• Objectives
  – Overview of principles of Community Ecology
    • Importance to Forest Ecology & Management
  
  “Community ecology is important in forest resource management because in attempting to favor particular species, the manager must understand … the variety of interspecific interactions that will determine, in large part, the success or failure of his or her activities.” (Kimmins 2004)

• First: take-home points, things you learned, etc. from reading assignment
Forest Community Ecology

- Ecological Hierarchy
Forest Community Ecology

• Community
  – Collection of species/populations interacting directly and indirectly in the same place & time (i.e., a collection of associated populations)
Forest Community Ecology

• Community – Environmental Gradients
Forest Community Ecology

• Community – Environmental Gradients

(Whittaker 1975)
Forest Community Ecology

- Community – Spatial Variability
Forest Community Ecology

- Community – Spatial Variability
Forest Community Ecology

- Biotic Community

Diagram showing interactions between humans, grazing mammals, plants, and microorganisms, including paths of human consumption, grazing, photosynthesis, decomposition, mineralization, and predation.
Forest Community Ecology

- Community Structure
Forest Community Ecology

- Community Structure

Boreal Forest

Temperate Forest

Tropical Forest
Forest Community Ecology

• Community – Interspecific Interactions

Table 15–2 Types of Interspecific Interactions

<table>
<thead>
<tr>
<th>Category of Interaction</th>
<th>Type of Interaction</th>
<th>Effect on Species A</th>
<th>Species B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbiosis</td>
<td>Mutualism</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Commensalism</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>Antagonism</td>
<td>Exploitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>physical</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>parasitism</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>predation</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Antibiosis, including</td>
<td>allelopathy</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td></td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>
Forest Community Ecology

- Community - Mutualism

N-fixation (root nodule)

Mycorrhizae

Lichens
Forest Community Ecology

• Community - Commensalism

Epiphytic Growth

Facilitation
Forest Community Ecology

• Community – Nonconsumptive Physical Exploitation
Forest Community Ecology

- Community – Consumptive Physical Exploitation

Parasitism
Herbivory
Predation
Forest Community Ecology

- Community – Antibiosis (Allelopathy)
Forest Community Ecology

- Community - Competition

**Tulip Poplar**
- Height (meters)
- Droughty soil
- Moist, well-drained soil

**Virginia Pine**
- Height (meters)
- Droughty soil
- Moist, well-drained soil

GROWING ALONE
Forest Community Ecology

- Community – Resource Partitioning
Forest Community Ecology

- Community - Ecological Niche

Relative Competitiveness

Resource utilization

Western Washington

Douglas-fir

Red Alder

Lodgepole pine

xeric

mesic

hydric
Forest Community Ecology

• Community - Biodiversity
  – Genetic diversity within a species
  – Taxonomic diversity
  – Structural Diversity
  – Functional/Life History Diversity
  – Temporal Diversity
  – Alpha, beta and gamma diversity
    • Stand, local, and regional diversity
Forest Community Ecology

- Community Ecology & Forest Management
  - Foresters manage the structure & function of forest ecosystems (biotic & abiotic)

- Community ecology, along with population ecology, largely informs management of the biotic component
  - Description, classification, & identification of forest communities
  - Interspecific interactions
    » Positive and Negative
  - Resource Partitioning
  - Ecological niche
  - Biodiversity
    » Biodiversity and Ecosystem Function