COMMUNITY

Groups of organisms of different species that live in common area, which are interrelated and interdependent. It is natural aggregation of plants and animals in the same environment.

Biotic Community = Animal community + Plant community + Microbial communi

Characteristics of a community -

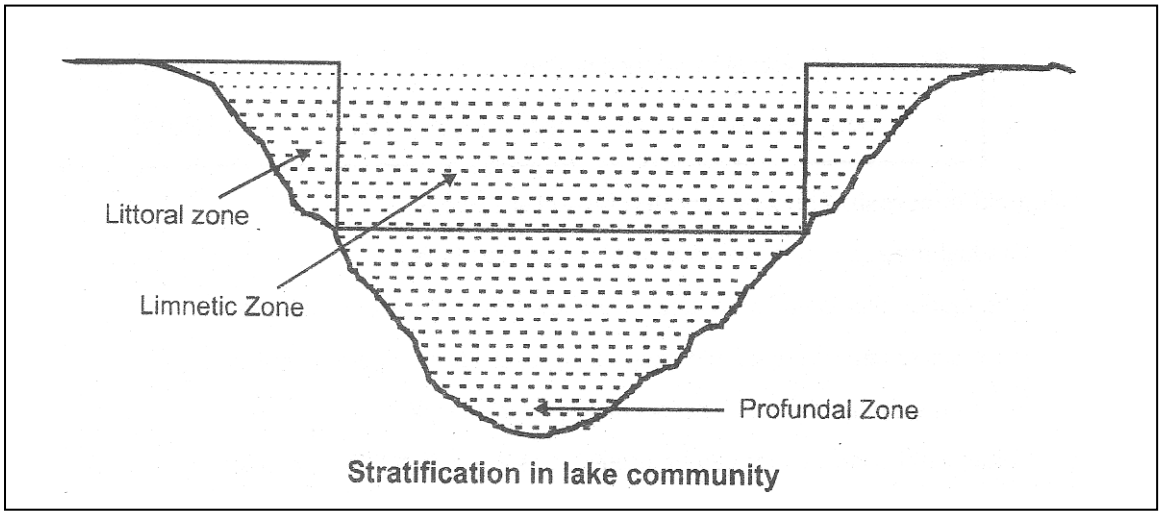
1. **Species Diversity -**
   There are different types of population (species) found in community, this is called species diversity. It depends on size of the area, type of area, type of soil, altitude, climate.

2. **Dominance -**
   The highest number of organism of a species present in community, is called as the dominant species . Whole community is known by the name of that particular dominant species.
   e.g. Prosopis community at Aravali hills, Pinus community at Himalaya

3. **Stratification -**
   The different growth form (trees, shrubs, under shrubs, herbs) determines the structure of a plant community. Stratification is based on mode of arrangement of various growth forms.

- **Stratification in lake -**

  In deep lake, zonation or stratification may be according to the need of **light.** There are three types of zones differentiated is a deep lake.
  A. Littoral Zone - This zone is found at bank of lake where very shallow water or marshy land is present. Rooted vegetation is found in this zone.
  B. Limnetic zone - This is the zone of lake water, where light reaches in sufficient amount to entire surface area. It means this is not too deep. In this region different types of floating plants (phytoplanktons), suspended and submerged plants are present.
  C. Profundal zone - It is very deep area of the lake where light does not reach up to the bottom. Only heterotrophs are present in this zone.



Stratification in lake community

- **Stratification is forest -**
  The clear stratification (vertical arrangement) in various growths from of plants according to the need of light is any dense forest.
  Surface dewellers $\rightarrow$ Herbs under shrubs $\rightarrow$ Shrubs Trees

Note:

- the **clear** stratification is found in tropical rain forest. So it is known as **multistoried** forest
- . Another example of stratification is mountain.

SUCCESSION

Development of plant community on barren area is called ecological succession or biotic succession. The replacement of existing community by new ones, in an orderly sequence in barren area with time due to change in environmental conditions.

Biotic communities are never stable. They are changing more or less over period and space, due to presence of different types of climatic & environment conditions. (So a continuous interaction is going on between the community and environment till state of stability.

Term for community is succession :-

Pioneer community – The first community to inhabit an area is called Pioneer community.

- **Climax community –** The last and stable community in an area is called climax community. This is more stable. Usually **mesophytes** are present in climax community.
- **Seral Communities or seral stage –** In succession, communities or stages which comes in between pioneer community and climax community is called transitional or seral communities.
- **Sere –** The entire series of communities is called sere
  The name of sere depends on where the succession occurs or takes place.

♦ Succession in fresh water	→	**Hydrosere**
♦ Succession in salty water	→	**Halosere**
♦ Succession in acidic water	→	**Oxalosere**
♦ Succession at dry Region	→	**Xerosere**
♦ Succession or rocks	→	**Lithosere**
♦ Succession on sand	→	**Psamosere**
♦ Succession at moistened region	→	Mesosere
♦ Succession of microbes on decomposed matters	→	**Serula**

Ecological succession shows certain characteristics:-

(1) Gradual replacement from short lived to long lived plant.

(2) Continuous change in communities towards a state of stability or climax.

(3) Increase species-diversity, biomass, niche specialization, humus content.

(4) Decreases- net community productivity or annual yield.

(5) Future seral communities can be predicated at it is a directional process.

CAUSES OF SUCCESSION –

1. **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.

2. **Physiographic factors –** These include climate and other physical factors like soil erosion, soil deposition, landslide, volcanic lava. These all factors makes an area barren.

TYPES OF SUCCESSION –

1. **Primary sucession -** Occurs in the barren area where there was no previously any type of living matter e.g. volcanic lava, esturrine, mud bank, igneous rock, sand dunes.
   Note : It required 1000(s) of years.

2. **Secondary succession -**This type of succession occur where vegetation was present previously but vegetation was destroyed due to natural or artificial causes i.e. fire, flood, sudden changes in climate land slide.
   Note : This succession is comparatively more rapid, requires 50-100 years for grass land and 100-200 years for forest

Some other type of succession :

On the basis of Replacement :

1. **Autogenic succession –** During the succession, the community reacts with the environment and changed it. This community is replaced by new community. This is known as autogenic succession.
2. **Allogenic succession –** Community is replaced due to external conditions or forces not by existing vegetation itself. This kind of succession is known as allogenic succession.
   E.g. Fire, Food

On the basis of changes in nutritional and energy contents :

(1) Autotrophic succession – this is succession of plants communities.
(2) Heterotrophic succession – this is succession of animal communities.
Note : Sometimes succession is in retrogressive direction – **e.g.** Forest to grass.

GENERAL PROCESS OF ECOLOGICAL SUCCESSION

1. **Nudation –** It involved development of barren area (i.e. removal of community) by topographic (Soil erosion, land slide, volcanic eruption), biotic (human activity) and climatic factors (fire, flood, hails). It is the early stage of soil formation.

2. **Invasion –** Successful establishment of a species in a barren area.

This process is complete in three steps

- **Migration (dispersal) –** Reaching of different reproductive structure like seed, spores through water or air on barren area.

- **Ecosis (ecesis) –** Successful **establishment** of species in new environment.
  Many juvenile plants are formed due to the germination of different spores or seeds. Out of them some of the plant species are modified or adapted according to the new climatic condition and established there.

- **Aggregation –** After ecesis (establishment), as a result of reproduction members of the species increase in number.

3. **Competition or co-action –** Due to increasing no. of species at limited place there developed competition for habitat and nutrition. Individuals affect each other, this is co-action.

4. **Reaction –** Species which have survived, will react with environment and modify the environment (change soil water, light, temperature). The modified environment is less favourable for the existing community so it is replaced by another community.

5. **Stabilization (Climax)-** Finally there occurs a stage in the process when the final terminal community becomes stabilized for longer period of time, maintains itself with the climate of the area. This community is called climax community. It is complex, stable, no more species can replace them.

HYDROSERE :

Stages of hydrosere or hydrarch succession in the newly formed pond or lake

1. **Phytoplankton stage -** It is pioneer community, first coming minute autotrophic organism. These produce organic matter.

   e.g. Soft mud diatom, Cyanobacteria

2. **Rooted submerged stages -**

   e.g. Vallisneria

3. **Rooted floating stages -**

   e.g. Nymphaea, Nulembuium Trapa

4. **Reed swamp stage (amphibious stage) -** Most part of these rooted plants remain exposed to air

   e.g. Typha, Sagitaria

5. **Sedge** (Meadow stage or marsh meadow stage) - Muddy plants

   e.g. Carex, Ipomea

6. **Scrub stage -** woody shrubs, tolerates water logging

   e.g. Cornus

7. **Forest stage -**

   e.g. Tree

LITHOSERE :

Stages of Lithosere (Succession or rocks)

1. **Crustone lichens stage -** It is pioneer community, tolerates desiccation, produces organic acid which causes weathering of rocks, so first minerals are released for own use.

   e.g. Rhizocarpon

2. **Foliose lichens stage -** large lichens with leafy thalli

   e.g. Dermatocarpon

3. **Moss stage**

   e.g. Polytrichum

4. **Herb stage -** Annual hardy grasses
   e.g. Poa, Eleusin, Aristida

5. **Shrub stage**
   e.g. Zizyphus
6. **Forest stage**
   e.g. Tree