

Concept and Dynamics of Ecosystem

Definition of Ecosystem

An ecosystem is a community of living organisms (plants, animals, and microbes) existing in conjunction with the nonliving components of their environment (air, water, and mineral soil), interacting as a system.

There are two components namely

1. Biotic and
2. Abiotic

As the name suggests biotic relates to the living things whereas abiotic is concerned with the non-living component.

These biotic and abiotic components are linked together through nutrient cycles and energy flows. As ecosystems are defined by the network of interactions among organisms, or between organisms and their environment, they can be of any size, but usually encompass specific, limited spaces.

Factors affecting ecosystem

There are basically two types of factors which interfere with the functioning of ecosystem namely Internal and External Factors

1. External factors: It includes climate and the parent material that forms the soil:

These control overall structure of an ecosystem and the way things work within it.

These are not themselves influenced by the ecosystem. Other internal factors include disturbance, succession, and the types of species present.

2. Internal factors: decomposition, root competition, or shading.

While the resource inputs are generally controlled by external processes, the availability of these resources within the ecosystem is controlled by internal factors

From one year to another, ecosystems experience variation in their biotic and abiotic environments. A drought, an especially cold winter, and a pest outbreak all constitute short-term variability in environmental conditions. Animal populations vary from year to year, building up during resource-rich periods, but crashing as the food supply becomes scarce.

Equilibrium is the steady state of an ecosystem where all organisms are in balance with their environment and with each other. In equilibrium, any small changes to the system will be balanced by negative feedback, allowing the system to return to its original state.

Resistance and Resilience

In ecology, two parameters are used to measure changes in ecosystems: resistance and resilience. Resistance is the ability of an ecosystem to remain at equilibrium despite disturbances. Resilience is the speed at which an ecosystem recovers to equilibrium after being disturbed. Humans may impact the nature of an ecosystem to such a degree that the ecosystem can lose its resilience entirely. In these cases, external human influences can lead to the complete destruction or irreversible altering of the ecosystem equilibrium.

Food Chains and Food Webs

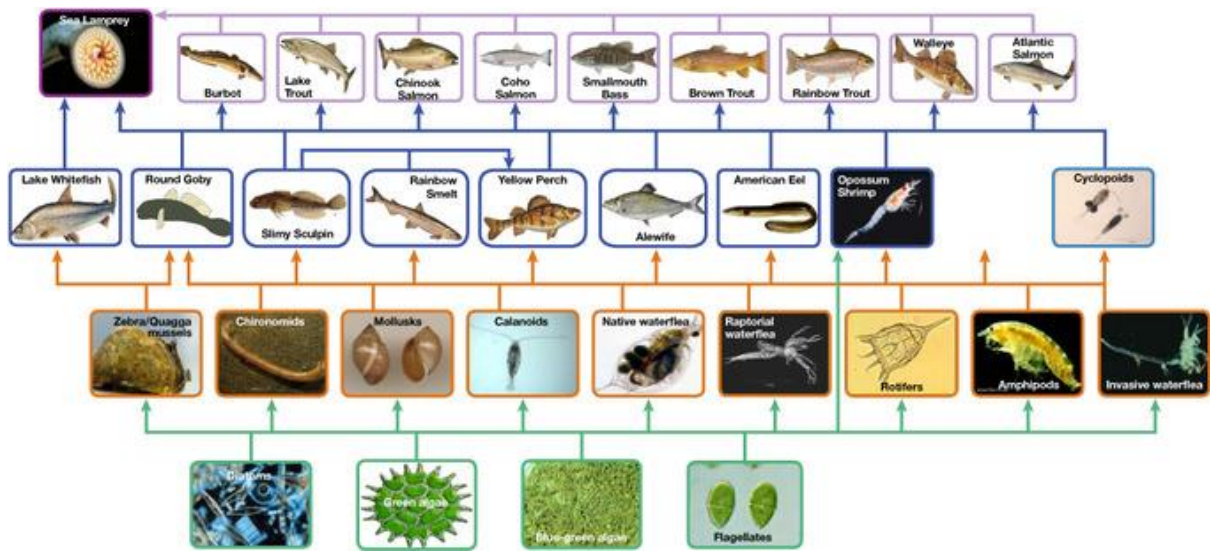
A food web describes the feeding connections between organisms in a biotic community. Both energy and nutrients flow through a food web, moving through organisms as they are consumed by an organism above them in the food web. A single path of energy through a food web is called a food chain.

Trophic Levels

Each organism within a food web can be classified by trophic level according to their position within the web. Depending on an organism's location in a food web, it may be grouped into more than one of these categories. Energy and nutrients move up trophic levels in the following order:

1. Primary producers
2. Primary consumers
3. Secondary consumers
4. Tertiary and other high-level consumers

In both food webs and food chains, arrows point from an organism that is consumed to the organism that consumes it. In many ecosystems, the bottom of the food chain consists of photosynthetic organisms, such as plants or phytoplankton, known as primary producers. The organisms that consume the primary producers are herbivores: the primary consumers. Secondary consumers are usually carnivores that eat the primary consumers, while tertiary consumers are carnivores that eat other carnivores. Higher-level consumers feed on the next lower trophic levels, and so on, up to the organisms at the top of the food chain, which are called the apex consumers. Some lines within a food web may point to more than one organism; those organisms may occupy different trophic levels depending on their position in each food chain within the web.



Food web: This food web shows the in