



## *Grassland : Sampling methodologies*

### **INTRODUCTION**

Suppose we are going to study the flora community of a grassland. The first question we have to ask ourselves would be: " what information do we want and what should we observe?" We cannot investigate everything because there are too many. We have to select those we think meaningful and appropriate.

The second question would be: " How can we obtain the information we want?" Suppose now we want to know the abundance of a grass species on the grassland. If the species is common and dense, it is almost impossible for us to count all individuals of the species in the habitat. Therefore, in most cases, we only take samples. The number of samples required should be able to validly represent the whole population, on the other hand it should not be too many because we want to minimize our time and effort. How can we determine the number of sample required?

Another problem is how to use sampling equipment. In a grassland, we normally use a transect and/or quadrat. How to place the transect? What quadrat size should we use? where to place the quadrats? ...

This project aims to introduce you: 1. how to describe vegetation, 2. how to determine the number of samples required, 3. some common sampling methods which are widely adopted by ecologists.

### **FIELD WORK**

#### ***A. BELT TRANSECT***

1. Run a transect ( 30 m measuring tape) across the grassland.
2. Along the transect, select 2 species of plants as target species. They should have contrasting densities, sizes or growing forms. The two species need not to be numerous, but should be common (not localized at particular areas).
3. a. Place a 50 cm x 50 cm quadrat at point 0 m.  
b. Place the point (pin) quadrat in the 50 cm quadrat.  
c. Count number of pins touching the target species.  
d. Repeat step b and c four times.  
e. Divide total number of pin touching the target species by total number of available pins (  $5 \times 10 = 50$ ), equal to the cover (in percentage) of that target species.  
f. Repeat the procedures for another target species.
4. Count number of species in the quadrat.
5. Place the quadrat at point 2 m, repeat step 3 and then count the number of new species ( those have not been found in any of the previous quadrats). Measuring cover of plants other than the target species is not required.

6. Place the quadrat at intervals of two meters for the rest of the transect line and repeat step 5 for all these quadrats.

7. Use a 20 X 20 cm grid to repeat step 3 to step 6. Use the same target species.

### DATA SHEET 1

#### Vegetation Data Obtained by Belt Transect Method (Using 50 x 50 cm quadrat)

Species A: \_\_\_\_\_

Species B: \_\_\_\_\_

Sample number	Cover (%)		Cumulative mean value of cover		Number of new species	Cumulative species total
	Species A	Species B	Species A	Species B		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

	Total cover #	Frequency*
Species A		
Species B		

\*  $Frequency = \frac{\text{Number of samples in which the species occurs}}{\text{Total number of samples}}$

#  $Total\ cover = \frac{\text{Total area covered by the species}}{\text{Total area sampled}}$

## DATA SHEET 2

Vegetation Data Obtained by Belt Transect Method (Using 20 x 20 cm quadrat)

Sample number	Cover (%)		Cumulative mean value of cover		Number of new species	Cumulative species total
	Species A	Species B	Species A	Species B		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

	Total cover #	Frequency*
Species A		
Species B		

## B. RANDOM SAMPLING

1. Place two transect lines at right angle to each other (do it at the beginning), which are regarded as X - axis and Y - axis
2. Select 16 pairs of random numbers from the random number table. Regard the numbers as X-Y coordinates and place the 50 X 50 cm quadrat according to the coordinates. Use the same target species and go through same procedures for the 16 samples.

### DATA SHEET 3

#### Vegetation Data Obtained by Quadrat Random Sampling

Sample number	Cover (%)		Cumulative mean value of cover		Number of new species	Cumulative species total
	Species A	Species B	Species A	Species B		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

	Total cover #	Frequency*
Species A		
Species B		

## C. Data analysis

### 1. Plot Curves

There are totally 3 sets of data collected from field. For each set of data, plot :

- a. cover (cumulative mean value) of the species A against sample number
- b. cover (cumulative mean value) of the species B against sample number
- b. cumulative species total against sample number

### 2. Questions to consider

- a. Describe and explain the tendencies of changes of cover (cumulative mean value) of species A and species B against number of samples. What can you say about the minimum number of samples required to represent the whole population of species A and the minimum number of samples required to represent the whole population of species B ? Are the numbers different when using different sampling methods ? Why ?
- b. Describe and explain the tendencies of changes of cumulative species total against number of samples. What can you say about the minimum number of samples required to represent the whole flora community ? Are the numbers different for different sampling methods ? Why ?
- c. What do you think are the advantages and disadvantages of using belt transect methods for sampling?
- d. What do you think are the advantages and disadvantages of using random sampling method?
- e. How would you compare 50 x 50 cm quadrat and 20 x 20 cm quadrat in respect of their suitability for sampling?

### Field Work equipment

1	Transect line - 30 m measuring tape	1 pc
2	50 x 50 cm quadrat	1 pc
3	20 x 20 cm metal grid	1 pc
4	Nail for holding transect line	1 pc
5	Counter	1 pc
6	Random number table	1 pc
7	Point quadrat	1 pc

### References

1	Grasses and Sedges of H.K.
2	H.K. Herbs Vol. 2
3	H.K. Shrubs Vol. 2
4	H.K. Ferns
5	Grassland plants



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## Results examples



