

# [Free report about vegetation richness and diversity](https://assignbuster.com/free-report-about-vegetation-richness-and-diversity/)

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## Abstract

Ecology, a scientific discipline based on ecosystem, interrelates organisms, vegetation, process and condition in nature. For ecological study of any landscape knowledge about structure of plant communities and role of soil is required. Knowledge of plant community is based on understanding of spatial relationships, abundance and diversity of plants or vegetation in that area. From the study of plant community and their associated edaphic or soil factors knowledge of vegetation patterns and species assemblage is developed. In a plant community it is very difficult to quantify number and distribution of all species and individuals, so techniques for obtaining representative sample have been described in this experiment. There are two types of sampling techniques – plot and plotless. Main objective of this experiment is to have knowledge of plot technique.   
Keywords: vegetation, plant community, sample

## Introduction:

Vegetation richness and diversity is one of the basic topics in ecology, rather biology. This topic helps to get an idea about structure of plant community in any landscape. In this lab experiment plots locations were selected subjectively by choosing sites with many species. Purpose of this experiment was to evaluate species richness, diversity by % cover, diversity by density, Shannon’s Diversity Index of plant of various types - such as tree, shrubbery and herbaceous.

## Methods:

Plot technique was used in this experiment. In this method a representative area was chosen within plant community followed by rigorous sampling of plant species and associated soils within areas of the plot called quadrats. Within a quadrat individual plants were identified. Then plants were counted for density calculation or the area covered by each species was estimated for calculation of percent cover.

## Results:

First location-   
Tree:   
Species % cover   
Red Oak23   
Tulip Tree25   
Sugar Maple5   
Species richness = 3   
% cover total = 53

## Calculating Diversity by % Cover:

Species % cover   
Red Oak23/53 = 0. 44   
Tulip Tree25/53 = 0. 47   
Sugar Maple5/53 = 0. 09

## Shannon’s Diversity Index

H’= -∑ pi ln (pi)   
H’ = -[(0. 44(ln 0. 44)) + (0. 47(ln 0. 47)) + (0. 09(ln 0. 09))]   
H’ = -[(0. 44 (-0. 82)) + (0. 47(-0. 76)) + (0. 09(-2. 41))]   
H’ = -[-0. 36 -0. 357 -0. 2169]   
H’ = 0. 9339

## Shrubbery:

Species % cover

## Beech40

Fruit tree10   
Species richness = 2   
% cover total = 50

## Calculating Diversity by % Cover:

Species % cover   
Beech40/50 = 0. 8   
Fruit tree10/50 = 0. 2

## Shannon’s Diversity Index

H’= -∑ pi ln (pi)   
H’ = -[(0. 8(ln 0. 8)) + (0. 2(ln 0. 2))]   
H’ = -[(0. 8 (-0. 223)) + (0. 2(-1. 6)) ]   
H’ = -[-0. 1784 -0. 32 ]   
H’ = 0. 4984

## Herbaceous:

Species % cover

## Species 130

Aster15   
Species richness = 2   
% cover total = 45   
Calculating Diversity by % Cover:   
Species % cover   
Beech30/45 = 0. 67   
Fruit tree15/45 = 0. 33

## Shannon’s Diversity Index

H’= -∑ pi ln (pi)   
H’ = -[(0. 67(ln 0. 67)) + (0. 33(ln 0. 33))]   
H’ = -[(0. 67 (-0. 4)) + (0. 33(-1. 1)) ]   
H’ = -[-0. 268 -0. 363 ]   
H’ = 0. 631

## Second Location-

Tree:

## SpeciesNumber of individuals

Birch3   
Hemlock8   
Oak 1   
Beech1   
Species richness = 4   
Individual total = 13

## Calculating Diversity by Density:

SpeciesNumber of individuals   
Birch3/13 = 0. 23   
Hemlock8/13 = 0. 61   
Oak 1/13 = 0. 08   
Beech1/13 = 0. 08   
Shannon’s Diversity Index   
H’= -∑ pi ln (pi)   
H’ = -[(0. 23(ln 0. 23)) + (0. 61(ln 0. 61)) + (0. 08(ln 0. 08)) + (0. 08(ln 0. 08))]   
H’ = -[(0. 23(-1. 47)) + (0. 61(-0. 5)) + (0. 08(-2. 53)) + (0. 08(-2. 53))]   
H’ = -[-0. 3381 -0. 305 -0. 2024 x 2]   
H’ = 1. 048   
Shrubbery:   
Species % cover

## Maple20

Beech5+1 = 6   
Birch26 + 2 = 28   
Species richness = 3   
% cover total = 54   
Calculating Diversity by % Cover:   
Species % cover   
Maple20/54 = . 37   
Beech6/54 = 0. 11   
Birch28/54 = 0. 52   
Shannon’s Diversity Index   
H’= -∑ pi ln (pi)   
H’ = -[(0. 37(ln 0. 37)) + (0. 11(ln 0. 11)) + (0. 52(ln 0. 52))]   
H’ = -[(0. 37 (-1)) + (0. 11(-2. 21)) + (0. 52(-0. 66))]   
H’ = -[-0. 37 -0. 2431 -0. 3432]   
H’ = 0. 9563

## Discussion:

Shannon’s Diversity Index for tree is almost same for both location but the index for the shrubbery is different in two locations. Quadrat size depends upon community attributes and quadrats are located either systematically or randomly depending upon the experiment.

## Reference

Biology Department. (2013). Lab handout for vegetation richness and diversity. SUNY-Fredonia, Fredonia, NY.