PLOT OBSERVATION

OBJECTIVE:

In this lab you will be introduced to different plot methods of sampling biological communities. You will also study and compare different habitats within Rowan University.

INTRODUCTION:

The plot sampling method is one of the basic and commonly used procedures for sampling many types of organisms. Typically a plot is a rectangle or square, although other shapes can be used. In plot sampling, one takes a given area of manageable size, and will identify, count and perhaps measure all individuals within it. This is an assessment of all plants or animals in a given community.

When identifying the species within a plot, be sure to minimize bias. Bias in plot sampling occurs when plants or animals are not included in the survey because the observer felt that they were not ideal representations of the area. Plot sampling is often duplicated or replicated many times in order to obtain an adequate representation of the community.

OPTION ONE: OUTDOOR SAMPLING

PART ONE: PLOT SAMPLING

In this exorcise you will be working in table teams. Your instructor will suggest good places around campus for your group's plot observation.

1) Before you leave for the field, obtain a rope and stake set, a collection bag, paper and pencil to record your observations.

2) Once you determine where your plot will be mark the location on the campus map provided.

3) Using the stakes and ropes stake out your 7m X 14m plot.

4) With graph paper make a scale map of your plot. Identify all components of your plot on the map.

5) Classify the plants in the area according to type: lichen, fungus, moss, fern, tree seedlings, grass, shrubs and larger trees. Use the **Error! Bookmark not defined.** at the end of his lab to record your findings.

6) Identify the trees and approximate height. Obtain leaves of unknown trees as field guides will be provided back in the laboratory for you to use.

7) Construct a key or table to accompany the map of your plot.
Where was your plot located?_____

PART TWO: TRANSECT SAMPLING

In this portion of the lab you will be using the transect sampling method. In some types of landforms, the use of plots may be impractical and very time consuming. Transects are often used in ecological succession of communities at transition zones (lakes to banks for instance)

1) Before you leave for the field, obtain a rope and stake set, a collection bag, paper and pencil to record your observations.

2) Mark out a transect connecting two randomly selected points on campus. Place one stake in the ground and place another stake 100m away.

3) Once you have identified where your transect will be mark the location on the campus map provided at the end of this lab.

4) Divide the transect into four contiguous segments of 25m long.

5) Classify and count all trees and bushes, (per specie) found in each continuous segment of the transect. Begin counting at one end of the line and record the data for each 25m interval. Count only those plants that are within 1cm of the line. Include any aerial foliage which may overlie the transect. Use the **Error! Bookmark not defined.** at the end of his lab to record your findings.

6) Construct a table and scale map including trees and bushes, and the abundance per species. Where was your transect located?_____

Laboratory Questions for Option One: Outdoor Sampling

Student_____ Section_____
Date_____

1) What were the main features or specimens of your plot?

2) What were the main features or specimens of your transect?

3) How did the plot method differ from the transect method?

4) Describe a situation where you might use a plot sampling method.

5) Describe a situation where you might use a transect sampling method.

OPTION TWO: INDOOR SAMPLING

Plot Sampling

For this option for the plot lab, you will utilize four different community sampling techniques: **square quadrats**, **line transects**, **variable radius plots**, and **points**. Each group will sample 5 square quadrats, 5 line transects, 2 variable radius plots, and 5 sets of 10 points. Square quadrats are 25 cm^2; line transects are 10 cm long; 10 points are 1 cm apart along a line. You will measure the length of time it takes you to use these each of these methods to sample a board with a representation of a plant community on it to determine the most efficient and most accurate methods for sampling. There are 6 species in this made-up plant community: Blue, Green, Orange, Red, White, and Yellow. Keep track of each species measurement separately for each sampling method. Work in groups of 4 and reach a consensus among your group for the estimate for each measurement.

Procedure

1. Select locations from the Table of Random Coordinates.
    a. For square and variable radius plots, the coordinates mark the plot center.
    b. Orient the square quadrats along the lines on the board.
    c. For line transects and points, also select a random orientation.
1. If a quadrat, line, or plot extends beyond the sampling board
    a. For square quadrats, reduce the quadrat size, extending only tot he board edge
    b. For line transects and points, measure only to the board edge
    c. For variable radius plots, select a new plot location
1. Estimate cover
    a. For quadrats, estimate the percentage of the quadrat covered by each species; quickly reach a group consensus.
    b. For line transects, measure the amount of the line intercepted by each species, to the nearest millimeter; convert to percentage (if the line is truncated at the board edge, remember to divide by the actual line length).
    c. For variable radius plots, count the number of "hits"; each hit equals 10% cover (if the points are truncated at the board edge, remember to divide by the actual number of points).
1. Complete all sample (5 or 2) consecutively for each method
2. Record the total elapsed time for each method; combine set-up, sampling, recording activities, and going to the next sample location in the time measurement; do not include the time it takes to calculate averages and the standard deviation.

3. After you complete your sampling, calculate the average cover and standard deviation for each technique.
4. Compile your data
    a. Add the cover of each color to get your estimate of total cover.
    b. Put group average total cover, standard deviations, and average elapsed time (seconds) per sample location on the blackboard; report cover means and standard deviations to 1 decimal point.
    c. Record overall averages and standard deviations and compare to your group's data.
    d. Compare overall sample estimates with the true values.

Laboratory Questions for Option Two: Indoor Sampling

Student_____ Section_____
Date_____

1) Which method was the most efficient? Which was the most accurate?

2) What kind of real world situations do you think the trade-off for efficiency would be better? For accuracy?

3) Give an example of a community that each of these methods might be best suited to?

4) What are two possible disadvantages to these sampling methods?

5) Would these methods work for mobile organisms? How might you adapt them to get a better estimate?

Glossary

Abundance: Numbers of individuals.

Basal Area (BA): Cross-sectional area of a tree at breast height; the total cross-sectional area of trees.

Biomass: Weight of living tissue.

Canopy Cover: Percentage of sky that is covered by upper branches or canopy of trees.

Cover: Percentage of the ground obscured by the aboveground portions of a species.

Density: Numbers of individuals per area.

Diversity: Can simply be richness, or it can incorporate evenness, usually reported as a diversity index then.

Dominance: One or a few species comprising most of the abundance of the organisms in the community. Most species would have few representatives.

Evenness: The degree to which species abundances are evenly distributed among all species.

Frequency: Proportion of sampling units in which a species is found.

Leaf Area (LA): Surface area of leaves per area of ground.

Species Richness: Number of species in an area.

Random Coordinates

X	Y	X	Y	X	Y	X	Y	X	Y
13	47	69	27	99	96	50	48	12	45
76	29	59	0	72	56	52	39	1	81
46	18	93	41	76	14	32	20	69	94
53	15	85	2	65	99	99	2	87	65
22	57	53	71	7	41	49	91	63	21
4	81	9	94	63	14	26	43	74	68
68	3	66	4	89	57	9	14	73	91
68	53	42	18	27	25	95	95	100	25
94	50	70	32	44	49	7	41	89	86
38	96	91	89	77	46	50	13	23	47
52	75	76	65	48	97	38	89	30	51
83	56	26	15	24	12	27	9	35	60
3	89	4	68	27	20	92	16	51	82
5	63	74	38	36	32	53	7	59	76
53	85	33	39	16	63	46	36	85	46
67	16	63	50	49	12	95	25	41	96
0	21	76	14	90	65	5	13	84	63
38	72	100	59	91	62	76	79	27	44
6	13	36	85	6	81	77	45	41	83
42	9	24	59	91	25	83	35	54	69

Random Orientations

127	154	93	104	132	144	3	83	88	36
178	52	18	158	157	127	160	11	120	165
172	97	74	79	129	134	95	129	123	156

% Cover Data Sheets

Square Quadrats

Species ----------Cover---------- x sd

1 2 3 4 5

Elapsed Time							
Blue							
Green							
Orange							
Red							
White							
Yellow							
TOTAL COVER							

Line Transects

Species ----------Cover---------- x sd

1 2 3 4 5

Elapsed Time							
Blue							
Green							
Orange							
Red							
White							
Yellow							
TOTAL COVER							

% Cover Data Sheets

Variable Radius Plots

Species ----------Cover---------- x sd

	1	2					
Elapsed Time							
Blue							
Green							
Orange							
Red							
White							
Yellow							
TOTAL COVER							

Points

Species ----------Cover---------- x sd

	1	2	3	4	5		
Elapsed Time							
Blue							
Green							
Orange							
Red							
White							
Yellow							
TOTAL COVER							