

Ecological Succession

Ecological succession, is a gradual process by which the structure of a biological community of a given area evolve over time. It can be recognized by the progressive changes in the species composition of the community. The time scale can be decades or even million of years after a large mass extinction.

There are three primary causes of succession.

- 1) Disturbance causes → There are climatic as well as biotic in nature. e.g. erosion, deposits, wind, fire (climatic cause) and various activities of organisms (biotic).
- 2) Ecesis or continuing causes - These are migration, ecesis, aggregation, competition, reaction etc. which causes successive wave of populations as a result of changes in the edaphic feature of the area.
- 3) Stabilising causes - such as climate of the area which result in stabilisation of the community.

Basic types of Succession

There are following types of Succession.

- 1) Primary succession - If an area of the any environments like terrestrial, freshwater, and marine is colonized by organisms for the first time this succession is called Primary succession.
- 2) Secondary succession :- If the area is colonized after the end of Primary succession by any agency, it is called



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Secondary succession. Usually, the rate of Secondary succession is faster than that of Primary succession because of better nutrients and other conditions in area.

3) Autogenic succession! - If a community in an area modifies its own environment and finally causing its own replacement by new better communities is called Autogenic succession.

4) Allogenic succession! - In some cases replacement of one community by another is due to forces other than the effects of communities on the environment. This is called Allogenic succession and it occurs in a highly disturbed area or in a pond where nutrients and pollutants enter from outside and modify the environment and communities.

5) Autotrophic succession! - It is characterized by early and continued dominance of autotrophic organisms. There is a gradual increase in the organic matter content supported by energy flow.

6) Heterotrophic succession! - In this, there is dominance of heterotrophic organisms (bacteria, fungi, actinomycetes etc.) in an organic matter rich medium. e.g. Rivers, streams are heavily polluted with sewage.

7) Induced succession! - Agricultural practices, over-grazing, and industrial pollution may cause deterioration of an ecosystem and they change stable state to a young state.

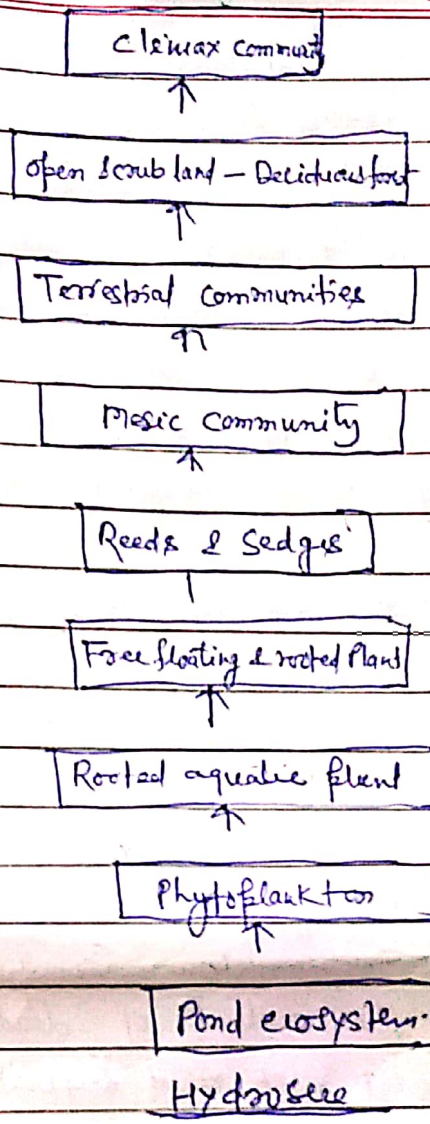


8) Retgressive succession → When an advanced or climax community regresses to simpler or even impoverished form of community it is called Retgressive succession. Excessive removal of wood, leaf, twig also lead to Retgressive succession. e.g. Savanna.

9) Cyclic Succession :- It is of local occurrence within a large community. Here, cyclic refers to repeated occurrence of certain stages of succession.

There are other kind of succession depending upon the nature of the environment.

A) Hydrosere :- In hydrosere or hydrosere succession a pond and its community are converted in a land community. Primary colonizers or phytoplankton are consumed by zooplankton. Gradually, these organism die and increase the content of dead organic matter in pond. The nutrient rich mud support the growth of rooted hydrophytes and flourishing of some crustaceans and other animals. Decayed hydrophytes also increase macroinvertebrates of pond. In addition to this, due to siltation the water depth of the pond is reduced and the margin of the pond grow rooted floating vegetation. In floating stage faunal living space is increased and diversified. Gradually, the water depth decreases due to evaporation and deposition of organic matter. The pond become a swampy ecosystem and later replaced by mesic communities. The possible trends of succession in the aquatic environment is as follows —



B) Xeric succession: - It begins in lithosphere or psammose. It involves the following stages: crustose lichen stage (Pioneers) → foliose lichens stage → moss stage → herbs stage → shrub stage → forest stage (Climax stage). Like the hydrosere, the lithosere involves successive changes in animal life. The pioneer animals are mites, spiders and ants. New sp. of mites, spiders etc are added in moss stage and the new ones characterized the herb stage. During the shrub and forest stage qualitative and quantitative modification occurs in the fauna.

Models of Succession.

Connell and Slatyer (1977) proposed the three models of succession.

- 1) Facilitated model - A/c to this model, each community like a relay process delivers the habitat to next or higher status community.
- 2) Tolerance model :- A/c to this model climax species can be tolerated by the early pioneers. With the passage of time species which mutually tolerate each other gain control over the habitat to form climax vegetation.
- 3) Inhibition model :- A/c to this model, the early arrived species on a new habitat may develop counter mechanisms to normal replacement process.

4) Resource-Ratio Hypothesis of Succession :-

~~A/c to Conn, resource~~ This model was proposed by Tilman (1985). A/c to him, the resource of the habitat are regarded as key factor. Due to competition a resource ratio is created for each kind of resource. Depending on the newly created ratio level, new species adapted to it succeeds.

In conclusion, succession is directional and progress towards the climax.