. Dr.Namita Kumari
Department of Botany
Magadh Mahila College
Patna University, Patna

Synecology
(Study of communities) **Part- 2**

- Synecology(Study of communities)- Introduction & Community composition already discussed in part – 1. Now here Study of **plant community structure.**
- The special field of Synecology which is concerned with the structure and classification of plant community is known as **Phytosociology.** It can be studied under two sets of characters-
- **1. Analytical characters-**

  A. Qualitative characters

  B. Quantitative characters.
- **2. Synthetic characters.**
- **1. Analytical characters-** Analytical characters are those features of community which can be observed or measured directly in each stand. There are two different aspects of vegetational analysis- namely Qualitative and Quantitative .
- A. Qualitative structure of plant community- The Qualitative structure of plant community can be described on the basis of visual observations without any special sampling and measurement. It can be studied in following **5 ways-**

Synecology

1. Analytical characters- A. Qualitative characters 2

- i) Floristic composition or species content of community- It can be studied by periodic collection and identification of plant species for the whole year. This also show the tolerance of each species for different environmental conditions.
- ii) Stratification and aspection- The number of strata or layers in a community can be determined by general observation of the vegetation. As L1- Ground stratum like mosses, L2- Herbs, L3- Shrubby layers. L4- Top layer or canopy layer of Trees. If one periodically observes the flora for the whole year, changes in the appearance of vegetation may be apparent with the change in the season. This is known as aspection.
- iii) Life- form- On the basis of general appearance and growth, the species of a community are grouped into different life form classes.

Synecology

1. Analytical characters- A. Qualitative characters 3

- iv)Sociability- In a plant community, the individuals of species are not evenly distributed. Individuals of some species grow widely spaced while those of some other species are found in clumps or mats. The **space relationship of plants** is referred to as sociability. As – Class 1- Shoots grow singly, Class-2- Scattered groups or tufts of plants, Class-3- Small scattered patches or cushions, Class-4- Large patches or broken mats, and Class-5- Very large mats of nearly pure population covering the entire area.
- v)Interspecific associations- When the plants belonging to two or more different species grow near one another they form a community. This type of association is known as interspecific association.

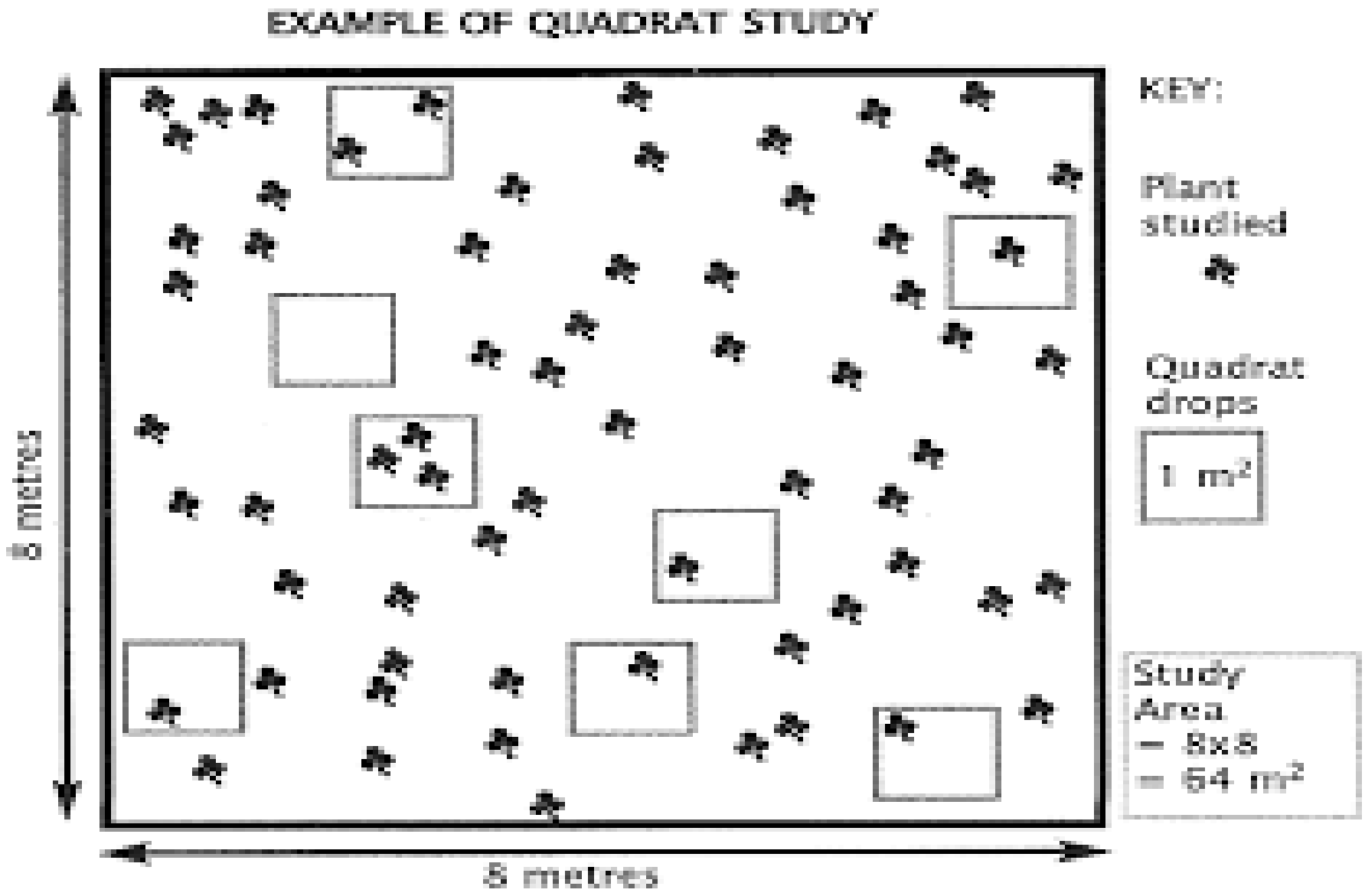
Synecology

1. Analytical characters- B. Quanitative analysis 4

- B. Quanitative structure of plant community- The structure of any plant community cannot be studied by observing each and every individual of plant species growing in a habitat. It is rather impossible. Therefore, rough estimate of species content of a habitat is made by observing the plant species at different places or sample areas, in the habitat. Several **methods** have been used by ecologists which are as follows-
- i) Quadrat method,
- ii) Transect method,
- iii) Loop method, and
- iv) Pointless or Point method.
- **i) Quadrat method**– The Quadrat is a **square sample plot or unit** for a detailed analysis of vegetation. In vegetational analysis, quadrats of any size, shape, number and arrangement may be used.

The quadrats of one square meter size or

Quadrate sampling method 5



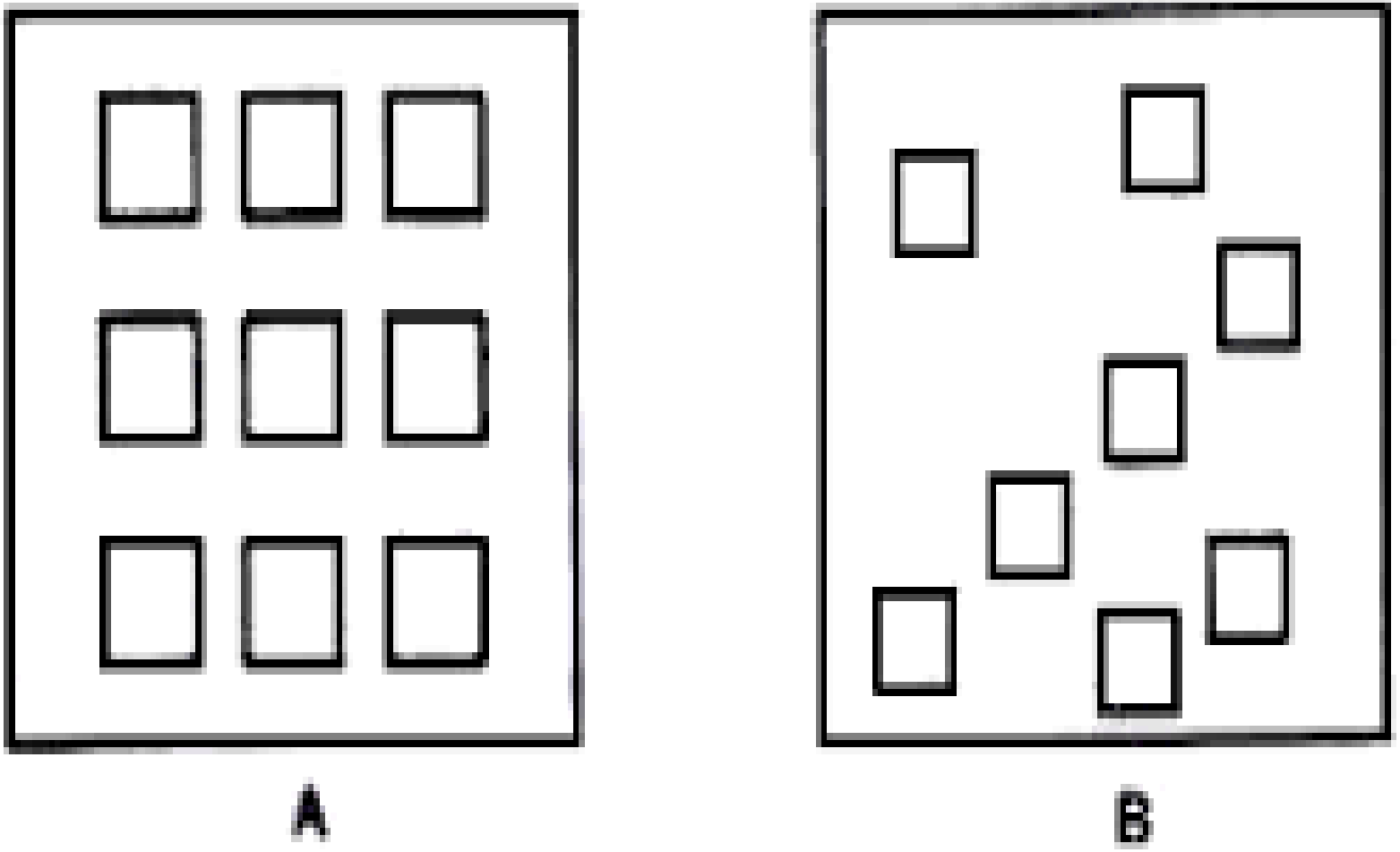


Fig. 6.5. A and B—Arrangement of quadrats in the study area

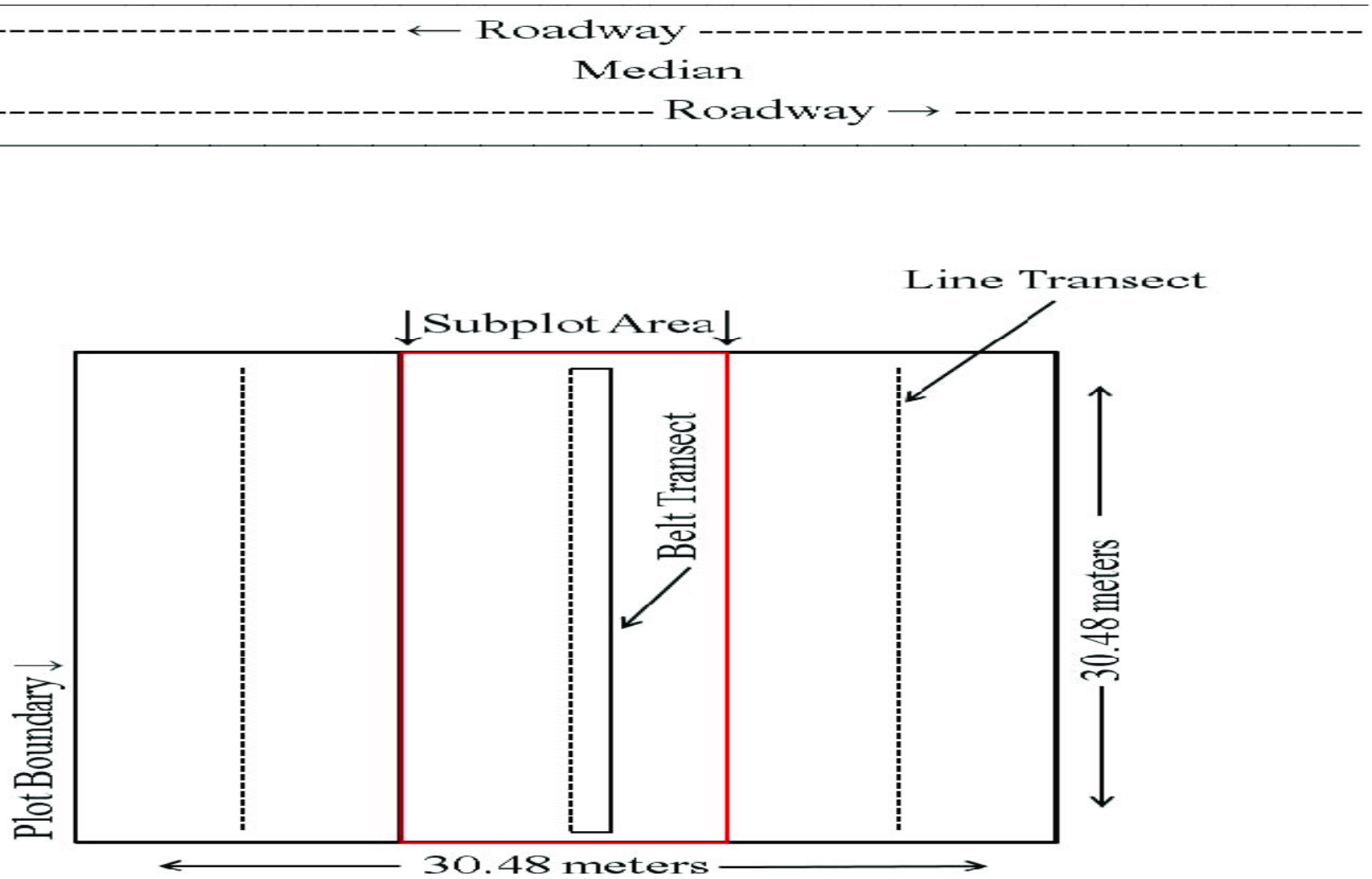
A—Systematically distributed quadrats. B—Randomized quadrats.

or 50cmX50cm size or even 20cmX20cm size may serve the purpose. The shape of quadrate is usually square but rectangular or even circular ones also used. In quadrates of different sizes, number of plant species found in them are counted and recorded separately.

- **ii) Transect method-** A cross- section of an area used as sample for recording, mapping or studying vegetation is called transect. It may be a **strip, belt or a line** across the area of study. The plant species occurring along these strips or lines are recorded.

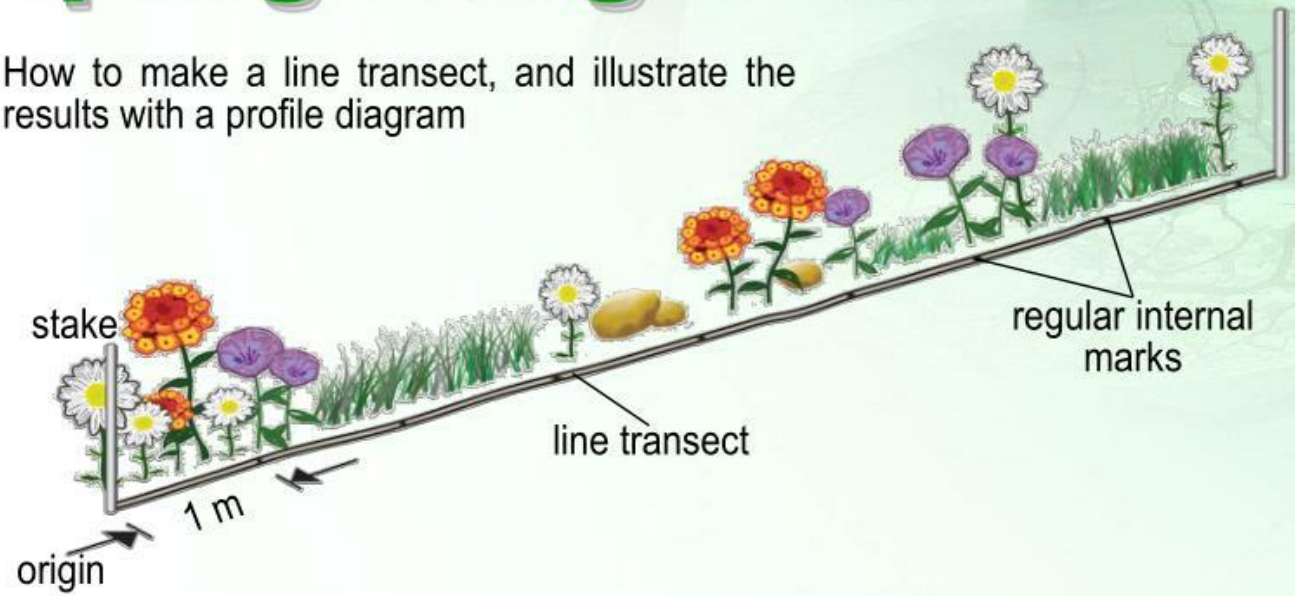
  A series of **belt transect** of pre-determined width and length are laid. A metric steel tape or steel chain (1cm.wide), considered as **line transect** is streched between one to other ends. Observation and recording of plant species in twenty or thirty randomly placed belts or lines under most conditions adequately sample the community.

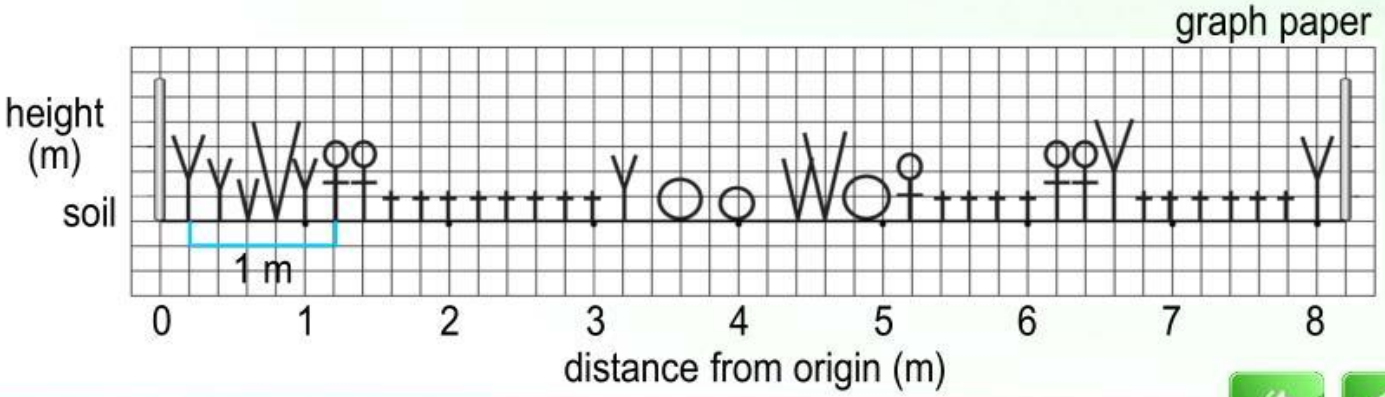
Transect method



Sampling using a line transect

- How to make a line transect, and illustrate the results with a profile diagram





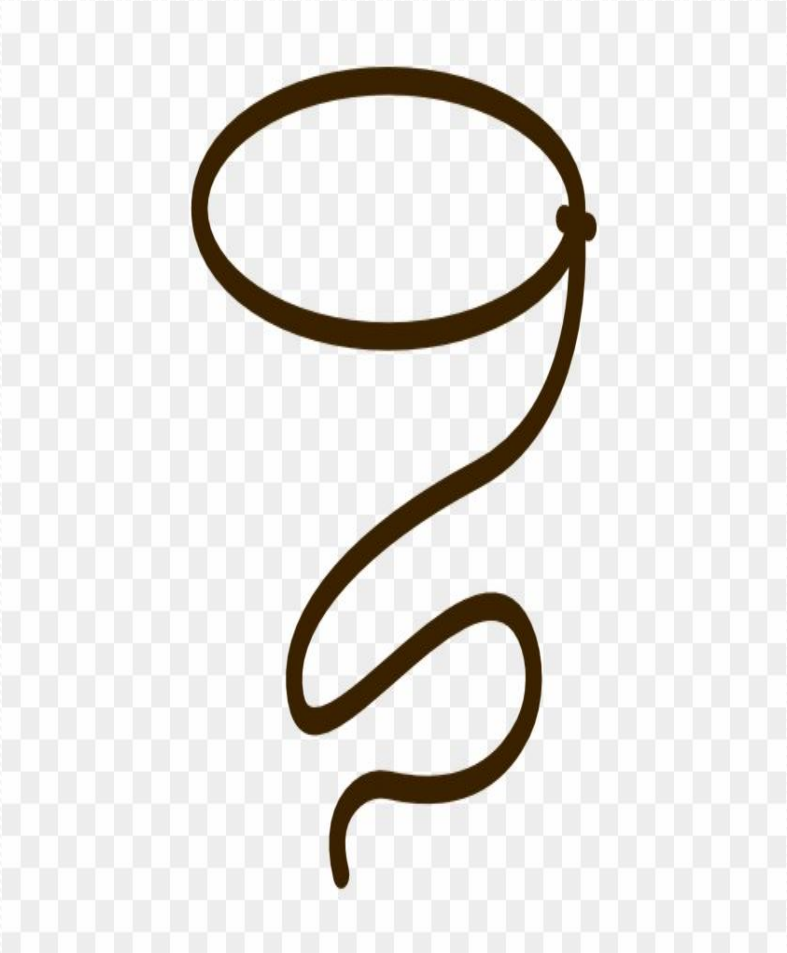
- **iii)The loop method-** This is a simple, accurate and quick method for sampling of only grassland and low herbaceous communities. In this method equally spaced 100 small metallic circles or loops of 2 cm diameter, located along a stretched line, are used as observation points. Here 20 to 30 transects are adequate to sample the community.
- **iv)Pointless or Point method-** In this method of sampling observations are taken **on the point** in the study area where a nail or set of nails touch the ground at random places. Two methods will be discussed—

  a) Point frame method

  b) Point centre method.

  a) Point frame method – It is done with the help of **Point frame** . This consists of a scale like frame, supported by a pair of legs. The frame bears **10 equidistant holes having 60 cm long pointers or pins.** It is placed one after another at several observation points in the study area and plant species that are hit by pointed end of the pointers or nails are recorded.

Loop method



Point frame method

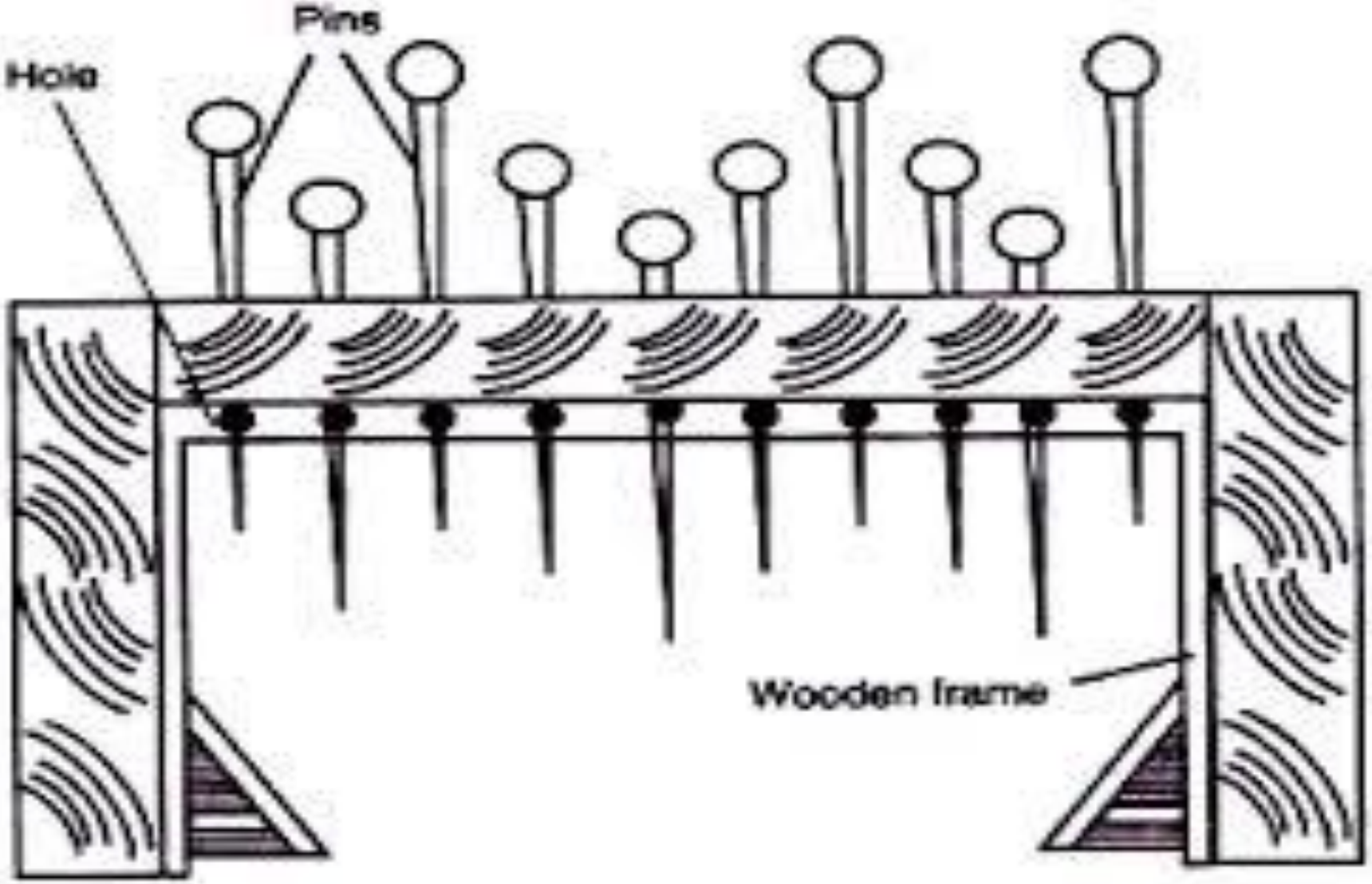


Fig. 6.9. Point frame apparatus.

Point centre method

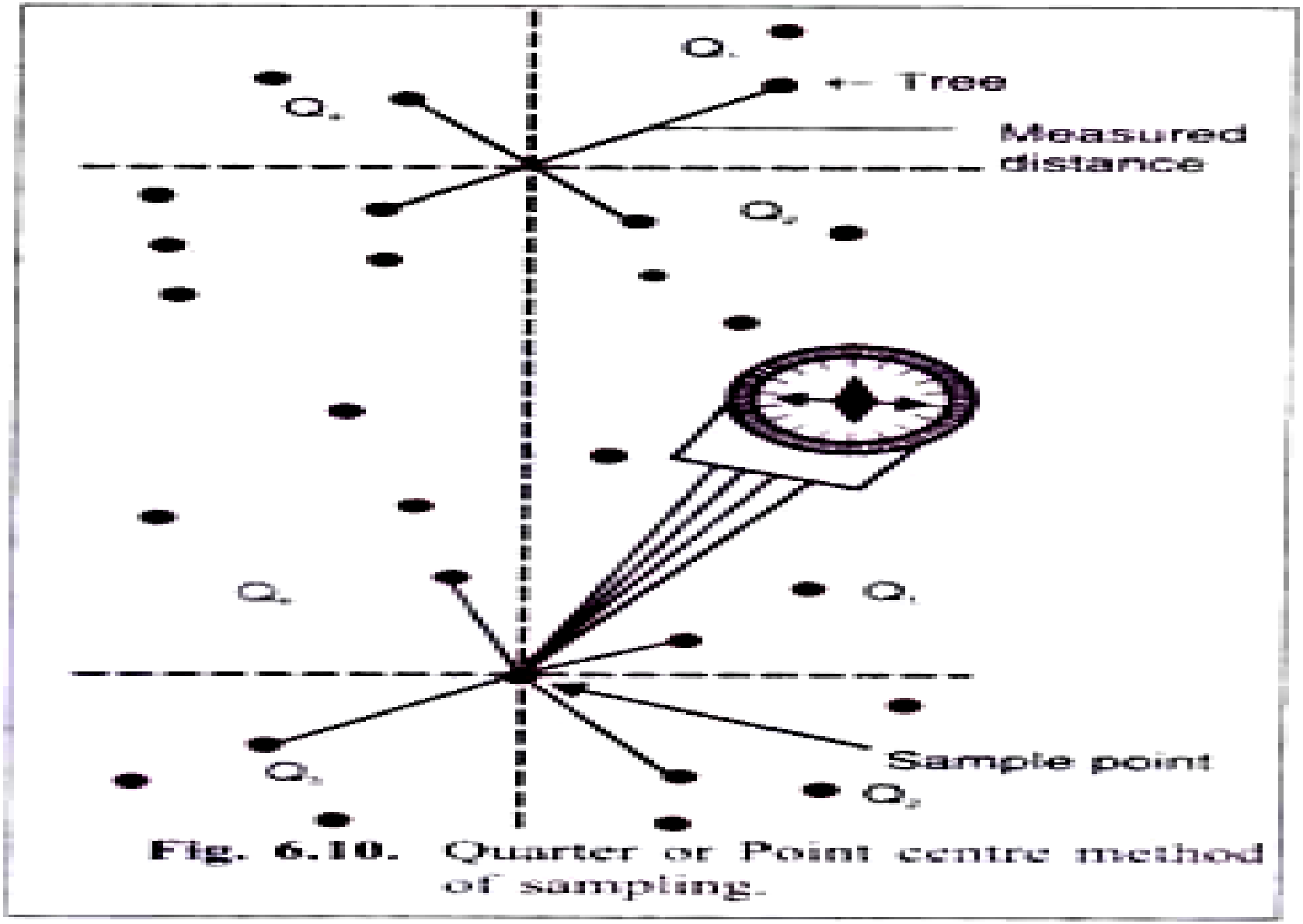


Fig. 6.10. Quarter or Point centre method of sampling.

Synecology

1. Analytical characters- B. Quanitative analysis - Methods 14

b) Point centre method- In this method an easy instrument is used which consists of a brass needle or nail fitted with rubber cork and compass on the top. Here **four measurements are taken at each observation point**. The observation points can be mechanically placed along a straight line or they can be located random.

--x—

In Synecology part- 3. will be discussed-

Quantitative structure of plant community as Density, Frequency, Abundance, Cover, Total Estimate, Association Index and index of similarity and Importance Value.

And **Synthetic characters of plant community.**

THANKS