

PHYTOSOCIOLOGICAL PERSPECTIVES OF REPRESENTATIVE HERBACEOUS GENERA OF COMMON OCCURRENCE BELONGING TO FAMILY ASTERACEAE IN GRASSLAND ECOSYSTEM OF ANPARA REGION IN DISTRICT SONEBHADRA (U.P.).

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ABSTRACT

This piece of work is a part of three year survey of Anapara region in Sonbhadra district of U.P. to record the phytosociological perspectives of herbaceous flora. In This study the status of about 40 species of grassland ecosystem of Anapara region in District Sonbhadra but in the present work the phytosociological aspects viz. Relative Frequency, Relative Density, Relative Dominance as well as the Importance Value Index (IVI) of three representative genera namely- *Vernonia*, *Tridax* and *Parthenium* of family Asteraceae were studied thoroughly for three successive years (2010-'11, 2011-'12 and 2012-'13). The investigations were carried out to record the annual variation in phytosociological status and population dynamics of these genera.

KEYWORDS : Phytosociology, Grassland Ecosystem, Herbs, Asteraceae, Anpara, Sonbhadra

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. Phytosociology is useful to describe the population dynamics of each plant species occurring in a particular community as well as to understand how they relate to the other species of the same community. This piece of work was carried out for three years to make a survey of Anapara region in Sonbhadra district of U.P. to record the phytosociological perspectives of herbaceous flora of family Asteraceae. This family is almost a herbaceous one which was recorded to have a large no. of species. In the study area i.e. Anapara region of district Sonbhadra (U.P.) it comprises of about 25 species out of which 12 namely- *Ageratum conyzoides*, *Blumea lacera*, *Chromolina odorata*, *Sonchus asper*, *Launia asplenifolia*, *Spillanthus achmella*, *Parthenium hysterophorus*, *Echinops echinatus*, *Eclipta prostrata*, *E. alba*, *Sphaeranthus indicus*, *Bidens pilosa*, *Tridax procumbans* and *Vernonia cinaria* are of very common occurrence.

Sonebhadra is the 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.

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.

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MATERIALS AND METHODS

The present work. The surveys were made for 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 caliper 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 three representative genera *Vernonia cinaria*, *Tridax procumbance* and *Parthenium hysterophorus* of family Asteraceae were studied.

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 three representative genera *Vernonia cinaria*, *Tridax procumbance* and *Parthenium hysterophorus* of family Asteraceae commonly found in the grassland ecosystem were investigated for their phytosociological perspective. In which the RF, RD, RM and IVI were calculated and recorded to find out 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 observations of the data represent the phytosociological status of each plant varies to a great extent year by year.

The plant *Parthenium hysterophorus* has minimum value of RF, RD, RM and IVI respectively to be

1.79, 12.03, 3.88 and 17.7 in the year 2012-'13 while the values of these parameters were 6.5, 13.1, 11.1 and 30.7 in the year 2011-'12 and in 2010-'11 these were recorded to be 8.7, 10.52, 12.36 and 31.58.

The case of *Tridax procumbens* shows the minimum value of these aspects to be 7.1, 15.74, 7.05 and 29.89 in the year 2011-'12 while the values were maximum (13.04, 19.72, 5.55 and 37.76) in the year 2010-'11.

The plant *Vernonia cinaria* shows a minimum of these values (2.17, 0.4, .72 and 3.29) in the year 2010-'11 and a maximum (2.36, 2.4, 1.5 and 6.26) in 2012-'13.

The plant *Tridax procumbens* had a maximum value of RF, RD, RM and IVI respectively to be 13.04, 19.72, 5.55 and 37.76 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. All these observations are tabulated in the table 1, 2 and 3 and graphically represented Graphs 1, 2 and 3 and also in phytograph

RESULTS AND DISCUSSION

It is clear from the above observations that out of the three plant species it is *Tridax procumbens* which has the maximum value of RF, RD, RM and IVI in the study area during the three successive years 2010-2011, 2011-2012 and 2012-13. The Importance value as well as the RF, RD and RM of *Parthenium hysterophorus* is on the next level on descending level (In 2010-11 the values are 8.7, 10.52, 12.36 and 31.58; In 2011-12 the values were 6.5, 13.1, 11.1 and 30.7, In the year 2012-13 the values were 1.79, 12.03, 3.88 and 17.7), It is clear from the observations that the phytosociological values were smallest and the Importance value is least in the case of *Vernonia cinaria*. (Graph 1, 2, 3 & Phytograph).

Table 1 : Table depicting the Phytosociological aspects of representative plants of family Asteraceae in the session 2010-11

Sl. No.	Name of Species	Session 2010-11			
		RF	RD	RM	IVI
1	<i>Parthenium hysterophorus</i>	8.7	10.52	12.36	31.58
2	<i>Tridax procumbens</i>	13.04	19.72	5.55	37.76
3	<i>Vernonia cinaria</i>	2.17	0.04	0.72	3.29

Table 2 : Table depicting the Phytosociological aspects of representative plants of family Asteraceae in the session 2011-12

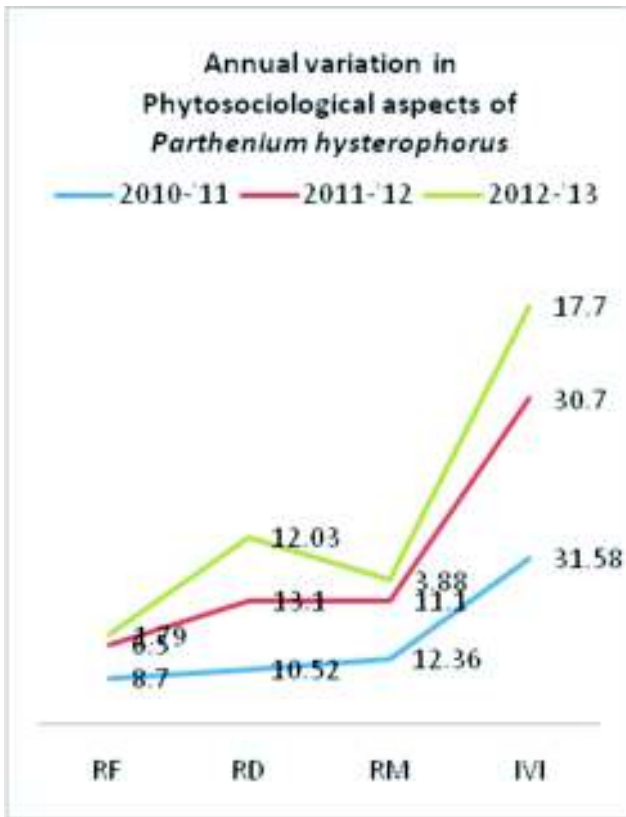
Sl. No.	Name of Species	Session 2010-11			
		RF	RD	RM	IVI
1	<i>Parthenium hysterophorus</i>	6.5	13.1	1.11	30.7
2	<i>Tridax procumbens</i>	7.1	15.74	7.05	29.89
3	<i>Vernonia cinaria</i>	2.36	2.4	1.5	6.26

Table 3 : Table depicting the Phytosociological aspects of representative plants of family Asteraceae in the session 2012-'13

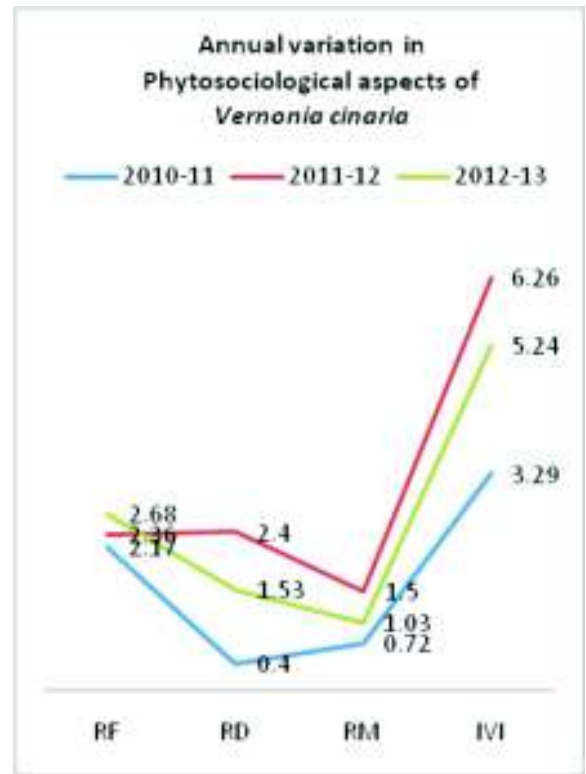
Sl. No.	Name of Species	Session 2010-11			
		RF	RD	RM	IVI
1	<i>Parthenium hysterophorus</i>	1.79	12.03	3.88	17.7
2	<i>Tridax procumbens</i>	7.65	8.22	9.93	25.8
3	<i>Vernonia cinaria</i>	2.683	1.53	3.03	5.24



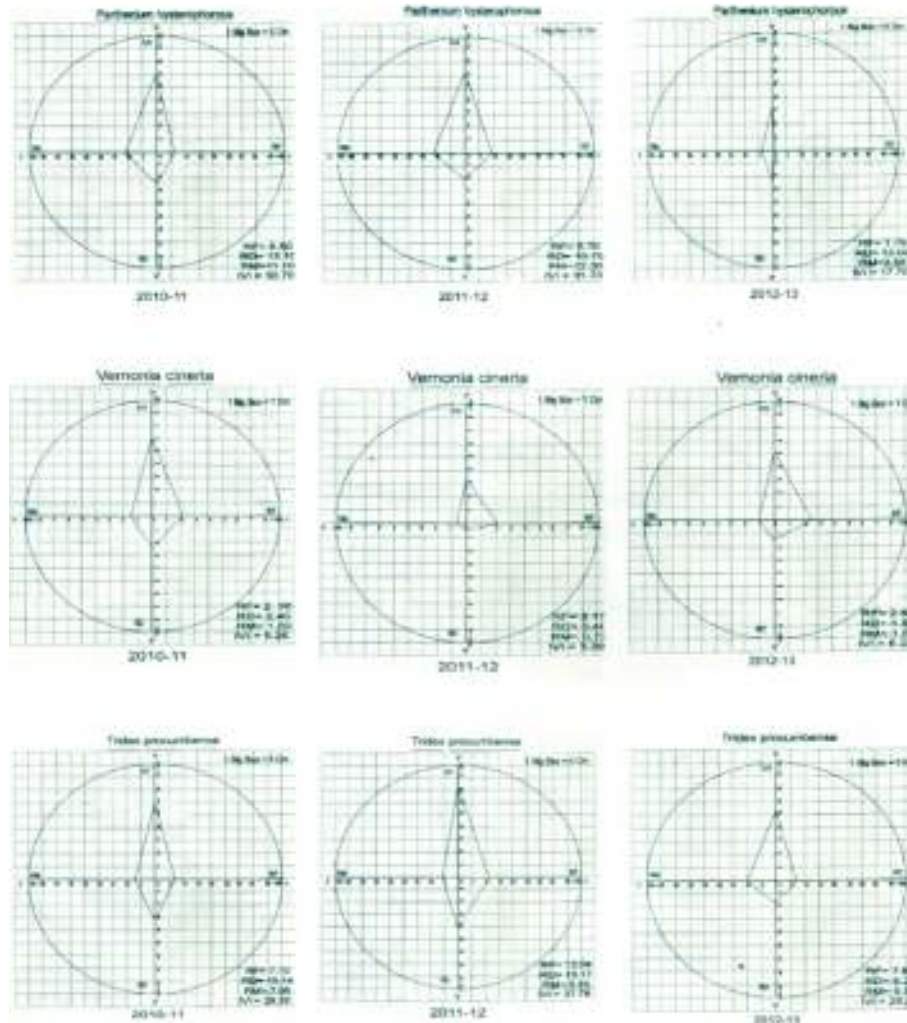
Graph 2 : Annual variation in *T. procumbens*



Graph 1 : Annual variation in *P. hysterophorus*



Graph 3 : Annual variation in *V. cinaria*



Phytograph : Showing annual variation in phytosociological aspects of representative genera of family Asteraceae

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.

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