

Edexcel B Biology A-Level

Core Practical 15

Investigate the effect of different sampling methods on estimates of the size of a population taking into account the safe and ethical use of organisms.

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The distribution of a species is determined by a range of different variables such as the **type of quadrats** used when sampling. Different quadrat types of quadrat will give different estimates of population sizes. In this investigation you will use different **types** of quadrats and quadrats with **varying size**.

Equipment

1. 0.5m x 0.5m quadrat
2. 1m x 1m quadrat
3. 2x tape measure
4. Random number generator
5. Clipboard

Method

1. Choose a **single species** which you want to measure the abundance of. Choose a species that changes in abundance in the sampling area and can be easily identified.
2. Choose a **10x10m** area to take samples from. Use two tape measures to create a set of **axes** off which coordinates can be read.
3. Use a **random number generator** to generate at least **10** sets of **random** coordinates.
4. Place the quadrat at each of the coordinates, placing the **bottom left corner** on the coordinate every time. Start with the smaller 0.5mx0.5m quadrat.
5. Record **percentage cover** for the chosen species. This can be done by recording how many of the quadrat's 100 squares contain the organism from the chosen species. A square should only be counted if **half or more** of it is covered.
6. As well as this record how many of the organisms of the chosen species touch the pins of the quadrat. If using a frame quadrat - record how many intersection points contain the chosen species underneath. (If your quadrat has 100 smaller squares inside then there will be around 81 intersecting points inside the quadrat). This acts as a model for a **point quadrat**.
7. Furthermore, record the number of organisms within the quadrat for the chosen species. An organism should only be counted if half or more of it is within the quadrat. This allows us to work out **density per square metre**.
8. Repeat steps 4-7 with the bigger 1mx1m quadrat.



Risk Assessment

Hazard	Risk	Safety Precaution	In emergency	Risk Level
Biohazard	Allergies; soil bacteria; contamination	Wash hands after practical	Seek assistance	Low
Slippery surfaces	Slip hazard	Wear appropriate footwear; don't run	Seek appropriate medical attention	Low

Graph/Analysing Data

1. Work out **mean percentage ground cover** for the frame and point quadrat.
2. Work out the **mean density per m^2** for the different sized quadrats
3. Construct a bar chart or histogram
4. Statistical test such as **t-test**

Conclusion

1. You should be able to find out if there is a significant difference between density per m^2 for the different sized quadrats.
2. You should be able to find out if there is a significant difference between mean percentage cover for the different types of quadrat.

