

Biotic community

- A group of several species living together with mutual tolerance (adjustment) and beneficial interactions in a natural area is known as a **community** or more appropriately **biotic community**.
- Synonyms:
 - biocoenose, biocenose, biotic community, biological community, ecological community
- Biocoenoses coined by [Karl Möbius](#) in 1877, describes the interacting [organisms](#) living together in a [habitat](#) ([biotope](#)).
- Descriptors in an ecosystem are:
 - Zoocoenosis for the faunal community,
 - [Phytocoenosis](#) for the floral community,
 - Microbiocoenosis for the microbial community.

The geographical extent of a biocenose is limited by the requirement of a more or less uniform species composition.

- Each biocoenosis comprises
 - Producer species (plants)
 - Consumer species (animals)
 - Decomposer (bacteria, fungi)

- **Community characteristics**

- Species diversity
- Growth form and structure
 - The diverse structure and growth forms of plants and animals determine the vertical stratification or vertical layering of the community.
- Dominance
 - Not all the species in the community are equally important in determining the nature of the community. Dominant species are those which are highly successful ecologically and which determine to a considerable extent the conditions under which the associated species must grow.
- Stratification
 - Stratification in the broadest sense refers to all distinguishable vertical or horizontal layers of organisms, and the result of their activities upon the environment.
- Succession
 - Succession represents a directional change in a community with time.
- Trophic structure or nutritional self sufficiency
 - A community is generally a **self-sustained unit** comprising of **producers**, **herbivores**, **carnivores**, **decomposers and transformers**. The feeding relations of the species in the community determine the flow of energy and materials from plants to herbivores to carnivores.
- Community periodicity
 - Communities show highly extensive and complex **seasonal rhythms**, **lunar rhythms**, **tidal rhythms** and many periodicities associated with the **cycle of day** and **night**. These periodicities are the result of both environmental and physiological rhythms.

Characters used to describe community structure

Broadly classified into two categories:

1. Analytical characteristics:

- these are generally expressed in term of 5-points scale
 - Quantitative characters
 - Qualitative characters

2. Synthetic characters:

- Actually computed for analytical characters

Analytical characters

- Quantitative characters
 - Frequency
 - Density
 - Abundance
 - Cover
 - Basal area
 - Dominance
- Qualitative characters
 - Physiognomy
 - Phenology
 - Stratification
 - Abundance
 - Sociability
 - Vitality
 - Life form (growth form)

Quantitative characters

- Frequency:
 - Number of sampling unit (as %) in which particular species occurs.
 - $\text{Frequency (\%)} = \frac{\text{No. of sampling unit in which sp. present}}{\text{total sampling unit}} \times 100$
- Density
 - $\text{Density} = \frac{\text{Total no. individuals of sp. in all sampling units}}{\text{total used sampling unit or quadrat}}$
- Abundance
 - $\text{Abundance} = \frac{\text{total \# of individual of sp. in all sampling unit}}{\text{total no. of sampling unit or quadrat}}$ in which they occur
- Cover
 - The area occupied by a plant, generally used for above ground parts
- Basal area
 - Refer to the ground actually penetrate by the stem
- Dominance

Qualitative characters

- Physiognomy
 - Growth form of dominant species (eg. Grassland, desert)
- Phenology
 - Vegetative form (leaves, stem, branches)
 - Reproductive form (flower, pollens, seed)
- Stratification
 - Plants of different sp. arranged in different vertical layers to use available physical environment.
- Abundance
 - Very rare, rare, common, frequent, very much frequent
- Sociability
 - It denote **proximity of plants** to one another
- Vitality
 - Capacity of normal growth and reproduction. (V1.....V5)
- Life form (growth form)
 - Phanerophytes (includes trees, shrubs and climber)
 - Chamaephytes (common at high altitude)
 - Hemicryptophytes (found in cold temperate zone)
 - Cryptophytes (found in arid zones)
 - Therophytes (seasonal plants)

- Synthetic characters
 - Presence and Consistency
 - Fidelity
 - Dominance
 - Other (inter-specific association, association index, similarity index, dominance index, species diversity, diversity index)

Synthetic characters

They determined by computing data

- 1. Presence and consistency (express the extent of occurrence of the individuals of a sp. in community)
 - Rare, seldom present, often present, mostly present, constantly present
- Fidelity (degree with which a species is restricted in distribution to one kind of community)
 - Fidelity 1. plant appearing accidentally
 - Fidelity 2. occurs in many community
 - Fidelity 3. specially occurs in one community
- Dominance
 - Relative density = $\text{density of sp.} / \text{total density of all sp.} \times 100$
 - Relative frequency = $\text{Frequency of a sp.} / \text{total freq. of all sp.} \times 100$
 - Relative dominance = $\text{dominance (cover) of the sp.} / \text{Total dominance of all sp.} \times 100$
- Other synthetic characters:
 - Interspecific association, association index, similarity index, dominance index, species diversity, sp. diversity, diversity index.

Thanks