

## **Module 1**

### **Ecology and Biodiversity**

#### **1.3 Ecological succession**

##### **Process of Ecological Succession**

##### **Community**

##### **Types of ecological succession**



### 1.3 ECOLOGICAL SUCCESSION

The progressive replacement of one community by another till the development of stable community in a particular area is called ecological succession. Ecological succession is the steady and gradual change in a species of a given area with respect to the changing environment. It is a predictable change and is an inevitable process of nature as all the biotic components have to keep up with the changes in our environment.

The gradual and fairly predictable change in the species composition of a given area is called ecological succession.

The changes lead finally to a community that is in near equilibrium with the environment and that is called a **climax**

#### Process of Ecological Succession

**1.Nudation:** It is the development of bare area without any life form. The bare area may be caused due to landslide, drought, volcanic eruption.

**2.Invasion:** It is the establishment of one or more species on a bare area through migration followed by establishment.

(a) Migration: The seeds are brought about by wind, water or birds.

(b) Establishment: the seed then germinate and grow on the land and establishes their Pioneer communities.

**3.Competition:** There is the competition with the same species and between different species for space, water and nutrients.

**4.Reaction:** The living organism, take water, nutrients and grow and modify the environment is known as reaction. Thus reaction leads to several seral communities

**5.Stabilization:** It leads to stable community, which is in balance with the environment.

During succession some species in an area and their populations become more numerous, whereas populations of other species decline and even disappear.

The entire sequence of communities that successively change in a given area are called **sere(s)**.

#### 1)Pioneer Community

First Group of organism, which establish their community in the area is called pioneer community.

### 1) Seral community

Various developmental stage of a community is called seres.

### Types of ecological succession:

#### 1.Primary succession:

Succession that starts where no.of living organisms are there or these could be areas where no living organisms ever existed. Primary succession can occur in newly cooled lava, bare rock, newly created pond or reservoir.

It involves the gradual establishment of biotic communities on lifeless ground.

(a). Hydrarch / Hydrosere → This type of Succession starts in a water body like pond. Succession takes place in watery areas are called hydrarch succession. when the plant succession occurs starting on relatively shallow water such as ponds reaching to a highest point of development in a mature forest. The hydrarch succession proceeds as

- A new formed water body
- The phytoplankton stage starts to grow in the water
- The phytoplanktons extend their roots to the ground and get submerged into water
- The soil starts to collect more dense due to the dead plants and the new plants starts to move on the surface
- Reed swamp stage — the water becomes more and more shallow and the soil gets rich in nutrients from the dead
- Sedge marsh — the water level decreases and the soil becomes unfavourable for the growth of reed swap. Cyperaceae become dominant.

There is ultimately formation of terrestrial soil.

- Woodland forest stage — shrubs and trees start to grow. The soil becomes dry.

(b) Xerarch / Xerosere → This type of succession starts in a dry area like desert and rock. Succession takes place in dry areas and the series progress from xeric to mesic conditions is called xerarch succession. plant succession starting on bare ground or rock and reaching up to a highest point in a mature climax forest.

This occurs in dry regions. It includes —

- Lichen stage — crustose lichen is a special form that can live in extreme conditions. In case of rainy days these become wet. They absorb all the water causing weathering of rocks. This allows the land to get prepared for its next stage.
  - Foliate lichen stage — they are leaves like lichen and get attached at a single point. It produces shade on the previous growing lichen which makes their growth hinder. The rocks become rough.
  - Moss stage — All the lichen litter gets collected making the soil more porous. The moss and lichens compete for water sources.
- The lichens become dead adding more humus to soil.
- Herbaceous stage — The soil has a large amount of humus and litter. The herbaceous plants grow in the region.

## **2.Secondary succession:**

It involves the establishment of biotic communities in an area, where some type of biotic community is already present. Succession that starts in areas where all the living organisms somehow lost that existed there is called secondary succession.

Secondary succession can occur in abandoned farm lands, burned or cut forests, lands that have been flooded.

Secondary succession is faster than primary succession because some soil or sediment is present.

