

ECOLOGICAL SUCCESSION

PART - (A)

The occurrence of relatively definite sequence of communities over long period of a time in the same area resulting in establishment of stable or climax community is known as ecological or biotic succession.

Characteristic of Ecological Succession:

- ✓ a) A continuous change in the kind of plants and animals towards a state of stability.
- ✓ b) Tendency towards increase in the species diversity.
- ✓ c) An increase in organic matter and biomass supported by available energy flow in atmospheric succession.
- ✓ d) Decrease in net community production or annual yield.
- ✓ e) In an area, the plant and animal communities undergo succession side by side.
- ✓ f) Biotic succession on bare ground progresses towards increasing wetness, while biotic succession in open water progresses towards increasing dryness.

✓ The first community to inhabit an area is called pioneer community, while last and stable community in area is called climax community. The intermediate community between the pioneer and climax communities are called transitional or seral communities. The entire series of community is called Community.

(2)

Causes of Ecological Succession:

These can be divided into two categories.

- (a) Biotic factors: the interactions among, the organisms in the communities are collectively called biotic factors. These influences structure, composition and function of a community.
- (b) Physiographic factors:

These includes the physical and chemical factors of the environment which determine the nature and composition of ~~the~~ ^a community. These includes landslides, erosion, storm, frost, fire etc.

Since, succession is a complex processes so it is controlled by a number of causes which are _____

- i) initiation causes - produce bare areas
- ii) continuing causes or ecosis - cause successive waves of population and
- iii) stabilizing causes - stabilize the organism.

Types of Succession:

These are of following types _____

- (a) Primary succession (Perisere):

In any of the basic environment (terrestrial, freshwater, marine), one type of succession is primary succession which starts from the primitive ~~succession~~ substratum where there was no previously any sort of living matter. C-sterile area of land formed by volcanic lava or newly formed estuarine made by bank etc.

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conditions are extreme so unfit for the growth of most plants and animals. The first group of plants establishing there are known as pioneers or primary community or primary colonisers. It takes longest period. eg development of forest climax on a barren land may take about 1,000 years.

② Secondary Succession (Subsera):

If the area under colonization has been cleared by whatever agency (such as burning, grazing, felling of trees etc) of previous plants, it is called secondary succession. The rate of secondary succession is faster than that of primary succession because of better nutrients and other conditions in area.

③ Autogenic Succession:

After the succession has begun, in most of the cases, it is the community itself which, as a result of its reactions with the environment, ~~is~~ called modifies its own environment and thus, causing its own replacement by new communities.

④ Allogenic Succession:

In some cases, however, the replacement of the existing community is caused largely by any other external conditions and not by the existing vegetation itself. Such a course is known as allogenic succession.

⑤ Autogenic Autotrophic succession:

It is characterized by early and continued dominance of autotrophic organisms eg. green plants. It begins in a predominantly inorganic environment.

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⑥ Heterotrophic succession: It is character

early dominance of heterotrophic organisms, such as bacteria, actinomycetes, fungi and animals. It begins in medium which is rich in organic matter such as small area of river stream.

⑦ Induced succession: Activity such as overgrazing, frequent scraping, cultivation or industrial pollution may cause deterioration of ecosystem. Agricultural practices are retrogression of a stable state to a young state by man's deliberate action.

⑧ Retrogressive succession: It means a return to simpler and less dense form of community from a climax or advanced community.

⑨ Cyclic succession: It is local occurrence, within a large community.

Process of succession:-

The entire process of primary autotrophic succession is completed through the following sequential steps:

1) Nudation: This is development of a bare area without any form of life. Exposure of new surface may occur due to several causes such as landslides, erosion, deposition etc. These causes of nudation are of three types-

(i) Topographic (eg. soil erosion, landslide, volcanic eruption etc.)

(ii) Climatic - (eg. glacial, hail, storms, fire etc.)

(iii) Biotic - (eg. epidemic, human activity).

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(part B)

- Invasion: It involves successful establishment of a species in a bare area.
- a) Migration: It involves 3 steps in a bare area through air, water etc.
 - b) Ecosis (establishment): It involves the adjustment of a species with the prevailing conditions of the area.
 - c) Aggregation: It involves the increase in number of organisms through the process of reproduction.

③ Competition and Co-action: It involves the development of intraspecific as well as interspecific competition among the numbers due to their large number but limited food and space.

4) Reaction: It involves the modification of the environment through the influence of living organisms. The modified area ^{become} ~~the~~ least favourable for the existing community which is sooner or later replaced by another community called Seral community and the process is repeated. The whole sequence of community which replaces one another in the given area is called Sere and various communities constituting the sere is called Seral community.

5) Stabilization (Climax):

Finally, there occurs a stage in the process, when the final terminal community becomes more or less stabilized for a long^{er} period of time and it can maintain itself in equilibrium with the climate of the area. The final community is not replaced and is known as Climax community.

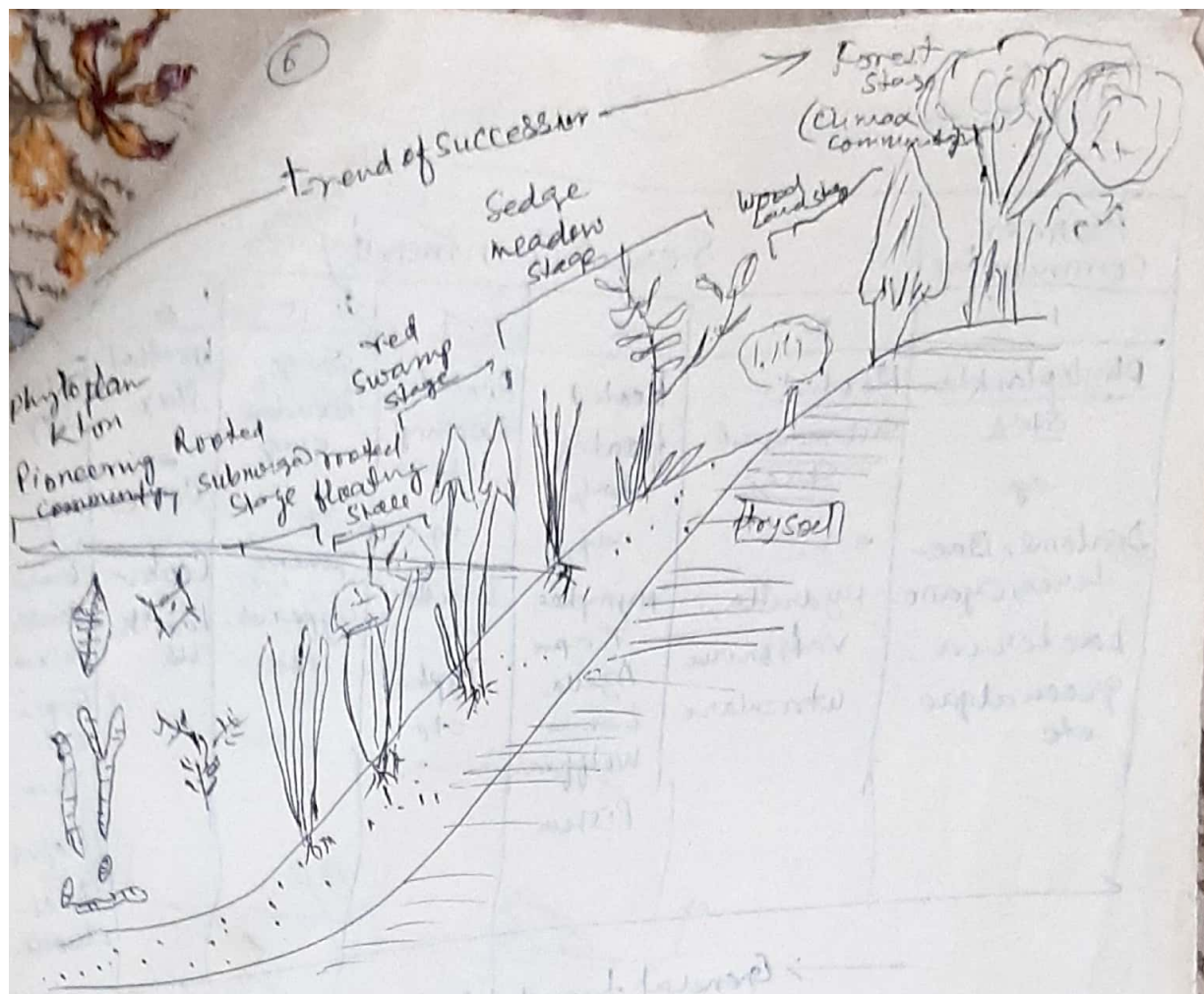


Fig - Diagrammatic representation of succession through autogenic process in lake or pond (Hydrosera).

Examples of Ecological succession:

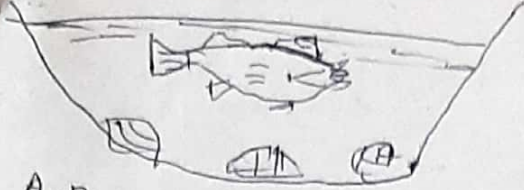
① Hydrosera or Hydarch - It involves the ecological succession in the newly formed pond or lakes.

The whole process of succession is divided into following stages -

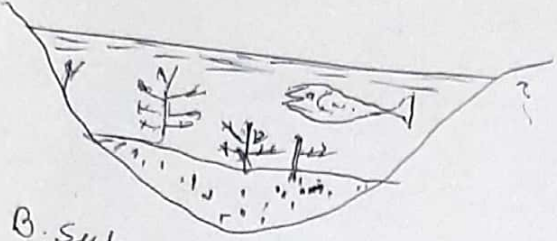
- ① Plankton stage
- ② Rotted submerged stage
- ③ Rotted floating stage
- ④ Sedge meadow stage
- ⑤ woodland stage
- ⑥ Forest stage.

The trend of succession here are as follows -

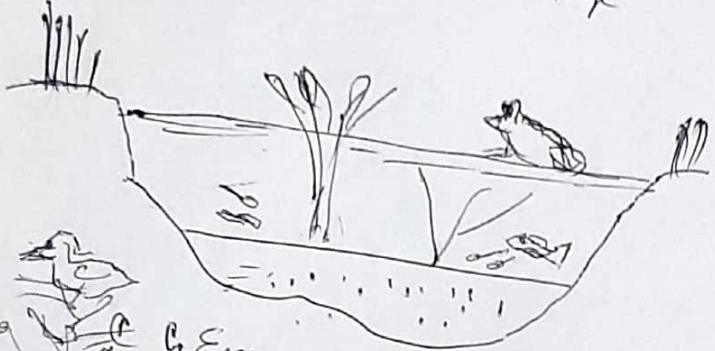
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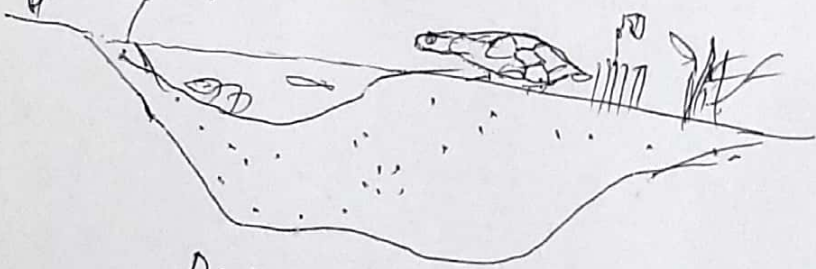
A. Bare Bottom stage.



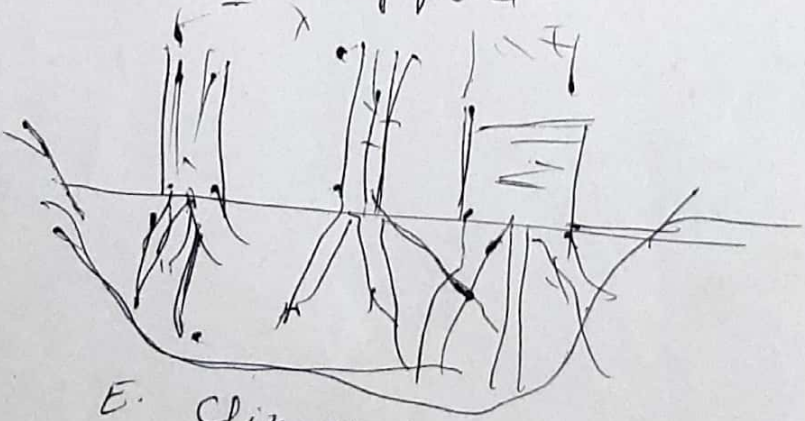
B. Submerge vegetation stage



C. Emerged vegetation stage



D. Temporary pond



E. Climax (Forest stage)

Rif Community Succession in a open pond.