Ecology

Lecture (1)

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Lecture Topics

- What is Ecology?
- History
- Level of Ecological study
- Branches of Ecology

What is Ecology

- **Ecology** from the Greek root.
- OIKOS = “at home” & OLOGY= “the study of”.
- **Ecology** is a basic division of the Science of Biology much like Botany and Zoology.
- ***Ecology:*** *is the study of the interactions of organisms with each other and their environment.*

History

- ***Anton van Leeuwenhoek*** a Dutch shopkeeper studied **"food chains" and "population regulation"** in the early 1700's.
- ***Ernst Baeckel***, a German Biologists, first used the word "ecology" in 1866.
- Ecology did not mature into a distinct field of study until the early 1900's.
- During the 1960's, ecology finally became part of the general public vocabulary and a distinct curriculum at universities in the U.S. and elsewhere.

Level of Ecological study

- The hierarchy, define each of the following:

Species ~ population ~ community ~ ecosystem ~ biosphere

- **Species:** Organisms that share common characteristics and are capable of interbreeding.



Level of Ecological study

- **Population:** Group of interacting and interbreeding organisms.

Level of Ecological study

- **Community:** Interacting populations which significantly affect each other's distributions and abundance (intertidal, hot spring, wetland).
- **Ecosystem:** Set of organisms and abiotic components connected by the exchange of matter and energy (forest, lake, coastal ocean).
- Or, "the smallest units that can sustain life in isolation from all but atmospheric surroundings."
- **Biosphere:** The earth's ecosystem interacting with the physical environment as a hole to maintain a steady state system intermediate in the flow of energy between the high energy input of the sun and the thermal sink of space.

Level of Ecological study

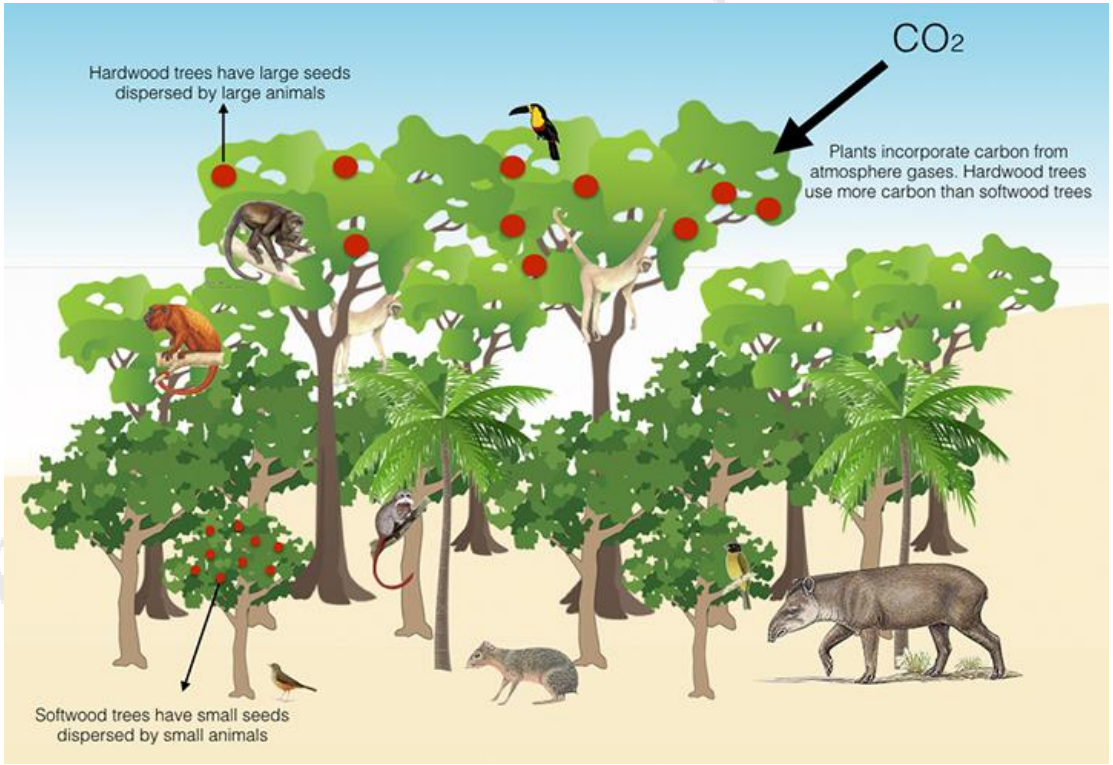
- **Organismal Ecology:** the study of individual organisms' behaviour, physiology, morphology, etc. in response to environmental challenges.
- **Population Ecology:** the study of factors that affect and change the size and genetic composition of populations of organisms.
- **Community Ecology:** the study of how community structure and organization are changed by interactions among living organisms.

Level of Ecological study

- **Ecosystem Ecology:** the study of entire ecosystems, including the responses and changes in the community in response to the abiotic components of the ecosystem. This field is concerned with such large-scale topics as energy and nutrient cycling.
- **Landscape Ecology:** study of the exchanges of energy, materials, organisms and other products of between ecosystems.
- **Global Ecology:** the study of the effects of regional change in energy and matter exchange on the function and distribution of organisms across the biosphere.

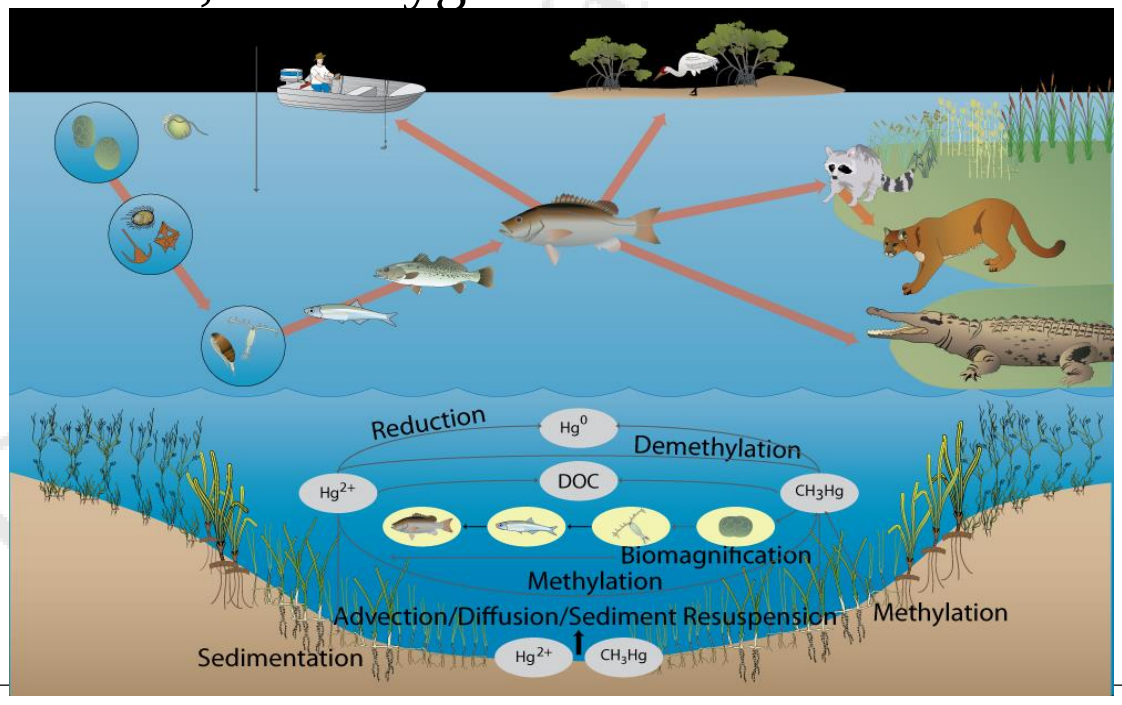
Branches of Ecology

1. Terrestrial ecology: is a branch of ecology that deals with the study of land organisms and how they interact with each other and adapt to their environment. Aside from that, the diversity and distribution of different organisms in various terrestrial habitats.



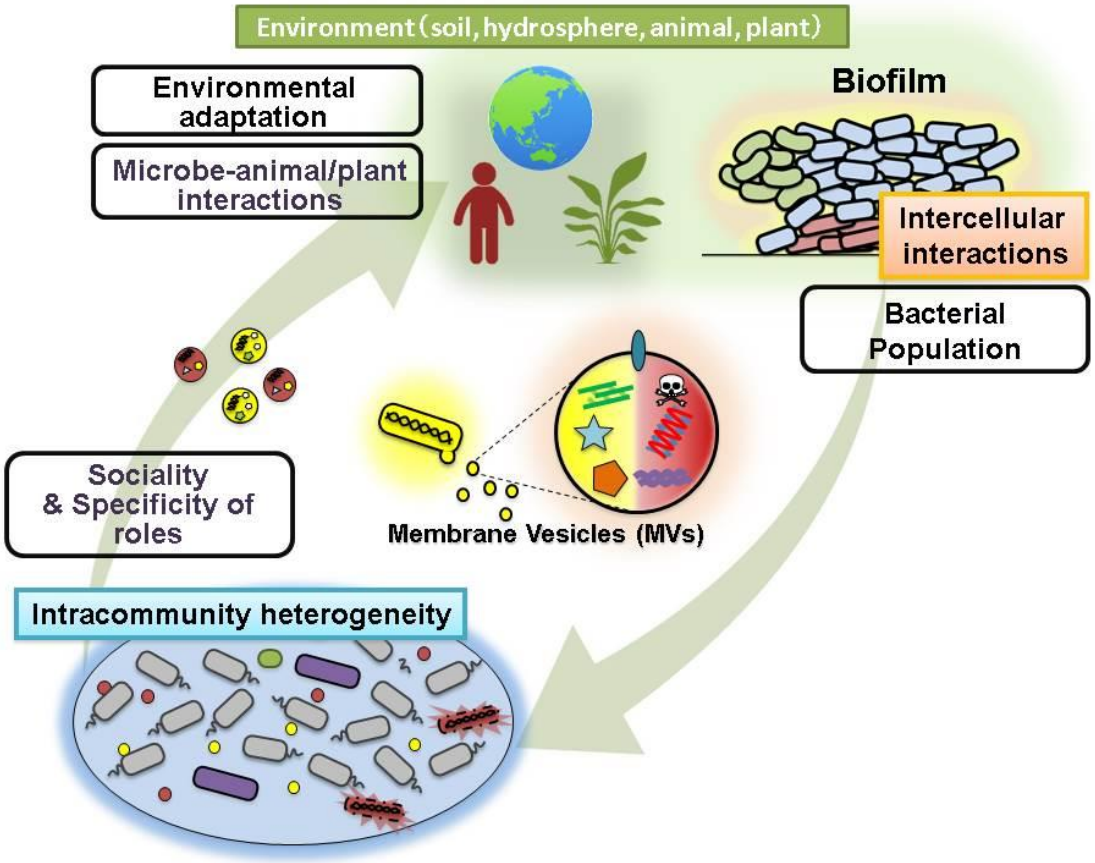
Branches of Ecology

2. Aquatic ecology: focuses on the interactions among living organisms in a particular aquatic habitat (marine, freshwater, or the estuarine) which can directly affect various factors in the ecosystem. Such factors include competition for food and predation, temperature, nutrient concentration, and oxygen demand.



Branches of Ecology

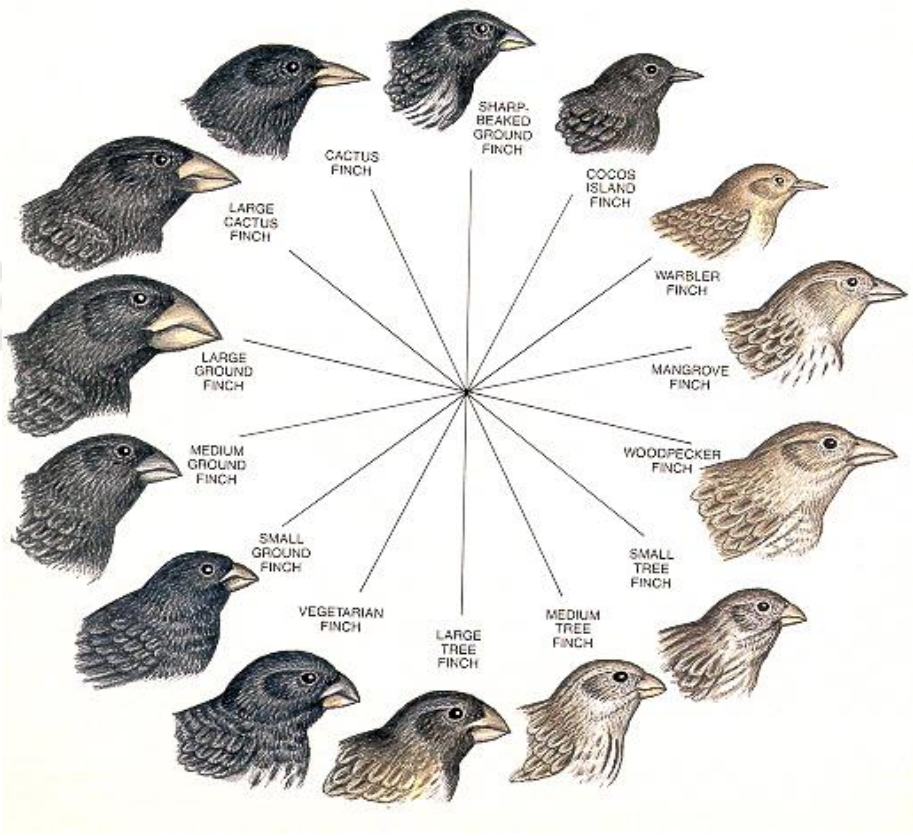
3. Microbial ecology: focuses on the study of how communities of microorganisms establish themselves on abiotic substrates and how such organizations enable them to interact with each other.



Branches of Ecology

4. Evolutionary ecology: focuses on the physical and genetic changes that occurred among organisms and how such modifications were affected by ecological factors.

Basically, it also considers the effect of forces like competition, predation, parasitism, and mutualism in the evolution of individual species, in a population, or in the entire community.



Galapagos finches (Darwin's finches)

Branches of Ecology

5. Population Ecology: deals with the study of population structures and dynamics, rather than looking at the individual behavioural patterns of living organisms.

Branches of Ecology

6. Behavioural Ecology: it examines how an organism changes its behaviour to ensure survival and perpetuation.

Branches of Ecology

7. Conservation ecology: studies the management of biodiversity through conservation and restoration methods. This branch of ecology had just recently evolved to address the decreasing biodiversity and deteriorating natural resources in the planet.

Branches of Ecology

8. Applied Ecology: Bringing together all the concepts and principles of ecology, applied ecology aims to apply these significant knowledge, findings, and technological advances to understand real world situations and to address practical human problems.


Thanks for listening