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Environment & Ecology

Ecological Succession

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Ecological Hierarchy

1. Organism
2. Population (Species)
3. Community

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4. Ecosystem
5. Biome
6. Biosphere

Ecology

- Study of interaction or inter-relationship of organism with their environment is called Ecology
- Organism and environment are always interdependent, inter related or mutually reactive

Ecological succession

- The process by which communities of plant and animal species in an area are replaced or changed into another over a period of time
- Biotic communities are never stable. They are changing more or less over period and space, in the presence of different type to climatic and environmental conditions.
- Continuous interaction is going on between the community and environment till the state of stability.

Ecological succession

Types -

- Primary Succession - Occurs in the barren area - Volcanic lava, Igneous Rocks etc
- (1000s of years)
- Secondary Succession - Occurs where vegetation was present previously but was destroyed due to natural or artificial causes - fire, floods, sudden changes in climate, land slide etc
- The soil has the necessary nutrients, large pool of seeds & other dormant stages of organisms
- So, comparatively rapid - 50-100 years for grassland, 100-200 years for forests
- Autogenic Succession - During the succession, the community reacts with the environment and change itself.
- Allogenic Succession - Succession brought by external conditions

Ecological succession - Important Terms

- Pioneer Community - Community that first inhabits a bare area. They will later get replaced by another community with different specie combination.
- Climax community - The last and stable community in an area.
- Seral Communities - Each transitional community that is formed and replaced during succession is called Seral community.
- Sere – The entire series of communities is called Sere.

Pioneer Community → Seral Communities → Climax Community

Causes of Succession

- Biotic Factors – The action of each seral community (interaction with its environment) makes the area less favourable for itself and more favourable for next seral community in the succession.
- Physiographic Factors – These include climatic and other physical factors like soil erosion, soil deposition, landslide, volcanic lava. These all factors makes an area barren.

Name of the Sere

It depends on where the succession occurs.

- Succession in fresh water – Hydrosere
- Succession in salty water – Halosere
- Succession in Dry Region – Xerosere
- Succession on Rocks – Lithosere

Successions:

- Xerach - Succession that occurs on a very low moisture land - like bare rock
- Hydrach - Succession that takes place in a water body

Ecological Succession - Process

1. Nudation - Bare area without any life
2. Invasion - Successful establishment of a species in a bare area
    a. Migration - seeds, spores
    b. Ecosis - successful establishment of species in the new environment
    c. Aggregation - species increase in number - reproduction
3. Competition or Co-action - for habitat, nutrition
4. Reaction - Species which have survived, will react with the environment & modify it (Sold, Water, Light, Temperature) → Autogenic Succession (The modified environment is less favourable for the existing community, so it is replaced by another community)
5. Stabilisation (Climax)

Climax Species

- Finally there comes a stage in the process of succession, when the final terminal community becomes stabilized for longer period of time, maintains itself with the climate of the area.
- This community is called the climax community
- It is complex and stable
- Harmony with Environment, both influence each other, adapt continuously
- Wide diversity, complex food chain

Question

Lichens, which are capable of initiating ecological succession even on a bare rock, are actually a symbiotic association of

a. algae and bacteria
b. algae and fungi
c. bacteria and fungi
d. fungi and mosses

Question

In the grasslands, *trees do not replace the grasses as a part of an ecological succession* because of:

(a) Insects and fungi

(b) Limited sunlight and paucity of nutrients

(c) Water limits and fire

(d) None of the above