Phytoecological Analysis of an Abandoned Desertic Landscape: A Case Study

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Abstract: **The present article reveals that desertic conditions which represent a unique landscape and have ample scope of diversity, despite the adverse physical conditions and stress. It has their own ecology, which address the functional role in community. However the ecology of desertic landscape is influence by phenology with large and unique number of species. Present study emphasis on territory of university campus which was earlier declared as a common grazing land, now restricted with somewhat direct interference and biotic stresses. The study encompasses with change due to abandoned landscape shows the ecological and sociological parameters, like density abundance, basal area, and importance value index.**

Keywords: Endemism, Desertic, Ecology and Phenology. Phytoecological, Abandoned landscape

I. INTRODUCTION

This peculiar landform is part of Thar desert lies in district Bikaner under category of tropical dry deciduous and thorny forest with direction 28°01'N Latitude 73°22'E and area approximately eleven hundred acre the landscape endowed low level of biological diversity and habitat heterogeneity with abundance of herbs , shrubs and grasses. The environmental impacts of transforming this grazing land through construction of infrastructure and human activities as university campus flourishes and demarcation of boundary in each direction shall leads it towards an isolated patch of an ecological unit so far which diminish this unique landscape in floral and faunal aspects. The area comprising with undulating plains, dunes and have tropical dry climate with meager of rainfall pattern. A study was conducted for assessing the current status of vegetation with reference to regeneration and indigenous in character.

II. MATERIAL AND METHODS

Extensive field studies has undertaken by the help of mapping and traverse method of the area in several directions and put stakes at number of points, photography, and quadrate methods for community structure to calculate the frequency (Raunkiaer's 1934, J.T. Curtis 1951), density(Oosting 1958), abundance, cover and basal area(Hanson and Churchill 1961) and Importance value index(Phillips 1959), comparison of stands by using Ecology Workbook by (R.Misra 1954).The following indices(phytosocioecological parameter) were used for the present study to ascertain species richness, diversity ,evenness and dispersion of the permanent vegetation of the study area. Percentage frequency=No. of sampling units in which the species occurred/Total no. of units studied x100.Abundance= Total no. of individual species/Total no. of quadrates in with species found. Relative Dominance= Total basal area of the species/Total basal area of all species x100, Relative Density= Number of individuals of the species/Number of individuals of all species x100, Relative frequency=Number of occurrence of the species/Number of occurrence of all species x100, Relative basal cover of individual species= Basal cover of individual species/ Total basal cover of all the species x100, Total basal area of the plant in sq. cm=πr^2 x absolute density, Absolute density of individual species=Relative density of the species/100 x total density of all species,Importance value index (IVI) =Relative density+ Relative frequency+ Relative Abundance(Philiips 1959), Distribution of species (Contagious or regular) =AxF=100xD (Cole 1946, Ashby 1963, Fracker and Brischle 1944), High frequency x low Abundance=regular distribution, Low frequency x high Abundance=contagious distribution.

Table A: Phytosocio-ecological parameters of the abandoned landscape

Botanical name of herbaceous plants	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total number of individual species	Frequency %	Density	Abundance
Octhocloa indica	32	17	12	20	25	18	22	21	12	09	188	100	18.8	18.8
Heliotropium indicum	5	14	*5*	*3*	-	*8*	*2*	-	*7*	*3*	*47*	*80*	*4.7*	*5.87*
Euphobia microphylla	*01*	*03*	*08*	*05*	*05*	*04*	*12*	*02*	-	*01*	*39*	*90*	*3.9*	*4.33*
Indigophera linnaei	*01*	*01*	-	*02*	-	*02*	*02*	*07*	-	*01*	*16*	*70*	*1.6*	*2.2*
Boerhavia diffusa	*01*	*05*	*02*	*02*	*02*	*02*	-	*05*	*03*	*02*	*24*	*90*	*2.4*	*2.6*
Convovulus desertii	-	*01*	-	- -	-	-	-	-	*02*	-	*03*	*20*	*0.3*	*1.5*
Eragrostis minor	-	*01*	-	-	*16*	-	-	-	-	*01*	*18*	*20*	*0.8*	*9.0*
Fagonia cretica	-	*02*	-	*01*	-	-	*02*	-	*04*	*02*	*11*	*50*	*1.1*	*2.2*
Acacia italica	*02*	*01*	*01*	-	-	*01*	-	-	-	-	*05*	*40*	*0.5*	*1.25*
Aerva persica	*01*	*01*	*01*	*02*	*01*	-	-	-	-	-	*06*	*50*	*0.6*	*1.2*
Aristida funiculata	*02*	-	*01*	-	*01*	-	*01*	*02*	*02*	-	*09*	*60*	*0.9*	*1.8*
Tribulus terrestris	*03*	*04*	-	*01*	*04*	*01*	*01*	*03*	-	*02*	*19*	*80*	*1.9*	*2.37*
Aerva pseudotomentosa	*02*	*01*	*03*	*01*	*01*	*01*	*01*	*01*	*02*	*02*	*15*	*100*	*1.5*	*1.5*
Crotolaria burhia	-	*01*	*05*	-	*02*	*01*	-	*01*	-	-	*10*	*50*	*1.0*	*2*
Cyprus rotandus	*01*	*01*	*01*	-	-	-	*01*	*02*	*02*	*02*	*10*	*60*	*1.0*	*1.42*
Indigofera cordifolia	*01*	*01*	*01*	*01*	*04*	*03*	*01*	*01*	*01*	*01*	*15*	*100*	*1.5*	*1.5*
Cenchrus setigerous	*01*	*02*	*02*	*01*	*01*	-	-	-	*02*	*01*	*10*	*70*	*1.0*	*1.42*
Lasiurus sindicus	*01*	*01*	-	-	-	-	--	-	-	-	*02*	*20*	*0.2*	*1.0*
Tragus biflorus	*04*	*03*	*02*	*03*	*03*	-	-	*01*	*01*	*01*	*18*	*80*	*1.8*	*2.25*
Brachiaria ramosa	-	-	-	-	-	*01*	*01*	*02*	*02*	*02*	*08*	*50*	*0.8*	*1.6*
Gisekia pharnacoides	*01*	-	-	-	-	-	-	*02*	-	-	*03*	*20*	*0.3*	*1.5*

Botanical names of species	frequency	density	Abundance	RF	RD	RA	IVI	Total Basal Area in Sq.cm
Octhocloa indica	100	18.8	18.8	8.7	39.4	27.93	76.03	49075.6
Heliotropium indicum	80	4.7	5.87	7.01	9.8	8.72	25.53	12206.6
Euphobia microphylla	90	3.9	4.33	7.8	8.1	6.43	22.33	10089.1
Indigophera linnaei	70	1.6	2.2	6.1	3.3	3.26	12.66	4110.39
Boerhavia diffusa	90	2.4	2.6	7.8	5.04	3.8	16.64	6277.6
Convovulus desertii	20	0.3	1.5	1.75	0.63	2.22	4.6	784.7
Eragrostis minor	20	0.8	9.0	1.75	3.7	13.37	18.82	4608.6
Fagonia cretica	50	1.1	2.2	4.3	2.3	3.2	9.8	2864.8
Acacia italica	40	0.5	1.25	3.5	1.05	1.85	6.4	1307.8
Aerva persica	50	0.6	1.2	4.3	1.26	1.78	7.34	1569.4
Aristida funiculata	60	0.9	1.8	5.2	1.89	2.67	9.76	2354.1
Tribulus terrestris	80	1.9	2.37	7.01	3.9	3.52	14.43	4857.7
Aerva pseudotomentosa	100	1.5	1.5	8.7	3.1	2.22	14.02	3861.2
Crotolaria burhia	50	1.0	2	4.3	2.1	2.97	9.37	2615.7
Cyprus rotandus	60	1.0	1.42	5.2	2.1	2.10	9.4	2615.7
Indigofera cordifolia	100	1.5	1.5	8.7	3.1	2.22	14.02	3861.2
Cenchrus setigerous	70	1.0	1.42	6.1	2.1	2.10	10.3	2615.7
Lasiurus sindicus	20	0.2	1.0	1.75	0.4	1.48	3.63	498.2
Tragus biflorus	80	1.8	2.25	7.01	3.7	3.34	14.05	4608.6
Brachiaria ramosa	50	0.8	1.6	4.3	1.6	2.37	8.27	1992.9
Gisekia pharnacoides	20	0.3	1.5	1.75	0.6	2.22	4.57	747.3

III. RESULT AND DISCUSSION

Quantitative evaluation by establishing statistically designed census quadrate sampling method revealed that present study area as a remnant of Thar Desert is highly generic endowed with low biological diversity and habitat heterogeneity but due to the anthropogenic activities leads or transforming into an abandoned landscape. It is assumed that if prevailing condition sustained this ecological habitat became degenerated drastically and the succession and regenerational process become curtailed and fragility increases. In the present study it is observed that maximum relative frequency of species are *Octhocloa indica, Aerva pseudotomentosa, Indigofera cordifolia* and minimum relative frequency was observed of *Convovulus desertii, Eragrostis minor Lasiurus sindicus, Gisekia pharnacoides* species respectively. The relative maximum density are found of species *Octhocloa indica* and minimum with species *Convovulus desertii, Lasiurus sindicus.*The relative maximum abundance shown by species *Octhocloa indica, Eragrostis minor* and minimum relative abundance of *Cyprus rotandus, Cenchrus setigerous, Lasiurus sindicus* respectively.It was observed that maximum IVI related to the species *Octhocloa indica* , *Heliotropium indicum* , *Euphobia microphylla* showing their ecological dominance while minimum IVI observed for species *Convovulus*

desertii, Lasiurus sindicus, Gisekia pharnacoides respectively.The total basal area of the studied quadrates in present landscape comprises of(123522.8 sq.cm) with maximum basal area of species *Octhocloa indica* is (49075.6sq.cm) and minimum basal area with *Lasiurus sindicus* (498.2sq.cm)and *Gisekia pharnacoides* (747.3sq.cm) respectively. Detail studies of flowering and fruiting phenology have been conducted in almost every area of present study randomly. The results show that different species may produce flowers and fruiting annually in favorable period of monsoon. The majority of species rely on air borne and animal to transfer their pollen, seeds are also transfer by animal dispersal during grazing or consuming comes through their excreta which are abandoned due to demarcation of the boundary around the campus.

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