Autecology vs. Synecology

- **Autecology** - study parts that make up the whole
- **Synecology** - study the whole in order to understand the parts
Environmental Factors: Abiotic

- Light- intensity, quality, duration
Environmental Factors: Abiotic

- Temperature - air, soil, water
Environmental Factors:
Abiotic

- Moisture- precipitation, humidity, available
Environmental Factors: Abiotic

- Currents - wind, water
- Edaphic (soil) - nutrients, pH, texture, water
Environmental Factors: Abiotic

• Catastrophic - fire, hurricane, volcano
Environmental Factors: Biotic

- Interactions: competition, predation
- Human: pollution, habitat destruction
Liebig’s Law

• The factor most closely approaching the critical minimum or maximum in a particular environment for a given organism is the limiting factor for that organism.
Compensating Factor

- A factor that allows an organism to exceed its normal range for another factor.
A HOLOCOENOTIC ENVIRONMENTAL COMPLEX

Billings, W.O. 1952
The environmental complex in relation to plant growth and distribution.
Quart. Rev. Biol. 27: 251-264
(See p. 256, Fig. 1)

Solid lines show factor-plant relationships. Dashed lines show relations between factors. Arrows show the general direction of the effect. If the effect is reciprocal, arrows are placed at both ends of the line.
Ecological Relationships

• **Holocoenotic** - integrated environment such that if one factor is altered, many other factors change as well.

• **Synergistic** - The total effect is more than the sum of individual effects.
Single vs. Multiple Factor View of Ecology

• Single factor ecology = simple, unrealistic
• Multiple factor ecology = complex, realistic
  – Factor interaction (non-independence)
  – Compensating factors
• Habitat- an organism’s “address”
• Niche- an organism’s “profession”
Ecological Equivalents

• Different species filling a similar niche in different localities.
Responses to Environmental Change

**Short-term Response**
- temperature
- humidity
- light
- wind
- body temperature change
- water loss
- respiration rate change

**Intermediate Response**
- behavioral (change habitat)
- acclimation (physiological adjustment)
- death

**Long-term Response**
- adaptation (change gene frequencies at pop. level)
- extinction
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