

ANNUAL VARIATION IN PHYTOSOCIOLOGICAL ASPECTS OF SOME MEDICINAL PLANT SPECIES FROM FAMILY EUPHORBIACEAE GROWING IN ANPARA REGION OF DISTT. SONEBHADRA (U.P.)

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ABSTRACT

Present piece of work is a part of a three year exhaustive project to observe the annual variation in phyto-sociological aspects of herbaceous plants of Anapara region of Distt. Sonebhadra (U.P.). The work was taken in consideration to note the Annual variation in Relative Frequency, Relative density, Relative dominance and the Importance Value Index (IVI) of some medicinal plants of family euphorbiaceae viz. *Euphorbia hirta*, *Euphorbia thymifolia*, *Phyllanthus niruri* and *Phyllanthus debile*.

KEYWORDS : Phyto-sociology, Euphorbiaceae, Anapara, Sonebhadra

Phytosociology is a branch of plant sciences dealing with the plant communities, their composition and development as well as the relationships between species within them. A phytosociological system is a system for classifying these communities. The term phytosociology was coined by Jozef Paczoski in 1896.

The aim of phytosociology is to achieve a coefficient empirical model of vegetation using plant taxa combination that characterize vegetational units. In this work the phytosociological aspects of herbaceous flora of Anapara region of District Sonebhadra (U.P.). Out of this exhaustive work, the three year's record of medicinal plants of family Euphorbiaceae viz. *Euphorbia hirta*, *Euphorbia thymifolia*, *Phyllanthus niruri* and *Phyllanthus debile* were analysed to depict the annual variation in various aspects of phytosociology.

Sonebhadra is the second largest district of Uttar Pradesh located on the globe on 24°41'23"N and 23°03'55"E. The district has an area of 6788 km² and population of 1,46,3468 with a population density of 216 person /km². This district is situated in the extreme south east of the state and is bounded by Mirzapur district to the north west, Chandauli district to the north, Kaimur and Rohtas district of Bihar to the north east, Garhwa district of Jharkhand state to the east. Koriya and Surguja district of Chattisgarh state to south and Singrauli District of Madhya Pradesh to the west. This district is located in the south eastern range of the Vindhya mountain and has a relatively subtropical climate with high summer and low winter

temperature. The average temperature is 32°C-42°C in summer and 2°C-15°C in winter. The average rain fall is approximately 150 cm-160 cm/annum falling from July to October. Due to distinct variation in climate the district is very rich in plant diversity. Several tribes reside in this district and use the plants in their general livelihood as food, fuel, fodder, medicine etc. The area consists of about 800 angiospermic plant species out of which about 200 are of well known medicinal importance. *Chrozophora rottelleri*, *Euphorbia hirta*, *E. thymifolia*, *E. geniculata*, *E. dracunculoides*, *Acalypha indica*, *Croton bonplendianum*, *Phyllanthus niruri*, *P. Fraternalis*, *P. debile*, *Ricinus communis*, *Jatropha sp.* are 12 herbaceous representatives of the family Euphorbiaceae which are very frequently found in the district out of which four namely- *Euphorbia hirta*, *E. thymifolia*, *Phyllanthus niruri* and *P. debile* are very commonly used by the tribals of the district.

The observations were made on these three species to record the annual variation in the Relative frequency(RF), Relative Density(RD), Relative dominance(RM) and Importance Value Index(IVI) following Braun-Blanquet, (1932). Works of George and Varghese, (1989); Hemadri, (1998); Khare et.al. (1985); Mullar and Ellenberg (1974); Negi and Nautial (2005); Pandeya et al., (1968) and Saxena and Singh, (1982) are of special reference for this work.

MATERIALS AND METHODS

The present work. The surveys were made for

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three successive years, 2010-11, 2011-12 and 2012-13 to record the annual variation in phytosociological aspects of herbaceous plant species of Anapara region of District Sonebhadra (U.P.). For this purpose the frequency, density and abundance of each herbaceous species was calculated and a mean basal area of each species was measured by caliparse method then after that the Relative density (RD), Relative Frequency (RF), Relative Dominance (RD) of each species was calculated following Braun-Blanquet (1932) and the Importance Value Index (IVI) was calculated by addition of these three relative values on the base of 300. The values of these phytosociological aspects were plotted on X-X' and Y-Y' graph. RF was plotted on X-axis, RD was plotted on Y'-axis, the value of RM was plotted on X'- axis on base 100 and IVI was plotted on Y-axis on the base 300. Thus, the phytograph was plotted and the values of all three years were compared to observe the annual variation in phytosociological aspects of some medicinal plants of family Euphorbiaceae namely- *Euphorbia hirta*, *E. thymifolia*, *Phyllanthus niruri* and *P. debile*.

OBSERVATIONS

In the phytosociological survey it was observed that the Anapara region of Sonebhadra district (U.P.) has a rich floristic wealth in which about 300 species of herbs are prevalent in the socio-consciousness as medicine, fodder, healer etc. In this piece of work some well known medicinal plant species viz. *Euphorbia hirta*, *E. thymifolia*, *Phyllanthus niruri* and *P. debile* were investigated for their phytosociological perspective. In which the RF, RD, RM and IVI were calculated to record the phytosociological status of each plant. This work was done for three successive years 2010-11, 2011-12 and 2012-13 and the data of every year was compared to depict the annual variation in the phytosociological status of these plants. The minute observation of the data represents that the phytosociological status of each plant varies to a great extent every year. The plant *Euphorbia thymifolia* has minimum value of RF, RD, RM and IVI respectively to be 1.09, 0.20, 0.04 and 01.33 in the year 2010-11 while the values of these parameters were 5.32, 4.25, 3.30 and 12.87 in the year 2011-12 and in 2012-13 these were recorded to be 4.69, 3.98, 2.70 and 11.37. The case of *Euphorbia hirta* shows the minimum value of

these aspects to be 6.98, 5.79, 1.02 and 13.79 in the year 2012-13 while the values were maximum (14.13, 11.27, 2.64 and 28.04) in the year 2010-11. The plant *Phyllanthus debile* shows a minimum of these values (1.26, 0.35, 0.48 and 02.09) in the year 2010-11 and a maximum (2.53, 0.78, 0.67 and 03.98) in 2012-13. The plant *Phyllanthus niruri* had a maximum value of RF, RD, RM and IVI respectively to be 10.87, 17.59, 62.45 and 90.95 in the year 2010-11 which shows the most prolific vegetation of this plant but a drastic fall in these values was observed in the successive years. It was observed regarding the values of these aspects of the plant *P. niruri* in the year 2011-12 as 5.32, 3.02, 3.8 and 12.14 as well as to be 5.93, 3.77, 8.93 and 18.63 in year 2012-13. All these observations are tabulated and represented in the table 1, 2 & 3 and graph 1, 2, 3 & 4.

Table 1 : Table depicting the Phytosociological aspects of medicinal plants of family Euphorbiaceae in the session 2010-11

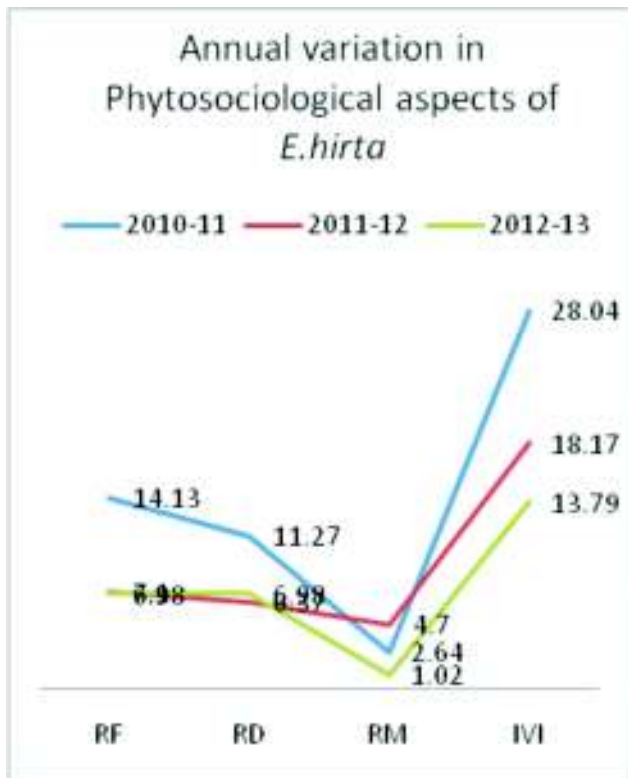
S. No.	Name of Species	Session 2010-11			
		RF	RD	RM	IVI
1	<i>Phyllanthus niruri</i>	10.87	17.59	62.45	90.95
2	<i>Phyllanthus debile</i>	1.26	0.35	0.48	02.09
3	<i>Euphorbia hirta</i>	14.13	11.27	2.64	28.04
4	<i>Euphorbia thymifolia</i>	1.09	0.20	0.04	01.33

Table 2 : Table depicting the Phytosociological aspects of medicinal plants of family Euphorbiaceae in the session 2011-12

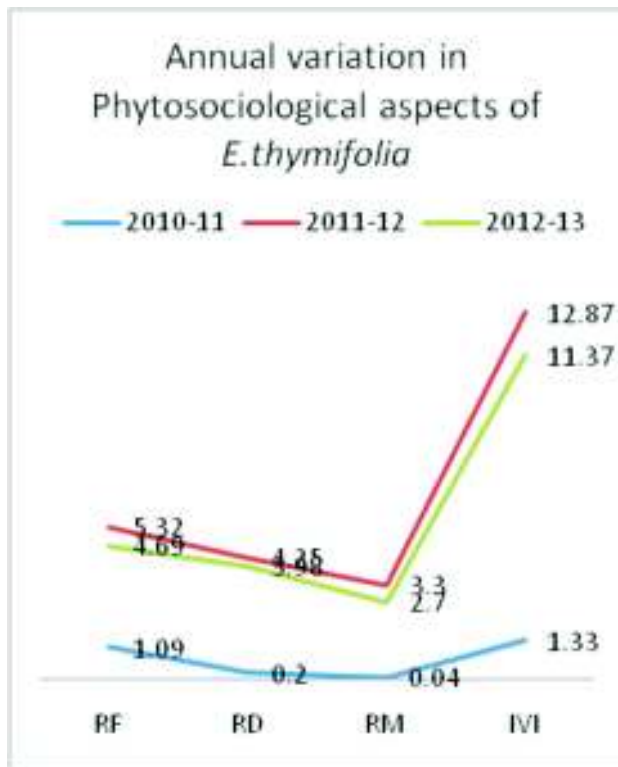
S. No.	Name of Species	Session 2010-11			
		RF	RD	RM	IVI
1	<i>Phyllanthus niruri</i>	5.32	3.20	3.8	12.14
2	<i>Phyllanthus debile</i>	2.5	0.38	0.59	03.47
3	<i>Euphorbia hirta</i>	7.10	6.37	4.7	18.17
4	<i>Euphorbia thymifolia</i>	5.32	4.25	3.30	12.87

Table 3 : Table depicting the Phytosociological aspects of medicinal plants of family Euphorbiaceae in the session 2012-13

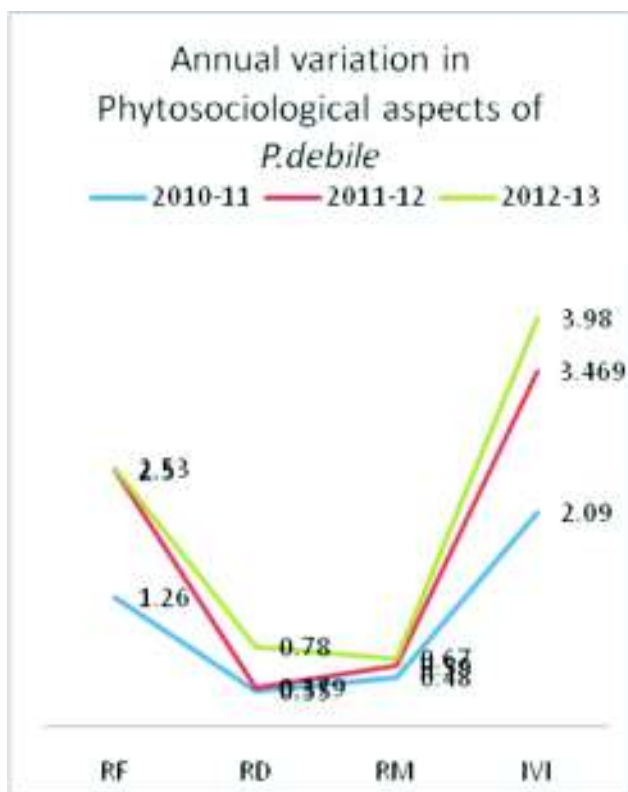
S. No.	Name of Species	Session 2010-11			
		RF	RD	RM	IVI
1	<i>Phyllanthus niruri</i>	5.93	3.77	8.93	18.63
2	<i>Phyllanthus debile</i>	2.53	0.78	0.67	03.98
3	<i>Euphorbia hirta</i>	6.98	5.79	1.02	13.79
4	<i>Euphorbia thymifolia</i>	4.69	3.98	2.70	11.37



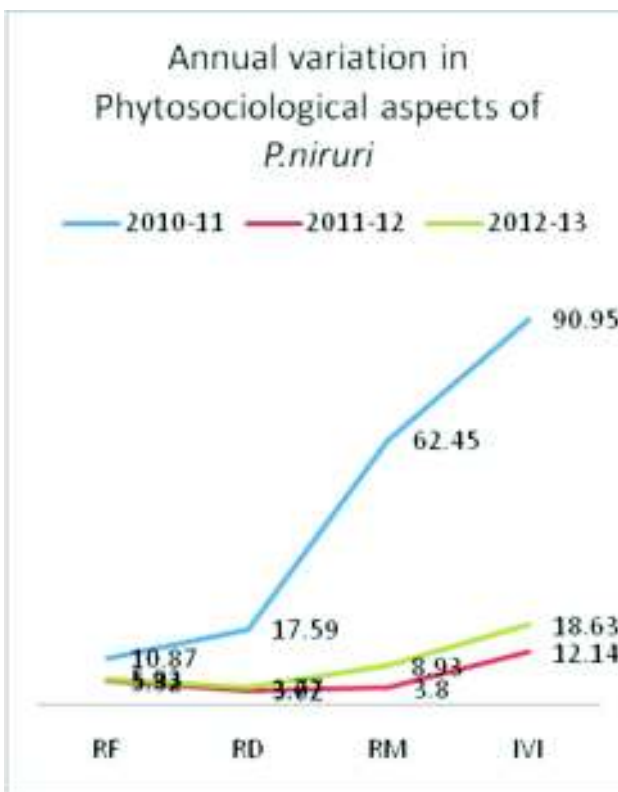
Graph 1 : Annual variation in *E. hirta*



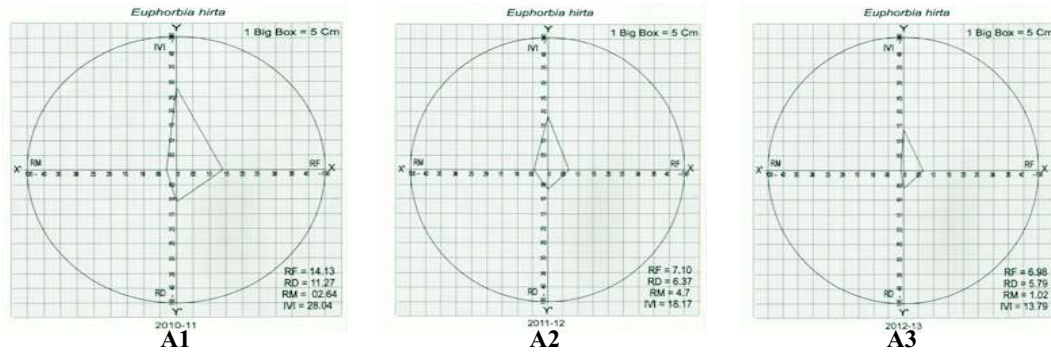
Graph 2 : Annual variation in *E. thymifolia*



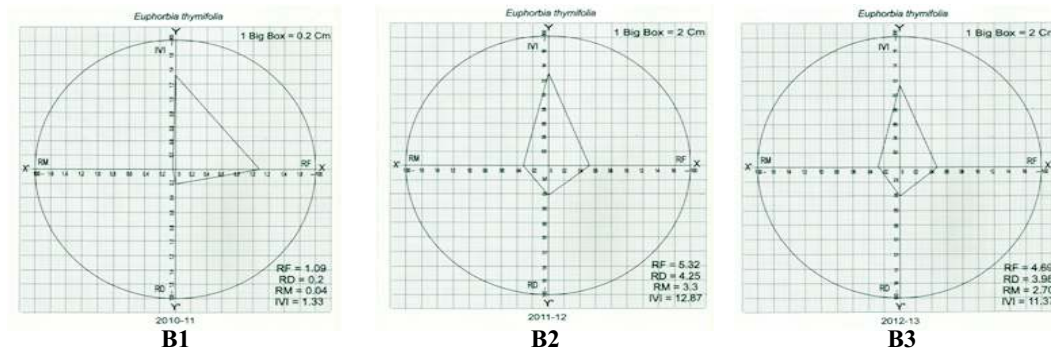
Graph 3 : Annual variation in *P. debile*



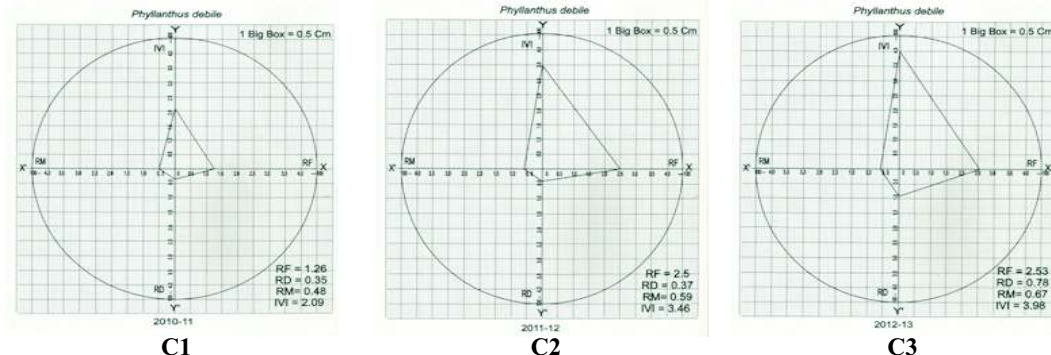
Graph 4 : Annual variation in *P. niruri*



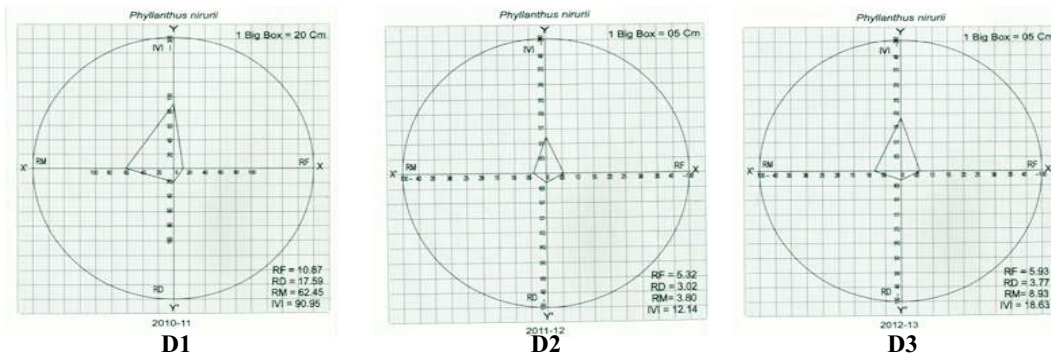
Phytograph A (1,2 and 3): Showing annual variation in phytosociological status of *Euphorbia hirta* during the years 2010-11, 2011-12 and 2012-13.



Phytograph B (1,2 and 3): Showing annual variation in phytosociological status of *Euphorbia thymifolia* during the years 2010-11, 2011-12 and 2012-13.



Phytograph C (1,2 and 3): Showing annual variation in phytosociological status of *Phyllanthus debile* during the years 2010-11, 2011-12 and 2012-13.



Phytograph D (1,2 and 3): Showing annual variation in phytosociological status of *Phyllanthus niruri* during the years 2010-11, 2011-12 and 2012-13.

RESULTS AND DISCUSSION

It is clear from the above observations that out of the four medicinal plant species it is *Euphorbia hirta* had the maximum value in the year 2010-11 which is 14.13, 11.27, 2.64 and 28.04 and the values successively decreased in the following years as 7.10, 6.37, 4.7 and 18.17 in year 2011-12 and 6.98, 5.79, 1.02 and 13.79 in the year 2012-13. (Graph 1 and Phytograph A 1,2 and C)

Euphorbia thymifolia had a maximum value in the year 2011-12 to be 5.32, 4.25, 3.30 and 12.87 and in the year 2012-13 the values were recorded to be 4.69, 3.98, 2.70 and 11.37 while the values were recorded to be minimum 1.09, 0.20, 0.04 and 01.33 in the year 2010-11. (Graph 2 and Phytograph B 1,2 and 3)

Phyllanthus debile had the maximum value in the year 2012-13 as it was recorded to be 2.53, 0.78, 0.67 and 03.98 and a minimum 1.26, 0.35, 0.48 and 02.09 in the year 2010-'11 and the records showed the values to be 2.5, .38, .59 and 03.47 in the year 2011-12. (Graph 3 and Phytograph C 1,2 and 3).

Phyllanthus niruri which has the most variant phytosociological aspect in the three year annual record. In the year 2010-11 the values were highest (RF 10.87, RD 17.59, RM 62.45 and IVI 90.95) and it was (5.32, 3.02, 3.8 and 12.14) in the year 2011-'12 and (5.93, 3.77, 8.93 and 18.63) in 2012-13. (Graph 4, Phytograph D1,2 and 3). From the analysis of the above record it is clear that the phytosociological status of each species varies annually to a great extent. It seems due to climatic and seasonal changes.

REFERENCES

- Braun-Blanquet J., 1932. Plant Sociology : The study of Plant Communities. Mc Graw Hill Book Co. & Inc., N.Y.
- George M. and Varghese G.,1989. Phytosociology of Mudumalai Forest Vegetation. Continuum. J. Trop. For., **5**: 70-75.
- Hemadri K.,1998. Quantitative assessment of medicinal plant II. Chittor District (A.P.), Manphar.
- Khare P.K., Yadav V.K. and Mishra G.P., 1985 : Phytosociological structure of some forest communities in central India. J. Trop. For. , **1**(4): 321-326.
- Mullar Dombios D. and Ellenberg H., 1974. Aims and Methods of Vegetation Ecology. John Villey and Sons, New York.
- Negi C.S. and Nautial S.,2005. Phytosociological studies of a traditional reserve forest Thal ke Dhar, Pithoragarh, Central Himalayas, India. Indian Forestry : 519-534.
- Pandeya S.C., Puri G.S. and Singh J.S.,1968. Research Methods in Plant Ecology. Asia Publishing House, Bombay.
- Saxena A.K. and Singh J.S., 1982. A phytosociological analysis of woody species in forest communities of a part of Kumaon Himalayas. Vegetatio., **50**:3-22.