

\*Assigned readings, 8<sup>th</sup> Edition pp. 1222-1236  
7<sup>th</sup> Edition pp. 1154-1206

**Ecosystems**

*Outline of Lecture 9*

- A. Ecosystem**
- B. Water cycle**
- C. Carbon cycle**
- D. Nitrogen cycle**
- E. Phosphorous cycle**
- F. Succession in ecosystems**
- G. Ecosystems and diseases – *Schistosoma***

- A. Ecosystem: an interacting system that involves both the organisms and their non-living environment. The flow of energy and nutrients is regulated.
  - 1. “Cycling” because substances originated from the atmosphere or weathered rock, then became incorporate into various organisms, and ultimately (through decomposition) are returned to the non-living world.

- B. Water cycle involves evaporation, precipitation, and transpiration...
  - Aquafer: permeable, saturated underground layers of rock, sand and gravel
  - point vs. non-point sources of pollution; what is biomonitoring?
- C. Carbon cycle involves atmosphere, autotrophic organisms, heterotrophic organisms, and decomposition

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- D. Nitrogen cycle involves nitrogen becoming available through metabolic activities of a few types of bacteria (some free-living, others symbiotic).
- E. Phosphorous cycle involves soil leaching, erosion, uplifting, guano, and mycorrhizae (symbiotic associations between plants and fungi); a mineral-based cycle.

- F. Succession in ecosystems
  - 1. As ecosystems mature, there is an increase in biomass but a decrease in net productivity.
  - 2. Earlier successional stages are more productive than later ones.
  - 3. Disturbance keeps some systems in earlier successional stages and at higher productivities.

- 4. Mature ecosystems have more species than immature ones (because of an increase in heterotrophic organisms).
  - 5. Plants and animals in later successional stages are more specialized, and often have narrower ecological tolerances.

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G. Ecosystems and disease- Schistosomiasis

1. Disease caused by Schistosoma blood flukes; >800,000 humans die per year.
2. Eggs leave human body, and if they reach water hatch into larvae; larvae must find a certain type of snail to invade. Infected snails may release 100,000 sporocysts a day. Cercaria burrow into human skin to bloodstream, lungs, and to the liver.

3. Effects of human activities: Nile Delta population has Schistosomiasis but after construction of Aswan Dam upper Nile infected as well.
4. Control approaches: sanitation, chemicals, “People’s war against the snail.”
5. Physician’s guiding principle