Microorganisms In Ecosystems

Websites:

Symbiosis examples: [http://www.mansfield.ohio-state.edu/%7Esabedon/biol2035.htm](http://www.mansfield.ohio-state.edu/%7Esabedon/biol2035.htm)


[http://www.cdpr.ca.gov/docs/factshts/what2.pdf](http://www.cdpr.ca.gov/docs/factshts/what2.pdf)

Symbiotic Relationships: relationships between organisms

Three types:

1. **Parasitism:** - a parasite HARMS the host
   - a + / - relationship
   - ex. *Streptococcus* lives in mouth, digests sugars producing LACTIC ACID which destroys tooth enamel, causing cavities
   - ex. tapeworm: lives in intestines and feeds on nutrients from food
     - causes host to starve even though host eats

2. **Commensalism:** - one benefits, the other is unaffected
   - a + / 0 relationship
   - ex. some intestinal bacteria in humans
     - the bacteria have a place to live and food, but provide nothing to us
   - ex. *Lactobacillus* – certain species help slow down diarrhea by overcrowding harmful bacteria in intestines (taken as medicine before travel)
   - ex. *Corynebacterium*: live on secretions and discarded cells on eye surfaces
3. Mutualism: - both organisms benefit
   - a + / + relationship
   
   a) - ex. *E.coli* in human intestines:
   - bacteria have a place to live and food, and provide Vitamins K and B to host
   
   b) - ex. *Rhizobium* bacteria on roots of LEGUME plants
   - bacteria live in nodules in roots and receive nutrients from plants, and provide plants with NITRATES needed to make PROTEIN
   
   ❖ The *Rhizobium* bacteria is capable of NITROGEN-FIXATION, a process where useless atmospheric nitrogen is changed into useful NITRATES

Legumes: clover, peas, alfalfa,
   - these plants are used by farmers to naturally return valuable nitrates to the soil, thus enriching the nitrogen content of the soil

   c) - ex. Mycorrhizae (fungus) and certain plant roots
   - the fungus receives nutrients and helps the plant absorb PHOSPHORUS

   d) - ex. Termites and a certain protist
   - termite is a home for a protist that helps in the digestion of cellulose (wood) Without this protist, the termite does not live long.

   e) - ex. lichens: a fungus and a cyanobacterium

Effective Microorganisms (EM) Applications

EM: using good microorganisms to benefit society

Three common microorganisms (EM):

- Lactic acid bacteria
- Yeast
- Photosynthetic bacteria

EM added to soil to:
- improve soil structure and fertility
- reduce disease
- reduce need for artificial pesticides

EM also used in:
- aquaculture: (fish farms)
- livestock production
- recycling processes and bioremediation

Pesticide Use and Microorganisms
Pesticides: anything used to control pests like insects, weeds, etc.

Types: insecticides, herbicides, fungicides,

Benefits of pesticide use:

- Protects crops and humans from disease
  - ex. a larvicide is being used to destroy mosquito larvae to prevent the spread of West Nile virus

Problems with misuse of pesticides:

1. may kill good microorganisms like the important decomposers in the soil which would slow down recycling process
2. may cause plant damage, making plants susceptible to other diseases

- IPM – Integrated Pest Management
  - a combination of cultural, biological, genetic, and chemical methods
  - used to control pests in parks and open public areas