

APES Notes – Chapter 5 and 6

Community Ecology: Structure, Species Interactions, Succession, and Sustainability

I. General Types of species

- A. **Native:** species that normally live and thrive in a particular ecosystem
- B. **Non-native species:** species that migrate into an ecosystem or are deliberately or accidentally introduced into an ecosystem by humans.
Problems caused by Non-native species: the non-natives have no natural enemies so they can thrive in the new ecosystem and crowd out the native species:
- C. **Indicator Species:** species that serve as early warnings that a community or ecosystem is being damaged or changed:
- D. **Keystone species:** species that play a pivotal role in the structure, function, and integrity of an ecosystem because
 - 1. Their strong interactions with other species affect the health and survival of these species
 - 2. Keystone species:
 - Pollinate, scatter seeds, modify habitats, predation to control prey populations, help plants get nutrients, recycle animal waste

II. Species Interactions

Five Types of Interactions:

- A. **Competition:** Two or more animals competing for the same resources.
Two Types:
 - 1. Intraspecific*: competition between members of the same species
 - 2. Interspecific*: competition between members of two different species
 - 3. ***Competitive Exclusion Principle***: No two species can occupy the same niche indefinitely in a habitat where there is not enough of a particular resource to meet the needs of both species.
 - 4. **Avoiding Competition: Resource Partitioning:** dividing up of scarce resources so that species with similar needs use them at different times, in different ways, or in different places. “Share the wealth”
- B. **Predator-Prey Interactions:** members of one species feed directly on all or part of a living organism or other species. They do not live on or in the other species. One species is clearly harmed and the other clearly benefits. However predation can be a good thing for the population of prey species as predators often weed out the sick and dying animal thereby reducing competition amongst the prey species.
Symbiosis: a long lasting relationship in which species live together in an intimate association.
- C. **Parasitism:** when one species feeds on part of another organism (host) by living on or in the host. In this relationship the host is harmed and the parasite benefits

D. Mutualism: symbiotic relationship in which both species involved benefit from the relationship. Ways in which this happens are pollination, providing food, and providing shelter.

E. Commensalism: a symbiotic relationship in which one species benefits and the other species is neither helped nor harmed.

III. **Ecological Succession (important, will be revisited later)**

A. Succession: One characteristic of all ecosystems is that they change over time. This is called ecological succession. There are two types of succession: Primary and secondary.

B. Primary Succession: Succession that starts with an essentially lifeless area where there is no soil or bottom sediment in an aquatic area. Examples include new lava or an abandoned parking lot. Succession happens in stages:

1. Pioneer species move in and make soil:
2. When enough soil is made and spread out then plants that are small and close to the ground move in. These plants can live under harsh conditions and usually have short lives. They are called early successional species.

C. Secondary Succession: begins in an area where the natural community of organisms has been disturbed or destroyed, but the soil remains. For example abandoned farms, burned or cut forests, and heavily polluted streams. Secondary succession occurs in the same way as primary starting with pioneer species and ending with late successional species.

D. Disturbances can Affect Succession

1. Some disturbances can be beneficial in the long run like fire, because they increase biodiversity, clear out excess brush, renew nutrients and encourage other species to grow
2. Some catastrophic disturbances can convert the ecosystem back to a lower level of succession
3. We used to think that succession was predictable and that it would continue until a stable climax community was reached. We now know that is false. We cannot predict the course of a given succession or view it as preordained progress toward an ideally adapted climax community. Succession is an ongoing struggle.
4. The stability of an ecosystem depends on three things:
 - Inertia: the ability of species to resist change
 - Constancy: the ability of a population to keep its numbers within the limits imposed by availability of natural resources.
 - Resilience: the ability of a living system to bounce back after a disturbance
5. Populations with more biodiversity are more stable. More biodiversity means greater primary productivity and more resilience.

