

BSc. L.Sc. II sem Plant Ecology and Taxonomy Practical

**Quantitative analysis of herbaceous
vegetation in the college campus for
frequency and comparison with Raunkiaer's
frequency distribution law**

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(16.4.2020)**

Frequency:

- *Frequency is one of the important parameter of vegetation analysis, which reflects the **spread, distribution or dispersion** of a species in a given area, and given in percent.*
- *For example, a species is **distributed uniformly** in an area there is **greater probability of its occurrence** in all quadrats and it would have maximum frequency.*
- *In another case, **a species may be clustered** or present only in a part of the area.*
- *In this case, it will occur only in few quadrats and hence it would **have lesser frequency**.*

The frequency of a species in a given area is studied by quadrat method is calculated by the following formula:

$$\text{Frequency} = \frac{\text{Number of Quadrats in which a species occurs}}{\text{Total number of Quadrats studied}} \times 100$$

Thus, if a species occurs in **5 out of total 10 quadrats** studied, its frequency would be **50%**.

If a species occurs in **all the quadrats studied**, its frequency would be **100%**.

Frequency does not give the numerical strength, but just indicates the presence (+) or absence (-) of species in any community and gives information about the general spread of various species present.

Frequency is a very important quantitative parameter.

Raunkiaer (1934) made an elaborative study on the frequency of species and based on his data, he divided species into **5 classes viz. A, B, C, D, E.**

The distribution of frequency in 5 classes is given here:
Raunkiaer's frequency classes

Frequency Class	Frequency Range
A	1-20%
B	21-40%
C	41-60%
D	61-80%
E	81-100%

Raunkiaer's Frequency Law for homogenous community:

$$A > B > C > = < D < E,$$

Any deviation from this law indicates disturbed community vegetation.

Raunkiaer's normal frequency diagram was a histogram made on the basis of the average frequency data in which values are:

class **A = 53%**

B = 14%

C = 9%

D = 8%

E = 16%

Procedure:

- Randomly select area with good herbaceous vegetation.
- Make quadrats of 1m x1m size, with help of thread and iron nails.
- Note the presence of different plant species in the sampling unit area.
- Repeat the above procedure with at least 10 different randomly selected sampling units.
- **Tabulate the results and calculate the % frequency of each species and based on their percentage, classify the species into frequency classes (A-E) and further calculate % frequency of each class.**
- Compare the observed frequency with the Raunkiaer's Law of Frequency and depict it in form of histogram.

Observation table I for Frequency (%)

Name of plant species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	No. of quadrats in which species occurred	Frequency (%)	Frequency class
1. <i>Oxalis corniculata</i>	+	+	+	-	-	+	-	-	-	+	5	5/10x100 =50%	C
2. <i>Poa annua</i>	+	+	-	+	-	+	-	-	-	-	4	4/10x100 =40%	B
3. <i>Cannabis sativa</i>	+	-	-	+	-	-	-	-	-	-	2	2/10x100 =20%	A
4. <i>Gnaphalium</i>	+	-	-	-	-	-	-	-	-	-	1		A
5. <i>Solanum nigrum</i>	+	+	-	-	-	-	-	-	-	-			A
6. <i>Amaranthus</i>	-	-	+	-	+	-	+	-	-	+			B
7. <i>Brassica sp.</i>	-	-	+			+		-	-	-			A
8. <i>Vernonia</i>	-	-	+	-	+	+	-	+	+	+	6		C
9. <i>Coronopus</i>	-	-	-	+	-	+	-	+	-	-			B
10. <i>Cynodon dactylon</i>	-	-	-	+	+	+	+	+	+	+	7		D
11. <i>Sonchus</i>	-	-	-	+	-	-	-	+	-	-			A
12. <i>Oxalis martiana</i>	-	-	-	+	+	+	+	+	-	+			C
13. <i>Nicotiana</i>	-	-	-	-	+	-	-	-	-	-			A
14. <i>Stellaria media</i>	-	-	-	-	-	-	+	+	+	+			B

Observation table II: Comparison of Normal and Observed % Frequency Class

Frequency class	No. of species falling in frequency class	Observed Frequency Class (%)	Normal Frequency Class (%)
A	6	$6/14 \times 100 = 42.8\%$	53
B	4	$4/14 \times 100 = 28.5\%$	14
C	3		9
D	1		8
E	0	0 %	16
Total no. of plant species recorded=			

Observed frequency (%)=

no. of species falling in frequency class

-----x100

Total no. of species recorded

Results:

1) As per observation **table 1**, plant species, (mention names from table 1)-----
----- shows maximum frequency (60-70%) whereas other plant
species, -----, show minimum frequency value as 10-20%.

2) As per observation **table 2**, the **observed % frequency classes varies from Raunkiaer's law of frequency, $(A>B>C) = <D<E$** .

Observed value of frequency classes (%) are:

Frequency class **A = 42.8%**,

B =

C =

D =

E = 0%.

Observed Frequency formulae: ----- (write new frequency formula), which varies from normal one.

3) $E+D/B+C$ ratio is also calculated:

= $0.02 < 1$, hence the plant community in college campus is found to be heterogenous.

As per observation table 2,

1) Observed value

Frequency class **A = 42.8%**,

B =

C =

D =

E =

**Observed Frequency
formulae:**

=A__B__C__D

(Fill sign >, < or =)

**How, it varies from
normal one.**

Raunkiaer's Normal value

of class **A = 53%**,

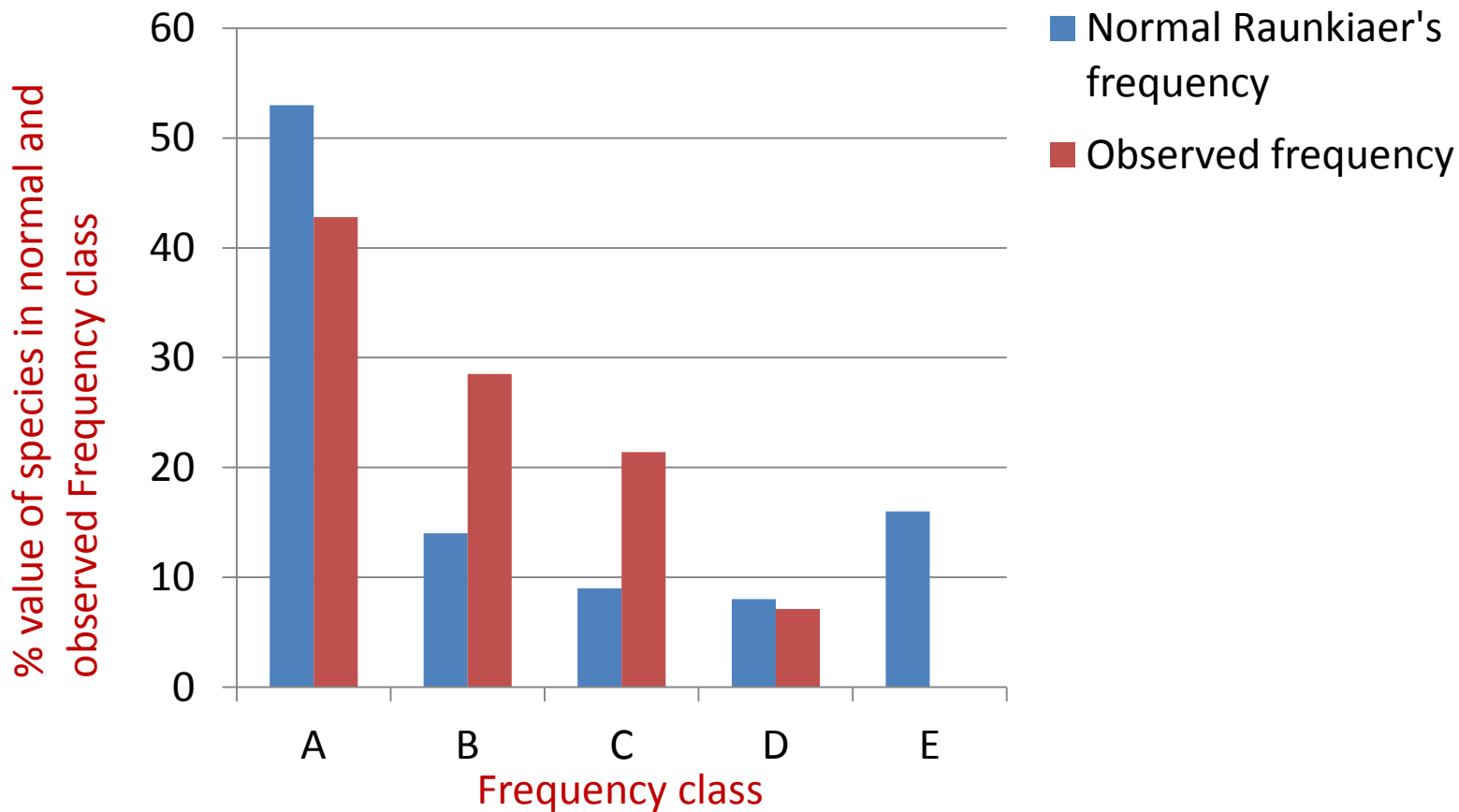
B = 14%

C = 9%

D = 8%

E = 16%.

A>B>C> = <D<E



Histogram representing comparison of Raunkiaer's Law of Frequency (normal) with observed frequency (from table 2)

Interpretation of results:

- Frequency data obtained indicates whether the distribution of the species is homogenous i.e. uniform throughout the college campus or heterogenous.
- Heterogenous distribution refers to the uneven distribution of various species within a specific area.
- Even **observed % frequency classes (A_B_C_D)** differs from the normal frequency law of Raunkiaer's as expected since the area under the study is highly disturbed due to various biotic factors. i.e. $(A>B>C) = (D<E)$.
- Higher the value of **Class E, more homogenous and undisturbed is the vegetation.**
- Further, Ratio of **$E+D/B+C < 1$** , i.e. The vegetation under study is **heterogenous**.
- In the present study **class E is totally absent, which indicates highly disturbed area.**