



**FREQUENCY, ABUNDANCE AND DENSITY OF PLANT SPECIES BY
LIST COUNT QUADRAT METHOD**



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ABSTRACT

The present paper deals with the nature of ecological vegetation in rainy season of Fergusson college campus. For the study of vegetation list quadrat method is applied. Repeated quadrat sampling leads to occurrence of 40 herbs with their frequency, abundance and density. The values of frequency, abundance and density to Raunkiers classification were done. It has been concluded that the type of vegetation is heterogeneous.

RESEARCH PAPER

Introduction :

The plants grow in the communities in the environment. Each community is characterized by its species diversity, growth forms and structures, dominance successional trends etc. The numerical data give focus on the species which are dominant in the communities. To know their dominance, certain analytical character such as frequency, densities, abundance of species in a community are expressed in quantity. Different methods like quadrat method, line transect method, point frame method are mean to serve the purpose of analytical characters. Several ecologists made their contribution on ecological diversity.(Chiarucci, A. & et.al. (2001)., Cadott, M.W. & et.al. (2002)., MohammedAdefa Seid1 and GiacomoSantini (2017)., Erenso F & et.al. (2014)., Aerts R & et.al., (2006)., Wassie A,& et.al., (2010)., Gotelli NJ and Colwell RK (2011).Graham JH, Duda JJ (2011)., Prusty G. B. &SahooH.P.n., (2015)

Material and methods :

The study was carried out in the Campus of Fergusson College campus, Pune for knowing the type of vegetation. A quadrat is used in the campus to mark out a specific area of the plant communities to be sample. Sampling unit of area was taken in the area of definite size. All the species occurring in each quadrat was noted and their numerical count was carried out. To know about the species occurring in the campus, repeated quadrat samples were taken in rainy season of 2016. This study helps in identification and occurrence of dominant species in the campus. The herbaceous flora was identified by Flora of Presidency (Cook), Names of species and number of individual species in each unit are recorded and percentage frequency, density and abundance are calculated by the formula.

Here count the number of individuals in each species that occur in the quadrat.

The frequency of individual species is the number of times. The species occur in the sampling unit or the degree of dispersal of species. It is usually represented as a percentage calculated as follows.

Abundance and Density :

Both this term refers to the number of species in a community. Abundance of any individual species is expressed as a percentage of the total number of species present in community and therefore it is a relative measure. In sampling the abundance of species the individual of species are counted instead of just noting their presence or absence was done while studying the frequency of a species.

Taken together abundance and frequency are of great importance in determining the community structure.

1. Abundance = $\frac{\text{Total no. of individual of the species}}{\text{No. of quadrat per units in which they occur}} \times 100$

2. Density = $\frac{\text{Total no. of individual of the species}}{\text{No. of quadrat per units studied}} \times 100$

3. Relative abundance = $\frac{\text{Total no. of species A}}{\text{Total no. of individual of all species recorded}} \times 100$

4. Relative Density = $\frac{\text{Density of a given species}}{\text{Total densities of all the species}} \times 100$

5. % Frequency = $\frac{\text{No. of units in which the species occurred}}{\text{Total no. of unit studied}} \times 100$

Results : Observation Table

S No.	Name of the plant species	Number of individuals in each quadrat										T otal no. of indi vid u al oc c ur red (Y)	No. of qua drat e in whi ch sps occ urre d (Z)	Tot al qu adr at stu die d (Z)	% freq. (Y/Z x100)	Freq uenc y Clas s	Abu ndan ce (III/ IV)	Dens ity(II I/ V)
		1	2	3	4	5	6	7	8	9	10							
1	<i>Ageratum conyzoides</i>	4	2	4	7	2	2	3	5	7	7	45	10	10	100	E	4.5	4.5
2	<i>Biophytums ensitivum</i>	2	1	1	3	4	0	4	3	1	0	33	08	10	80	D	4.1	3.3
3	<i>Indigoferas p</i>	5	6	4	8	0	4	6	5	3	4	45	9	10	70	D	4.1	3.3
4	<i>Acalyphain dica</i>	3	1	3	0	3	1	0	3	0	6	20	7	10	70	D	2.8	2.0
5	<i>Parthenium histerophor</i>	7	8	1	3	1	9	0	4	3	4	50	9	10	90	E	5.5	5.0

	<i>us</i>																	
6	<i>Euphorbia hirta</i>	1 6	3	5	6	3	4	2	2	1	1	52	10	10	100	E	5.2	5.2
7	<i>Sidaacuta</i>	5	0	4	0	0	0	2	1	5	1	18	7	10	70	D	2.5	3.8
8	<i>Ageratum haustonianum</i>	1	0	0	2	6	1	0	0	2	1	13	6	10	60	C	2.0	1.3
9	<i>Chenopodium album</i>	1	1	0	3	4	1	0	2	3	1	16	10	10	100	E	1.6	1.6
10.	<i>Achyranthesaspera</i>	3	2	1	1	5	2	1	3	2	2	22	10	10	100	E	2.2	2.2
11	<i>Cynodonactylon</i>	4	4	5	3	2	1	2	2	1	1	25	10	10	100	E	205	2.5
12	<i>Setariaglauca</i>	2	3	2	-	1	-	2	1	2	3	16	8	10	80	D	2.0	1.6
13	<i>Vernoniaenithelmitica</i>	1	2	1	-	-	2	1	-	1	2	10	7	10	70	D	1.4	1.0
14	<i>Vernoniacinerla</i>	2	1	-	-	1	0	2	1	1	1	9	9	10	90	E	1.0	0.9
15	<i>Paspalumdistichium</i>	3	2	1	2	3	-	-	2	1	-	14	7	10	70	D	2.0	1.4
16	<i>Commelinabenghalensis</i>	3	2	1	-	-	-	1	2	3	-	12	6	10	60	C	2.0	1.2
17.	<i>Synedrellanodiflora</i>	2	3	1	2	1	3	-	-	2	-	14	7	10	70	D	2.0	1.4
18	<i>Alternantheratriandra</i>	2	1	1	1	-	2	-	-	-	-	7	5	10	50	C	1.4	0.7
19.	<i>Trichosdesma</i>	1	1	-	-	-	-	-	-	-	-	2	2	10	20	A	1.0	0.2
20	<i>Andropogonsp</i>	1	1	-	-	-	-	-	1	1	-	4	4	10	40	B	1.0	0.4
2	<i>Bidenspumi</i>	2	2	1	-	-	-	1	2	-	-	5	3	10	30	B	1.6	0.5

1	<i>lla</i>																	
2	<i>Amaranthu</i>	1	2	1	2	1	2	3	-	-	-	13	8	10	80	D	1.6	1.3
2	<i>sviridis</i>																	
2	<i>Tridexproc</i>	2	2	1	-	2	-	1	1	1	2	12	8	10	80	D	1.5	1.2
3	<i>umbens</i>																	
2	<i>Distichilisp</i>	1	1	-	1	-	-	-	-	-	-	3	3	10	30	B	1.0	0.3
4	<i>illosa</i>																	
2	<i>Euphorbia</i>	1	2	-	-	-	1	1	-	-	-	5	4	10	40	B	1.25	0.5
5.	<i>hyperifolia</i>																	
2	<i>Euphorbia</i>	1	-	1	-	-	-	-	-	-	-	-	2	10	20	A	1.1	0.8
6	<i>milli</i>																	
2	<i>Launeaproc</i>	2	-	-	2	-	-	-	2	-	1	7	4	10	40	B	1.75	0.7
7	<i>umbens</i>																	
2	<i>Desmodium</i>	2	-	-	-	2	-	1	-	-	1	6	4	10	40	B	1.5	0.6
8	<i>gyrans</i>																	
2	<i>Leucasaspe</i>	1	1	1	1	-	-	-	1	1	1	7	7	10	70	D	1.0	0.7
9	<i>ra</i>																	
3	<i>Phyllanthus</i>	3	2	1	2	2	1	2	2	1	1	17	10	10	100	E	1.7	1.7
0	<i>niruri</i>																	
3	<i>Portulacaol</i>	-	-	-	-	-	1	1				2	2	10	20	A	1.37	1.1
1	<i>eracea</i>																5	
3	<i>Oxalis</i>	2	3	1	2	1	1	1	1	1	1	14	10	10	100	E	2.0	1.4
2	<i>corniculata</i>																	
3	<i>Cassia tora</i>	3	3	4	3	2	1	3	2	4	1	26	10	10	100	E	2.6	2.6
3																		
3	<i>Mariniaann</i>	-	1	-	-	1	-	-	-	-	-	-	2	10	20	A	0.2	-
4	<i>ua</i>																	
3	<i>Euphorbia</i>	2	2	1	1	1	3	2	1	1	-	14	9	10	90	E	1.5	1.4
5	<i>geniculate</i>																	
3	<i>Ipomeahedr</i>	2	-	-	2	-	-	-	-	-	-	4	2	10	20	A	2.0	0.4
6	<i>acea</i>																	
3	<i>Boerhaavia</i>	1	-	-	-	-	-	-	-	-	-		1	10	10	A	2.14	1.5
7	<i>diffusa</i>																	

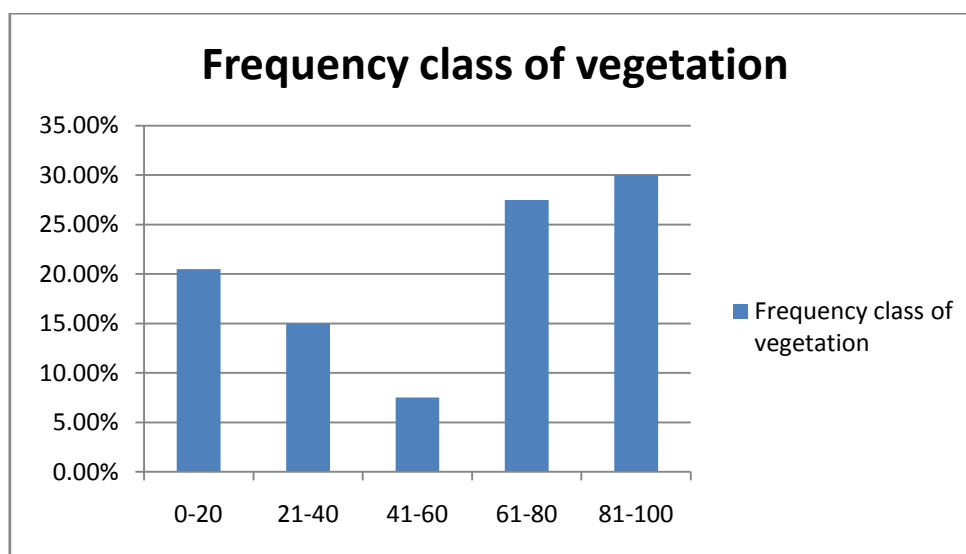
38	<i>Passifloraf oetida</i>	1	-	-	-	-	1	-	-	-	-	2	2	10	20	A	1.0	0.2
39	<i>Hyptissurve olens</i>	3	2	1	1	1	1	1	1	1	1	13	10	10	100	E	1.3	1.3
40	<i>Sporobolus diander</i>	2	-	-	-	-	-	-	-	-	-	-	2	10	20	A	2.2	0.9

Preparation of frequency diagram

On the basis of percent values various species distribute into five frequency class-

Frequency percentage	Class
0-20	A
21-40	B
41-60	C
61-80	D
81-100	E

A graph is plotted (Histogram) with frequency class on X-axis and frequency percentage on Y-axis and compared with Raunkier’s value.



Frequency class	Class value	Raunkier’s value	Frequency class of vegetation
A	0-20	53	20.5%
B	21-40	14	15%
C	41-60	9	7.5%
D	61-80	8	27.5%
E	81-100	16	30%

Conclusion :

- The frequency values refers to the values of Raunkier's formula $A>B>C<D<E$
- Frequently occurring species are
- The dominating species are
- The present ecological study shows that the given vegetation is heterogeneous in nature.

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