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Synecology

(Study of communities) **Part- 3**   **1**

- I already discussed in
- Synecology(Study of communities) **part-1**- Introduction & Community composition.
- Synecology(Study of communities) **part- 2-**

  Plant community structure- Analytical characters- Qualitative structures of plant community and Methods of studying Quantitative structures.

  Now here I will discuss Quantitative structures (which will always be measured by any of the methods as Quadrate, Transect, The Loop or Pointless or point method) and Synthetic characters of plant community.

1. Analytical characters- A. Quantitative characters 2

Quantitative structures-

Coexistence and Competition both are affected directly by the number of individuals in the community. Therefore, it is essential to know the quantitative structure of community. To characterize the community as a whole certain(**7**) numerical parameters are used as **density, frequency, abundance, cover, total estimate, Association index & index similarity and important values**.

- i) **Density-** The numerical strength of a species in relation to a definite unit space(may be quadrate) is called its density.

  Density of a plant species per unit area –

  Ex- If 45 plants of *Solanum nigrum* occurred in 10 quadrate then 4.5 will be density of this species.

= | **Total number of individuals of a species in all the quadrates** |
| **Total number of quadrates studied** |

1. Analytical characters- A. Quantitative characters   3

- ii) **Frequency**- In the community, the individuals of all the species are not evenly distributed. Individuals of some species are widely spaced while those of some other species are found in clumps or mats. Frequency refers to the degree of dispersion in terms of percentage occurance.

- Ex- If *Solanum nigrum* occurred in 8 quadrates out of total 10 quadrates studied then frequency will be 40% of this species.

- Frequency =

Total number of quadrates in which the species occurs
Total number of quadrate studied

X100

1. Analytical characters- A. Quantitative characters   4

- Raunkiaer(1934)recognised five **frequency classes** of plant species in the community on the basis of their frequency percentages. These are as follows-
- Class A- 1 to 20% frequency.
- Class B- 21 to 40% frequency.
- Class C- 41 to 60% frequency.
- Class D- 61 to 80% frequency.
- Class E- 81 to 100% frequency.

  The dispersion of species in relation to that of all species is termed as **Relative Frequency** of a species. Relative Frequency is determined by the following formula:

- Relative Frequency of a species=

  100 X | **Frequency of the species in stand x** |
  | Sum of the frequencies for all the species in stand x |

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- iii) **Abundance-** The estimated number of individuals of a species per unit area is referred to as abundance. Abundance of a species is determined by following formula:
- Abundance of a species =

Total number of individuals of the species in all quadrates
Total number of quadrates in which the species occurred.

- Abundance classes – Rare- 1 to 4, Occassional- 5 to 14, Frequent- 15 to 29, Abundant- 30 to 90 and Very abundant-100+   stalks per square meter quadrate.

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1. Analytical characters- A. Quantitative characters   6

- iv) **Cover**- The cover implies the area covered or occupied by the leaves, stems and flowers, as viewed from the top. The coverage is studied at the **canopy level and basal region**. In forest, where several strata are well marked, each layer of vegetation is considered separately for measuring the coverage. The area of coverage is used to express the dominance.

1. Analytical characters- A. Quantitative characters   7

- v) **Total estimate-** Abundance and coverage can be a combined in a community description as total estimate. It is probably the best method for obtaining a complete general picture of plant community.

- vi) **Association index and index of similarity-**

   The interspecific association can be evaluated by association index and also by calculating the index of similarity. The index of similarity is utilized to compare two co-existing groups.

- vii) **Importance value-** In any highly heterogeneous plant community, it can be obtained by adding the values of relative density, relative dominance and relative frequency.

- **2. Synthetic characters-** Synthetic characters describe the make-up of a community. The chief synthetic characters used are- **Fidelity, Presence and Constance.**

- **i) Fidelity-** The term fidelity refers to the **faithfulness of a species to a community**. In the community, there are different types of species. Some plant species are confined to one particular community and they are called indicator species. Some can flourish in several communities. There are different classes of species on the basis of their fidelity-

- Class 1- **Strange species** or accidentals which are either intruders from other community or relics from other successional stages.

- Class-2- **Indifferent species** or Companions which have no preference or affinities for any community.

- Class-3- **Preferential species** that may be found in several communities but have affinity for only community.

- Class-4- **Selective species** which may occur rarely in other communities but have strong affinity to one particular community.

- Class-5- **Exclusive species** which occur exclusively in one community

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- ii) **Presence**- It indicates nearly the **presence of a species in a stand.** It is generally expressed in a scale of 1 to 5.

- a) **Rare**, which occur in 1-20 % of stands examined.

- b) **Seldom present**, which occur in 21- 40% of stands examined.

- c) **Often present**, which occur in 41-60 % of stands examined.

- d) **Mostly present**, which occur in 61-80 % of stands examined.

- e) **Constantly present**, which are present in 81-100 % of stands examined.

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- iii) **Constance**- It is the degree of **presence in an unit area(sample area)** instead of the whole stand. It actually improves the method of presence study, otherwise there is no fundamental difference between presence and constance. It is generally determined from frequency and the following 5 constance classes have been recognised-

- Constance 1- 1to 20 % frequency.

- Constance 2- 21to 40 % frequency.

- Constance 3- 41to 60 % frequency.

- Constance 4- 61to 80 % frequency.

- Constance 5- 81to 100 % frequency.

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- THANKS.