EXPERIMENT 5

To study the plant population density by quadrat method.

THEORY/PRINCIPLE

Population Density

It represents the numerical strength of a particular plant species in the community per unit area at a specific time. The unit area may be small or large, depending on the size and nature of the plant community being studied.

Population density of a organism in an ecosystem varies from place to place and depends on various factors such as food and water availability, predation, weather conditions, birth rate, death rate and migration rates. It can be calculated using the following formula:

$$\text{Density } (D) = \frac{\text{Total number of individual(s) of the species in all the sampling units (S)}}{\text{Total number of sampling units studied (Q)}}$$

The value thus obtained is then expressed as number of individuals per unit area. When the measured unit area is divided by the number of individuals, the average area occupied by each individual is obtained. For obtaining more accurate results, it becomes necessary to take different sample areas for studying population density in a large geographical area.

Quadrat Method

It would be an extremely laborious and time consuming task to count all the individual plants within a given population and may also incur disturbance and damage to the habitat and population under study. Thus, we use **quadrat** as representation of the total population.

Quadrats are the sampling units of a known area. These sampling units must be distinct and must not overlap each other. The quadrats having a rectangular frame and dimensions of 1m x 1m are most commonly used for herbaceous plants. Quadrat method is considered as the most preferable method to calculate population density and percentage frequency of different plant species.

Significance of Plant Population Density

Plant population density values hold significant importance as they show relative importance of each species with respect to the other species and the surroundings. With the increase in density, the competition stress also increases which further gets reflected in poor growth and lower reproductive capacity of the species. Data on population density is useful for measurement of the effects of reseeding, burning, spraying and successional changes.