that live are interdependent on one another.

### Why is Biodiversity so Important to Us?

- ⇒ **Maintenance of Soil Quality:** Bacteria, fungi, mites, millipedes and worms (to name a few) help to break down organic matter, recycle materials back to the soil and the environment. Trees prevent valuable soil from being washed away.
- ⇒ **Maintenance of Air Quality:** plants and algae remove CO<sub>2</sub> (greenhouse gas) from the environment and release O<sub>2</sub> into the atmosphere.
- ⇒ **Pest Control:** some biologists estimate that around 99% of potential crop pests are controlled by a variety of other organisms such as birds, insects and fungi. Natural control of pests eliminates the need for harmful chemical insecticides.
- ⇒ **Pollination:** Flowering plants rely on the activities of various animal species including bees, butterflies, bats, and birds to help them reproduce through the transport of their pollen. More than 1/3 of our food crops depend on this process of natural pollination.
- ⇒ **Diversity in Food Sources:** with decreased biodiversity we would have less variety in the foods we eat.
- ⇒ **Sources of Medicine:** by limiting biodiversity, we lose potential plants and animals that may provide us with new medicines, drugs, insecticides, or other valuable resources.

### Threats to Biodiversity

- ✓ Physical alteration of habitat areas (ex: cutting down rainforests)
- ✓ Introduction of alien species (have no natural predators)
- ✓ Exploitation for human consumption (ex: killing seal pup for fur coats)
- ✓ Air, water, and land pollution
- ✓ Continual increase in human population
- ✓ Wasteful consumption and management of limited resources



