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Topic : Ecological succession

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ECOLOGY SUCCESSION

ECOLOGICAL SUCCESSION

Succession is a universal process of directional change in vegetation, on an ecological time scale. Succession occurs due to large scale changes or destruction (natural or manmade). The process involves a progressive series of changes with one community replacing another until a stable, mature, climax community develops. The process by which communities of plant and animal species in an area are replaced or changed into another over a period of time is known as ecological succession.

The first plant to colonize an area is called the pioneer community. The final stage of succession is called the climax community. A climax community is stable, mature, more complex and long-lasting. The stage leading to the climax community is called successional stages or seral. Each transitional community that is formed and replaced during succession is called a stage in succession or a seral community.

Succession is characterized by the following:

- i. increased productivity,
- ii. the shift of nutrients from the reservoirs,
- iii. increased diversity of organisms, and a
- iv. gradual increase in the complexity of food webs.

Succession would occur faster in area existing in the middle of the large continent. This is because here seeds of plants belonging to the different ser would reach much faster.

Primary succession:

1. Primary succession takes place on over bare or no community has existed previously. Such areas include rock outcrops, newly formed deltas and sand dunes, emerging volcano islands and lava flows, glacial moraines (muddy area exposed by a retreating glacier), etc. In primary succession on a terrestrial site, the new site is first colonized by a few hardy pioneer species that are

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often microbes, lichens and mosses. The pioneers over a few generations alter the habitat conditions by their growth and development. Lichen are plant-like organisms that consist of a symbiotic association of algae (usually green) or cyanobacteria and fungi. Fungi provide shelter, water and minerals to the algae and, in return, the alga provides food.

2. The pioneers through their death and decay leave patches of organic matter in which small animals can live. The organic matter produced by these pioneer species produces organic acids during decomposition that dissolve and etch the substratum releasing nutrients to the substratum. Organic debris accumulates in pockets and crevices, providing soil in which seeds can become lodged and grow. The new conditions may be conducive to the establishment of additional organisms that may subsequently arrive at the site. As the community of organisms continues to develop, it becomes more diverse, and competition increases, but at the same time, new niche opportunities develop. The pioneer species disappear as the habitat conditions change and invasion of new species progresses, leading to the replacement of the preceding community.

Secondary Succession:

Secondary succession is the sequential development of biotic communities after the complete or partial destruction of the existing community. A mature or intermediate community may be destroyed by natural events such as floods, droughts, fires, or storms or by human interventions such as deforestation, agriculture, overgrazing, etc. This abandoned land is first invaded by hardy species of grasses that can survive in bare, sun-baked soil. These grasses may be soon joined by tall grasses and herbaceous plants. These dominate the ecosystem for some years along with mice, rabbits, insects and seed-eating birds. Eventually, some trees come up in this area, seeds of which may be brought by wind or animals. And over the years, a forest community develops. Thus, an abandoned land over a period becomes dominated by trees and is transformed into a forest. Unlike in the primary succession, the secondary succession starts on a well-developed soil already formed at the site. Thus, secondary succession is **relatively faster**.



Autogenic and allogenic succession:

When succession is brought about by living inhabitants of that community itself, the process is called autogenic succession, Autogenic succession is driven by the biotic components of an ecosystem. While change brought about by outside forces is known as allogenic succession. Allogenic succession is driven by the abiotic components (fire, flood) of the ecosystem.

Autotrophic and heterotrophic:

Succession in which, initially the green plants are much greater in quantity is known as autotrophic succession; and the ones in which the heterotrophs are greater in quantity is known as heterotrophic succession.

Succession of Plants

Based on the nature of the habitat – whether it is water (or very wet areas) or it is on very dry areas – succession of plants is called hydrarch or xerarch, respectively.

1. **Hydrarch** succession takes place in moisture areas and the successional series progress from hydric to the mesic conditions.
2. **Xerarch** succession takes place in dry areas and the series progress from xeric to mesic conditions.

Hence, both hydrarch and xerarch successions lead to medium water conditions (mesic) – neither too dry (xeric) nor too wet (hydric).

Question:

1. Write short note on Ecological Succession and its Types.