Research Article CODEN: IJPRNK ISSN: 2277-8713
Bhanu Pratap Singh Chauhan, IJPRBS, 2015; Volume 4(3): 100-107 IJPRBS

INTERNATIONAL JOURNAL OF PHARMACEUTICAL RESEARCH AND BIO-SCIENCE

FLORISTIC DIVERSITY IN THE RAVINES OF OTTANGAN RIVER UNDER PROTECTION AND BIOTIC DISTURBANCE

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Accepted Date: 15/05/2015; Published Date: 27/06/2015

Abstract: Natural Vegetation of ottangaon ravine at Khander (Agra) was studied for assessing the impact of biotic disturbance on the phytosociological characters of the flora. Two different sites as protected & unprotected (biotically disturbed) ravine forest were sampled from top, slope, bottom and river bank by quadrant method. Number of the tree species in frequency classes was increased in protected ravine whereas their importance value index in protected ravine was decreased in comparison of biotically disturbed area. Species richness of trees varied from 3 to 13 in unprotected to protected ravine. *Froropis juliflora, Acacia nilotica* were the dominant and co-dominant respectively on the top; *Prosopis juliflora, Dalbergia sisso* were dominant and co- dominant respectively on the slope; *Dalbergia sissoo, Balanitis aegyptica* were dominant a co-dominant respectively on the bottom. *Prosopis juliflora, Dalbergia Sisso* were dominant & co-dominant on the river bank of protected ravines whereas, only three species were recorded from unprotected ravines in the much reduced number and form.

Keywords: Floristic diversity, Biotic Disturbance, Ravine forest, importance value index. Frequency classes.

PAPER-QR CODE

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Access Online On:

www.ijprbs.com

How to Cite This Article:

Bhanu Pratap Singh Chauhan, IJPRBS, 2015; Volume 4(3): 100-107

INTRODUCTION

Ravines are the worst form of land degradation & are characterized by edaphic, topographic & climatic adversities. The resultant scarce vegetative cover is unable to withstand the high biotic pressure usually excerted On the lands. Large chunks of ravenous lands are thus subjected to further degradation due in adequate vegetative cover. Champion & Seth (1968) classified ravenous forests of Chambal under Northern tropical ravine thorn Forest (6 BC2 Subclass). Establishment of vegetarian cover has been adreocated as biological measure to check land degradation, but the restoration of vegetative cover in the ravines area continues to be adversely affected by high biotic disturbances. Protection from biotic interferences has been found to improve the quantity & quality of vegetation in several phytosociological studies (Lall, 1988& 1990;Parmdayal et. al; 1994, Samra & Singh, 1994, 1996, Raizada et. al.; 1998).

The impact of disturbances on forest vegetation has been well documented (Raup, 1964; White, 1947; Smiet, 1992). The relationship of community properties & disturbances has been examined several workers (Johns, 1945; Whitemore, 1975; Runkel, 1982). Nicolson & Monk (1974) reported rapid increase in species richness in first few years after protection in an old field Georgica Pandey and Singh (1987) also reported higher species richness in the initial years after protection at Varansi.

Information on the composition & diversity of forest flora of ravines in India is scarce & adequate attempts have not been made to quantify the impact of biotic factors on the scarceness vegetation. In view of this a study was taken up to assess the impact of disturbances on analytic & synthetic characters of the forest vegetation in Ottangan ravines at Khandari (Agra).

2. MATERIALS METHODS

The phytosociological studies were done at four predetermined such as ravines top, slope, bottom & river bank by quadrate method as suggested by Mishra & Puri (1994) & Mishra (1973). Five quadrate four trees were laid at selected as 5 m squares. In this study analytical & synthetical characters were observed. Relative frequency relative density & relative dominance were calculated according to Phillips , 1959; Mishra, 1973 by the following formula.

$$\text{Relative frequency} = \frac{\text{Number of quadrate of occurrence of the plant}}{\text{Number of quadrates of occurrence of all the plant species}} \times 100$$

$$\text{Relative density} = \frac{\text{Number of individuals of the species}}{\text{Number of individuals of all the species}} \times 100$$

Relative dominance = Total basal area of the species X 100

Total basal area of all species

The total of their three parameters gave the importance value Index (I.V.I).

Presence & constant values was calculated from the frequency data according to (Sharma,1979). Frequency classes were given according to (Raukier's 1934).

3. RESULT AND DISCUSSION

A total of 13 species of trees ware recorded from the two sites. The protected had 13 species whereas unprotected ravine of ottangaon river had only three species. Disturbance of species in different frequency classes (Table no. 1) according to Raunkier's 1934 indicate that on the tops of protected ravine, rare frequency class had 6 species which was the dominant class there, other frequency classes were also observed except constantly. Whereas on the top of unprotected ravine rare frequency class had 2 species 7 reldom only remaining frequency classes were absent there. On the ravine slope of protected area, frequency class reldom was dominant because that had 5 species. Other classes was also recorded there where as on the slopes of unprotected ravine reldom frequency class was dominant and bear 2 species remaining classes were present and beard single species except constantly because it was absent there. Dominant class was rare on the bottom of protected ravine and it was contained with 7 species, remaining all frequency class were present there whereas on the bottom of unprotected ravine two frequency classes as mostly and constantly were absent and remaining frequency classes represent single species. On river bank of protected ravine the dominant class was rare because it bear 7 species. In this topography other frequency classes was available except reldom but on unprotected ravines only two frequency classes was present and showing single species were reldom and often; other frequency classes were unavailable.

Important value index (I.V.I.) of tree species in the ravine of ottangan river was studied from year 2010 (Table No.2) to 2011 (Table No. 3).

In the year 2010, on the top of protected ravine 10 species were recorded in which Prosopis Juliflora had highest importance value index whereas on the unprotected ravines only three species was recorded among which Prosopis Juliflora had highest Importance value index which is more to highest value of protected ravine. On ravine slope of protected area 7 species was recorded among which Prosopis Juliflora contain highest importance value index whereas on unprotected ravine slope 3 species was recorded among which Prosopis Juliflora with highest importance value index which was more to the highest value of protected ravine slope. On the bottom of protected ravine 8 species was recorded among which Dalbergia sisso bear highest value of importance value index but on the bottom of unprotected only two species was

recorded in which Prosopis Juliflora had highest importance value index. This value is higher to value protected ravine. On the river bank of protected ravine 6 species of trees was observed in which Prosopis Juliflora showing highest value of importance value index whereas in the river banks of unprotected ravine only 1 species; Prosopis Juliflora was found and showing highest value of importance value index in comparison whole species of all topography of protected and unprotected ravines.

In the year 2011, on the top of unprotected ravine 6 species of trees was recorded among which Prosopis Juliflora had highest value of importance value index whereas on top of unprotected ravine 3 species was observed among which Prosopis Juliflora representing highest value of importance value index. This value is high to the highest value of top of protected ravine. On the slope of protected ravine 8 species was recorded among which Prosopis Juliflora had highest importance value index whereas on slope of unprotected ravine only two species was found in which Prosopis Juliflora showing highest importance value index. This value is high in comparison of importance value index of slope protected ravine. On the bottom of protected ravine, 8 species was recorded in which Balanitis aegyptica had highest value of importance value index but on the bottom of unprotected area 2 species was present only in which Prosopis Juliflora had highest value importance value index which was more rather than protected bottom highest value on the river bank of protected ravine 5 species was recorded in which highest importance value index was calculated in Prosopis Juliflora whereas on the river bank of protected ravine only 1 species recorded as Prosopis Juliflora which had very high importance value index, such type highest value is not showing any species of whole topography of protected and unprotected ravine.

The dominance of Prosopis Juliflora in biotically disturbed area clearly indicates that it is the most successful species in comparison to other species which recorded there.

Table No. 1- Distribution of tree species in different frequency classes in 2010 and 2011

S. No	Raunkiers' Frequency classes	Character & range of species	Value of & presence Constance	Ravine Top		Ravine Slope		Ravine Bottom		Ravine Bank	
				P.R.	U.R.	P.R.	U.R.	P.R.	U.R.	P.R.	U.R.
1.	A	Rare (0-20%)	1	6	2	2	1	7	1	7	-
2.	B	Seldom Present (21-40%)	2	5	1	5	2	2	1	-	1
3.	C	Often Present (41-60%)	3	2	-	3	-	3	1	2	1

4.	D	Mostly Present	4	3	-	4	-	3	-	1	-
5.	E	Constantly Present (81-100%)	5	-	-	-	-	-	-	1	-

PR= Protected Ravine; UR= Unprotected Ravine; - =Absent

Table No. 2: Importance Valus index of tree species in the ravines of ottangaon river Year 2010

S. No	Name of Species	Ravine Top		Ravine Slope		Ravine Bottom		Ravine Bank	
		P.R.	U.R.	P.R.	U.R.	P.R.	U.R.	P.R.	U.R.
1.	Prosopis juliflora (S.W.) DC	85.34	172.71	77.81	151.5	47.95	211.49	134.48	300
2.	Acacia nilotica (L.) Del.	52.64	-	33.95	-	32.28	-	-	-
3.	Bombax Ceiba L.	14.18	-	-	-	-	-	-	-
4.	Azadirachta indica A.Jurs.	13.97	-	-	-	24.72	-	22.58	-
5.	Maringa oleifera Lam.	13.84	-	-	-	-	-	-	-
6.	Acacia catechu wild.	51.07	-	41.64	-	12.03	-	33.88	-
7.	Prosopis cineraria (Linn.) Druce	33.18	86.52	37.09	73.04	38.28	88.49	-	-
8.	Salvadora oleoides Decne	12.69	40.74	30.46	75.43	-	-	-	--
9.	Salvadora percica Linn.	12.63	-	-	-	-	-	-	-
10.	Bauhunia recemosa Lamk.	9.33	-	-	-	-	-	-	-
11.	Dalbergia sisso Roxb.	-	-	68.35	-	77.39	-	55.48	-
12.	Balanitis aegyptica (L.) Del.	-	-	9.82	-	55.67	-	29.06	-
13.	Zizyphus mauritiana Lamk.	-	-	-	-	11.29	-	24.45	-
	Total	298.97	299.97	299.12	299.97	299.61	299.98	299.93	300

PR= Protected Ravine; UR= Unprotected Ravine; - =Absent

Table No. 2: Importance Valus index of tree species in the ravines of ottangaon river Year 2010

S. No	Name of Species	Ravine Top		Ravine Slope		Ravine Bottom		Ravine Bank	
		P.R.	U.R.	P.R.	U.R.	P.R.	U.R.	P.R.	U.R.
1.	Prosopis juliflora (S.W.) DC	70.55	172.28	66.76	237.22	43.26	194.96	153.49	300
2.	Acacia nilotica (L.) Del.	67.32	-	34.72	-	14.82	-	29.22	-
3.	Bombax Ceiba L.	27.13	-	20.57	-	-	-	-	-
4.	Azadirachta indica A.Jurs.	-	-	25.72	-	20.15	-	15.07	-
5.	Maringa oleifera Lam.	-	-	-	-	-	-	-	-
6.	Acacia catechu wild.	40.72	-	39.89	-	14.45	-	-	-
7.	Prosopis cineraria (Linn.) Druce	43.82	86.74	39.09	62.76	17.12	105.03	-	-
8.	Salvadora oleoides Decne	49.48	40.96	-	-	-	-	41.31	-
9.	Salvadora percica Linn.	-	-	-	-	-	-	-	-
10.	Bauhunia recemosa Lamk.	-	-	-	-	-	-	-	
11.	Dalbergia sisso Roxb.	-	-	62.93	-	113.93	-	60.24	-
12.	Balanitis aegyptica (L.) Del.	-	-	-	-	62.72	-	-	-
13.	Zizyphus mauritiana Lamk.	-	-	10.23	-	13.41	-	-	-
	Total	299.02	299.98	299.91	299.98	299.87	299.99	299.33	300

PR= Protected Ravine; UR= Unprotected Ravine; - =Absent

4. CONCLUSION

This study reveals that the analytical & synthetic characters of trees in Ottangan ravines are highly affected by protection. In protected ravines 13 species of trees was recorded whereas in unprotected ravines its number was three.

Study on the distribution of species in Raunkeires frequency classes represent that the dominant frequency class in the protected ravines was rare (A), whereas in unprotected area, the dominant class was seldom (B). The constantly present (E) frequency class was empty in the unprotected ravines due to high pressure of biotic disturbances.

On the basis of the study of importance value index of three species on the ravines of Ottangan rivers in 2010 & 2011. It was concluded that Prosopis Juliflora, Acacia nilotica, Dalbergia sisso & Balansis aegptica are the dominant species in regulating importance value index out of 13

species in protected ravines only three species was recorded in reduced number and farm near the farm fencing in which Prosopis Juliflora had highly importance value index & showing dominant itself. Therefore we can easily calculate that Prosopis Juliflora is the most successful species in unprotected ravines.

5. REFERENCES:

1. H. G. Champion and S. K. seth, Characteristics of two kota soil series. *Indian forester*, *94,* 1968, 281-262.

2. J. Lall, Hierarchical community classification of Bandhavgarh National Park and Tala forest range Madhya Pradesh, India, *Trop. Ecol*., *29(1)* 1988, 79-88.

3. J. Lall, Vegetative structure and regeneration studies in two adjacent protected and un protected tropical forest sites in central Indian, *Indian Forester*, *116(3)*, 1990 194-201.

4. A. K. Parndiyal Rao, Rama Mohan Gadekar M. S. H. and B. L. Rathore, Composition and diversity of forest flora in Chambal Ravines in India, *Soil and water conservatation Challehges and Opportunities*, *(2),* 1994, 1520-1526.

5. J. S. Samra and S. C. Singh, Floristic diversity due to time differential in imposition of integrated Watershed measures. *In Soil and Water Conservation – Challenges and opportunities*, *(2),* 1994, 1526-1535.

6. J. S. Samra and S. C. Singh, Vegetation status and biomass estimates of rel marza Dam catchment- base line survey, *Indian J. Soil Cons*., *24 (3),* 1996, 240-2247.

7. A. Raizada, S. P. Joshi and M. M. Srivastava, Composition and vegetational diversity in alpine grassland in the Garwal Himalays, *Tropical Ecology*, *39 (1)*, 1998, 133-141.

8. H. M. Raup, Some problems in ecological theories and their relation to conservation, *J. Ecology*, *52,* 1964, 19-28.

9. P. S. White, Pattern and processes in plant community, *J. Ecology*, 55, 1947, 1-22.

10. A. C. Smiet, Forest ecology of Java: Human impact and vegetation of montane forest, *Journal of Tropical Ecology*, *8(2),* 1992, 129-152.

11. E.W. Johns, The structure and reproduction of the virgin forest of North temperate Zone, *New phytologist*, 45, 1945, 130-138.

12. T. C. Whitemore, Tropical rain forest of Far East. Clarendon press, Oxford, England, 1975.

13. R. J. Runkle, 0 Pattern of distribution in some old growth mesic forest of Eastern North America, *Ecology 63 (5)* 1982, 1533-1546.

14. S. A. Nicholson and C. D. Monk, Plant species diversity in old field succession in the Georgia Piedoment Ecology, 55, 1974, 1075-1085.

15. H. N. Pandey and R. N. Singh, Structure and function of early succession communities on an abandoned crop field at Varanasi, *India trop*. Eco., *28*, 1987, 92-100.

16. C. Raunkier, The life forms of plants and statistical plant geography, the collected papers of C. Rankier. Clarendon press Oxford. Eng. Lancl., 1934.