

Topic 4 – Practical 2

Comparing the distribution of two plant species using quadrat sampling

Safety

- There are no specific safety hazards associated with this practical.
- Take normal precautions when carrying out outdoor fieldwork.

Apparatus and materials

- 0.5 m × 0.5 m (0.25 m²) quadrat
- two 20 m tapes or ropes marked out at 1 m intervals
- random number tables
- clipboard, pencil and paper

Introduction

A quadrat is a square (or circular) sampling device, which has a known area. In this practical, you will use a quadrat with an area of 0.25 m². Quadrats are used to measure the abundance of plants or other non-motile organisms such as seaweed, limpets or barnacles. A quadrat can be used to measure the species frequency (the percentage of quadrats in which a species is found) or the density of individuals (the number of individuals per unit area). A quadrat can be used to compare the abundance of one species in two different areas or to compare the abundance of two species in one area. Here we will compare the density of a common plant species in two different areas.

Procedure

- 1 Select a local plant species to investigate. You must be able to identify the plant with certainty.
- 2 Select two different areas of grassland to sample. For example, one might be a cultivated lawn in your school grounds and the other an area of neglected ground of similar size. Choose areas that both contain the plant species you wish to investigate.
- 3 Place the two tapes (or ropes) at right angles to one another to create a sampling area. The point at which the tapes meet is the origin.
- 4 Use random number tables to generate numbers between 0 and 20, allowing you to draw up a list of 20 sampling points. For example, if your first random numbers are 1 and 7, use these numbers as you would use plot coordinates on a graph (1,7) and place the corner of your quadrat so that it is 1 m ‘horizontally’ along the first tape and 7 m ‘vertically’ up the second tape.
- 5 Count the number of plants of interest in the quadrat and record the results.
- 6 Repeat the counting procedure for the next nine sampling points.
- 7 Now place the tapes in a similar way on the second area of ground and repeat steps 4, 5 and 6, recording all your data as you go.
- 8 Calculate the density of plants in each of the two areas as follows:

$$\text{density} = \text{number of individuals} \div \text{area}$$

For example, if 10 quadrats contain a total of 175 plants:

$$\begin{aligned}\text{density} &= 175 \div (10 \times 0.5 \text{ m} \times 0.5 \text{ m}) \\ &= 175 \div 2.5 \text{ m}^2 \\ &= 70 \text{ m}^{-2} \text{ or } 70 \text{ plants per m}^2\end{aligned}$$

- 1 Compare the densities of the plant you have selected in the two areas. Are they similar or very different?

- Record your results on separate paper.