

Impact of protection on the herbs & grasses in the top ravines of Ottangan River at Khander, Agra, U.P.

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ABSTRACT

Impact of protection on the herbs & grasses in the top ravines of Ottangan River at Khander has been recorded during the phytosociological analysis by the standard methods in the three seasons of two years comparatively & found that no. of herbs & grasses species increased more in protected ravines in all seasons. *Achyranthus aspera* Linn; *Cynodon dactylon* (L.) Pers; *Cyperus niveus* Retz; *Aristida adscensionis* Linn; *Justicia simplex* D.Don. were dominant species in the protected ravines whereas in the unprotected ravines *Cenchrus ciliaris* Linn; *Tephrosia purpuria* Linn; *Cynodon dactylon* (Linn.) Pers; *Kickxia ramosissima* (Wall.) Jancher; *Eragrostic ciliaris* (Linn.) R.& Br; *Indigofera cordifolia* Heyen. Ex Roth. Were most successful species inspite of biotic interference.

Keywords:- Protected Ravine, Unprotected Ravine, Phytosociology, Ottangan, Khander, Topography, Biotic Interference.

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INTRODUCTION

The ravines in India are not of recent origin, they date back to the 11th century & are still growing. An intensive system of gullies forms ravines. These ravines caused by major rivers & their tributaries are extending fast towards agricultural lands & habitation (Sharda et al. 1982). Ravines are the worst form of land degradation & are characterised by edaphic, topographic & climatic adversities leading to very low biological productivity. The resultant scarce vegetative cover is unable to withstand the high biotic pressure usually exerted on the lands. Large chunks of ravinous lands are thus subjected to further degradation due to inadequate vegetative cover. Champion & Seth [3] classified ravinous forests of Chambal under Northern Tropical Ravine Thorn Forest (6 BC2 SubClass). Establishment of vegetative cover has been advocated as a biological measure to check land degradation but the restoration of vegetative cover in the ravinous areas continues to be adversely affected by high biotic disturbances. Protection from biotic interferences has been founded to improve the quantity & quality of vegetation in several phytosociological studies [9, 10, 19, 20, 24]. Phytosociology deals with plant communities their composition, development & the relationship between the species within them. A phytosociological system is a system for classifying these communities. The aim of phytosociology is to achieve a coefficient empirical model of vegetation using plant taxa combination that characterizes vegetation units. Phytosociology is an useful to describe the population dynamics of each plants species occurring in a particular community & to understand how they relate to the other species in a same community [14, 15].

The impact of disturbances on forest vegetation has been well documented [21, 26, 28]. The relationship of community properties & disturbances has been examined by several workers [8, 22, 29]. Nicholson & Monk [17]; reported rapid increase in species richness in first few

years after protection in an old field of Georgia. Panday & Singh [18] also reported higher species richness in the initial years after protection at Varanasi.

The convention on biological diversity mandates the preservation, exploration & sustainable use of biodiversity & requires its protection at all levels from the genetic to the ecosystem [5,11]. The global decline in biodiversity & the loss of species & habitats in enormous [16, 17]. The global model estimate that changes in land use and climate as well as anthropogenic disturbances with subsequent habitat fragmentation, will result in a loss of vascular plant species by 25% in the next few hundreds of years in comparison to diversity status in 1995 [15, 16, 27, 4].

MATERIAL AND METHODS

Experimental Site- The Khander experimental site is comprised of ravine system made up of different classes of gullies varying from very shallow to very deep. This village is spread in 553 sq. hectares situated in deep ravine on the sides of Ottangan river. This river has very high current & large area of spread. The residents of this village do not build permanent residences due to the high current of the river which destroys their houses. This Ottangan river is formed by combination of various streams & this village is near the combination side.

Climatic Condition of Experimental Site- Experimental site has dry climate except during the monsoon months, with an average annual rainfall of 765 m.m., 90% annual rainfall is received during monsoon season. Monsoon rains which starts in the last week of June & very active in July to August, tapering off by the middle of September, cause of considerable erosion. May-June being the hottest months when the maximum temperature touches 48°C & minimum temperature goes as low as 1°C in month of December-January. The evaporation ratio is also high due to strong wind velocity & high temperature.

The phytosociological studies were done on the top in the protected & unprotected ravine by quadrat method as suggested by Mishra & Puri [14] & Mishra [15] & impact of protection on the herbs & grasses has been recorded. Ten quadrates of 50 sq. c.m. each were laid down for herbs & grasses on the selected spots in different seasons such as rainy, winter & summer & the following characters were noted.

A. Analytical Characters:-

1. **Quantitative Characters-** For herbs & grasses the following quantitative values were observed in each plant community.

a. **Frequency-** The no. of quadrates in which a given species occurred & thus express the distribution for dispersion of various species in a community. For this the percentage of frequency was calculated as-

$$\frac{\text{No. of Quadrates in which species occurred}}{\text{Total No. of Quadrates studied}} \times 100$$

b. **Density-** The no. of individuals per sampling unit in a community (species may or may not occur in all sampling units) as

$$\frac{\text{Total no. of individuals of the species in all sampling units}}{\text{Total No. of sampling units studied}}$$

c. **Abundance-** No. of individual of a species per sampling units of occurrence as

$$\frac{\text{Total no. of individuals of the species in all sampling units}}{\text{Total No. of sampling units in which species occurred}}$$

2. Qualitative Characters-

Sociability- It refers to the space relationship of plants or how closely together the individual plants grow [6]. Thus, the degree of the sociability that a species will develop in an area will depend upon the biological equipment of the species in relation to the environment. Braun-Blanquet's [2] scale given below for rating the sociability of species were used.

S1= Grow one in a place, singly

S2= Groups or tufts

S3= In troops, small patches or cushions

S4= In small colonies, in extensive patches or forming carpets.

S5= In great crowds (Pure populations).

B. Synthetic Characters-

Presence & Constancy- It expresses the extent of occurrence of individuals of a particular species in the community. Constancy shows to some extent, the interrelation between different communities. Presence & constancy values were calculated from the frequency data in following five figures [25].

Presence & Constancy 1= 1% to 20% frequency

Presence & Constancy 2= 21% to 40% frequency

Presence & Constancy 3= 41% to 60% frequency

Presence & Constancy 4= 61% to 80% frequency

Presence & Constancy 5= 81% to 100% frequency

RESULT

It was found on the top topography of protected ravines of Ottangan River that most abundant herb & grass species in the first year of the study are *Achyranthus aspera* Linn; *Tephrosia purpurea* Linn; *Cynodon dactylon* (L.) Pers. & *Peristrophe bicalyculata* (Retz.) Nees in winter (Table No. 1) and *Cyperus niveus* Retg. and *Kickxia ramosissima* (Wall.) Janchin in summer (Table No. 2) and *Justicia simplex* D.Don and *Aristida adscensionis* Linn. in rainy season (Table No. 3).

The *Achyranthus aspera* Linn. & *Cynodon dactylon* (L.) Pers. Were the most abundant herb and grass species respectively in winter season of second year of study (Table No.4). The *Cyperus niveus* Retg.; *Cynodon dactylon* (L.) Pers. & *Convolvulus microphyllus* (Roth.) Sieb ex Spreng; were most abundant grasses & herb species respectively in summer season (Table No. 5) & The *Indigofera linifolia* (L.) Retz. and *I.cordifolia* Heyne. Ex Roth. and *Aristida adscensionis* Linn. were the most abundant herbs & grass species respectively in the rainy season (Table No. 6). All above mentioned herbs & grasses were showing a lower strata (upto 1.5 metres from the ground).

Following Braun-Blanquet's [2] classes of sociability, the present author observed that herbs & grasses were found in small colonies for in troops or single in a place.

Justicia simplex D.Don; *Convolvulus microphyllus* (Roth.); *Indigofera linifolia* (L.) Retz; *Aristida adscensionis* Linn; *Cymbopogon jwarancusa* (Jones.) Schult; *Cynodon dactylon* (L.) Pers; etc of presence & constancy values were appear that the species growing in most of the stands of this community in the best growing season such as rainy season.

First year study revealed that during winter season in the unprotected ravine of Ottangan river, the *Tephrosia purpurea* (L.) Pers. & *Cenchrus ciliaris* Linn. were found in most abundant herb & grass on top (Table No.1). In the summer season, the *Kickxia ramosissima* (Wall.) Jancher & *Cynodon dactylon* (Linn.) Pers. Were found on top as a most abundant herb & grass (Table No.2). In the rainy season, *Indigofera cordifolia* Heyne. Ex. Roth; & *Eragrostis ciliaris* (Linn.) R. & Br. Were found on top as a most abundant herb & grass (Table No.3).

Second year study revealed that during winter season in the unprotected ravines of Ottangan river, the *Tephrosia purpurea* (L.) Pers. & *Cenchrus ciliaris* Linn. were found on top as a most abundant herb & grass (Table No.4). In summer season, the *Kickxia ramosissima* (Wall.) Jancher; & *Cynodon dactylon* (L.) Pers. were found on top as a most abundant herb & grass (Table No.5). In rainy season, *Indigofera cordifolia* Heyne. Ex. Roth. & *Eragrostis ciliaris* (Linn.) R. & Br. were found on top as a most abundant herb & grass (Table No.6).

Lower layer of plant in unprotected ravines was herbs & grasses. The herbs & grasses were in small groups or single in place.

Presence & Constancy value showed that the species of herbs & grasses growing in most of the stands of this community in the best growing season were *Achyranthes aspera* Linn; *Borreria articulate* (Linn. F.) F.N; *Peristrophe bicalyculata* (Retz.) Nees; *Euphorbia hirta* Linn; *Tephrosia purpurea* (Linn.) Pers; *Cynodon dactylon* (L.) Pers; *Cenchrus ciliaris* Linn. etc.

Table No.1:- Quantitative, Qualitative & Synthetic value of herbs & grasses on the top of protected & unprotected ravine in winter season of 1st year
Particular of Quadrates - 10 (50 sq.cm.)

Sr. No.	Name Of Species	Top Of Protected Ravine					Top Of Unprotected Ravine				
		F	D	A	P	S	F	D	A	P	S
1	2	3	4	5	6	7	8	9	10	11	12
1	<i>Abutilon indicum</i> (Linn.) Sweet	80	1.8	2.2	P4	S2	-	-	-	-	-
2	<i>Achyranthus aspera</i> Linn.	30	1.8	6.0	P2	S1	40	1.4	3.5	P2	S1
3	<i>Argemone mexicana</i> Linn.	20	0.2	1.0	P1	S1	10	0.2	2.0	P1	S1
4	<i>Blepharis molluginifolia</i> Pers.	30	0.3	1.0	P2	S1	20	1.2	6.0	P1	S1
5	<i>Boerhaavia diffusa</i> Linn.	40	0.9	2.2	P2	S1	60	1.7	2.8	P3	S2
6	<i>C. microphyllus</i> (Roth.) Sieb Ex. Spreng	60	1.6	2.6	P3	S3	50	1.5	3.0	P3	S1
7	<i>C. niveus</i> Retz.	50	1.2	2.4	P3	S1	-	-	-	-	-
8	<i>Cannabis sativa</i> Linn.	10	0.7	1.0	P1	S1	-	-	-	-	-
9	<i>Cenchrus ciliaris</i> Linn.	70	2.1	3.0	P4	S2	70	7.0	10	P4	S4
10	<i>Chrysopogon fulvus</i> (Spreng.) Choir	30	0.3	1.0	P2	S3	-	-	-	-	-
11	<i>Commelina benghalensis</i> Linn.	20	0.4	2.0	P1	S1	-	-	-	-	-
12	<i>Convolvulus arvensis</i> Linn.	50	1.4	2.8	P3	S1	40	0.4	1.0	P2	S1
13	<i>Cymbopogon jwarancusa</i> (Jones.) Schult	60	2.7	4.5	P3	S2	40	0.5	1.2	P2	S2
14	<i>Cynodon dactylon</i> Linn. Pers.	90	5.4	6.0	P5	S4	20	1.2	6.0	P1	S2
15	<i>Cyperus rotundus</i> Linn.	60	1.4	2.3	P3	S1	-	-	-	-	-
16	<i>Dactyloctenium sindicum</i> Boiss.	10	0.2	2.0	P1	S1	-	-	-	-	-
17	<i>Desmostachya bipinnata</i> (L.) Stapf.	60	1.2	2.0	P3	S3	20	0.3	1.5	P1	S2
18	<i>Echinops echinatum</i> Roxb.	20	0.4	0.2	P1	S1	40	0.7	1.7	P2	S1
19	<i>Euphorbia hirta</i> Linn.	40	0.7	1.7	P2	S1	30	0.3	1.0	P2	S2
20	<i>Heteropogon contortus</i> (L.) Roem & Schult.	60	2.0	3.3	P3	S3	-	-	-	-	-
21	<i>Hibiscus micranthus</i> Linn.	60	1.4	2.3	P3	S2	30	1.3	4.3	P2	S1
22	<i>Justicia simplex</i> D.Don.	40	1.7	4.2	P2	S2	40	1.4	3.5	P2	S1
23	<i>Launaea procumbens</i> Roxb. Rammaya & Rajgopal	10	0.3	3.0	P1	S1	50	0.5	1.0	P3	S2
24	<i>Peristrophe bicalyculata</i> (Retz.) Nees.	80	4.0	5.0	P4	S1	30	1.2	4.0	P2	S1
25	<i>S. spontaneum</i> Linn.	30	1.2	4.0	P2	S1	-	-	-	-	-
26	<i>Saccharum munja</i> Roxb.	10	0.1	1.0	P1	S3	-	-	-	-	-
27	<i>Setaria verticillata</i> (L.) Beauv.	10	0.2	2.0	P1	S1	20	0.2	1.0	P1	S1
28	<i>Sida cordata</i> Burm. F.	90	3.1	3.4	P5	S3	-	-	-	-	-
1	2	3	4	5	6	7	8	9	10	11	12
29	<i>Sida cordifolia</i> Linn.	100	3.7	3.7	P5	S4	-	-	-	-	-
30	<i>Solanum nigrum</i> Linn.	20	0.2	1.0	P1	S1	10	0.2	2.0	P1	S1
31	<i>Sonchus brachyotes</i> Dc.	40	0.4	1.0	P2	S1	-	-	-	-	-
32	<i>Tephrosia purpurea</i> Linn.	100	5.0	5.0	P5	S4	100	7.0	7.0	P5	S4
33	<i>Tragus roxburghii</i> Panigrahi.	40	0.7	1.7	P2	S2	-	-	-	-	-
34	<i>Tridax procumbens</i> Linn.	10	0.1	1.0	P1	S1	-	-	-	-	-

F=Frequency, D=Density, A=Abundance, P=Presence & Constance, S=Sociability, Dash(-)=Species absent

Table No.2:- Quantitative, Qualitative & Synthetic value of herbs & grasses on the top of protected & unprotected ravine in summer season of 1st year
Particular of Quadrates - 10 (50 sq.cm.)

Sr. No.	Name Of Species	Top Of Protected Ravine					Top Of Unprotected Ravine				
		F	D	A	P	S	F	D	A	P	S
1	2	3	4	5	6	7	8	9	10	11	12
1	<i>Blepharis molluginifolia</i> Pers.	30	0.4	1.3	P2	S1	-	-	-	-	-
2	<i>Boerhaavia diffusa</i> Linn.	60	1.2	2.0	P3	S2	40	0.4	1.0	P2	S1
3	<i>Calotropis procera</i> (Ait.) R. Br.	20	0.3	1.5	P1	S1	20	0.2	1.0	P1	S2
4	<i>Convolvulus microphyllus</i> (Roth.) Sieb. Ex. Spreng.	60	0.9	1.5	P3	S1	30	0.3	1.0	P2	S2
5	<i>Cynodon dactylon</i> (Linn.) Pers.	30	0.3	1.0	P2	S2	80	4.0	5.0	P4	S2
6	<i>Cyperus niveus</i> Retz.	90	6.3	7.0	P5	S2	-	-	-	-	-
7	<i>Datura metal</i> Linn.	10	0.1	1.0	P1	S1	10	0.2	2.0	P1	S1
8	<i>Echinops echinatum</i> Roxb.	10	0.2	2.0	P1	S1	30	0.7	2.3	P2	S1
9	<i>Erigon bonariensis</i> Linn.	20	1.2	6.0	P1	S2	40	0.4	1.0	P2	S2
10	<i>Euphorbia hirta</i> Linn.	40	0.4	1.0	P2	S2	30	1.2	4.0	P2	S1
11	<i>Gnaphalium parpureum</i> Linn.	20	0.7	3.5	P1	S1	-	-	-	-	-
12	<i>Heliotropium echwaldii</i> Steud.	30	0.9	3.0	P2	S1	50	0.8	1.6	P3	S1
13	<i>Indigofera linifolia</i> (L.) Retz.	30	0.4	1.3	P2	S1	20	0.2	1.0	P1	S1
14	<i>Kickxia ramosissima</i> (Wall.) Jancher.	80	5.0	6.2	P4	S2	100	5.0	5.0	P5	S2

15	<i>M. indica</i> All.	40	1.1	2.7	P2	S2	-	-	-	-	-
16	<i>Meililotus alva</i> Desr.	50	1.2	2.4	P3	S2	-	-	-	-	-
17	<i>Nicotiana plumbaginifolia</i> Viv.	10	0.2	2.0	P1	S1	-	-	-	-	-
18	<i>Pluchea lanceolata</i> Cl.	10	0.2	2.0	P1	S1	60	1.3	2.1	P3	S2
19	<i>Rumex dentatus</i> Linn.	20	0.4	2.0	P1	S1	-	-	-	-	-
1	2	3	4	5	6	7	8	9	10	11	12
20	<i>Solanum surattense</i> Burm. F.	20	1.2	6.0	P1	S1	30	0.5	1.6	P2	S1
21	<i>Volutarella ramose</i> (Roxb.) Santapau	30	0.4	1.3	P2	S1	10	0.4	4.0	P1	S1
22	<i>Withania somnifera</i> Dunal.	20	0.2	1.0	P1	S1	-	-	-	-	-
23	<i>Xanthium strumarium</i> Linn.	60	0.7	1.1	P3	S2	70	1.7	2.4	P4	S2

F=Frequency, D=Density, A=Abundance, P=Presence & Constance, S=Sociability, Dash(-)=Species absent

Table No.3:- Quantitative, Qualitative & Synthetic value of herbs & grasses on the top of protected & unprotected ravine in rainy season of 1st year Particular of Quadrates - 10 (50 sq.cm.)

Sr. No.	Name Of Species	Top Of Protected Ravine					Top Of Unprotected Ravine				
		F	D	A	P	S	F	D	A	P	S
1	2	3	4	5	6	7	8	9	10	11	12
1	<i>A.funiculata</i> Train.	30	0.3	1.0	P2	S1	-	-	-	-	-
2	<i>Abutilon indicum</i> Linn.	40	1.2	3.0	P2	S1	-	-	-	-	-
3	<i>Acalypha lanceolata</i> Willd.	20	0.3	1.5	P1	S1	-	-	-	-	-
4	<i>Achyranthes aspera</i> Linn.	60	1.0	1.6	P3	S3	40	0.7	1.7	P2	S1
5	<i>Alysicarpus vaginalis</i> Dc.	20	0.2	1.0	P1	S3	40	0.4	1.0	P2	S1
6	<i>Amaranthus spinosus</i> Linn.	30	0.4	1.3	P2	S1	-	-	-	-	-
7	<i>Aristida adscensionis</i> Linn.	100	9.0	9.0	P5	S3	30	0.3	1.0	P2	S2
8	<i>Boerhaavia diffusa</i> Linn.	20	0.3	1.5	P1	S2	30	0.9	3.0	P2	S2
9	<i>Borreria articulate</i> Linn. F.	60	1.6	2.6	P3	S2	60	0.6	1.0	P3	S2
10	<i>C.ciliaris</i> Linn.	40	0.4	1.0	P2	S1	70	0.9	1.2	P4	S3
11	<i>C.depressus</i> (Linn.) Stocks.	50	1.5	3.0	P3	S2	30	0.3	1.0	P2	S1
12	<i>C.setigerus</i> Vahl.	40	0.5	1.2	P2	S1	-	-	-	-	-
13	<i>Cenchrus biflorus</i> Roxb.	30	0.3	1.0	P2	S1	20	0.2	1.0	P1	S1
14	<i>Chrysopogon fulvus</i> (Spreng.) Choir.	40	0.4	1.0	P2	S1	-	-	-	-	-
15	<i>Commelina benghalensis</i> Linn.	40	1.4	3.5	P2	S1	-	-	-	-	-
16	<i>Convolvulus microphyllus</i> (Roth.) Siev. Ex. Spreng.	70	2.4	3.4	P4	S1	30	0.7	2.3	P2	S1
17	<i>Corchorus aestuans</i> Linn.	30	1.4	4.6	P2	S1	-	-	-	-	-
18	<i>Cymbopogon jwarancusa</i> (Jones.) Schult.	70	1.4	2.0	P4	S3	80	1.4	1.7	P4	S3
19	<i>Cynodon dactylon</i> (Linn.) Pers.	50	1.2	2.4	P3	S4	40	0.5	1.2	P2	S2
20	<i>Cyperus niveus</i> Retg.	30	2.1	7.0	P2	S1	-	-	-	-	-
1	2	3	4	5	6	7	8	9	10	11	12
21	<i>Cyperus rotundus</i> Linn.	70	1.7	2.4	P4	S1	-	-	-	-	-
22	<i>Dactyloctenium indicum</i> Boiss.	20	1.1	5.5	P1	S1	-	-	-	-	-
23	<i>Desmostachya bipinnata</i> (L.) Stapf.	40	0.5	1.2	P2	S3	30	0.3	1.0	P2	S1
24	<i>E.diarhena</i> Beauv.	40	0.4	1.0	P2	S1	30	0.3	1.0	P2	S1
25	<i>E.dracunculoides</i> Lank.	10	0.2	2.0	P1	S1	-	-	-	-	-
26	<i>E.hirta</i> Linn.	40	0.4	1.0	P2	S1	60	0.6	1.0	P3	S1
27	<i>E.poaoides</i> Beauv.	20	0.2	1.0	P1	S1	-	-	-	-	-
28	<i>E.tenella</i> (L.) P. Beauv. Ex. Roem. & Schult.	30	0.3	1.0	P2	S1	20	0.2	1.0	P1	S1
29	<i>Eragrostis ciliaris</i> (Linn.) R. & Br.	60	0.8	1.3	P3	S3	20	1.0	5.0	P1	S1
30	<i>Euphorbia clarkeana</i> Hook.	40	0.7	1.7	P2	S1	-	-	-	-	-
31	<i>Heteropogon contortus</i> (L.) Roem. & Schult.	60	0.6	1.0	P3	S2	-	-	-	-	-
32	<i>Hibiscus micranthus</i> Linn.	50	1.0	2.0	P3	S2	20	0.4	2.0	P1	S1
33	<i>I.linifolia</i> (L.) Retz.	70	1.4	2.0	P4	S1	20	0.2	1.0	P1	S1
34	<i>I.linnaei</i> (L.) Ali.	50	0.5	1.0	P3	S1	30	0.3	1.0	P2	S1
35	<i>Indigofera cordifolia</i> Heyen. Ex. Roth.	20	0.7	3.5	P1	S1	100	4.2	4.2	P5	S2
36	<i>Justicia simplex</i> D.Don.	100	8.4	8.4	P5	S1	40	0.4	1.0	P2	S1
37	<i>Peristrophe bicalyculata</i> (Retz.) Nees.	70	2.1	3.0	P4	S5	50	0.9	1.8	P3	S2
38	<i>Phyllanthus fraternus</i> Webs.	50	1.3	2.6	P3	S2	-	-	-	-	-
39	<i>S.spontaneum</i> Linn.	40	1.4	3.5	P2	S1	-	-	-	-	-
40	<i>S.verticillata</i> (L.) Beauv.	40	0.7	1.7	P2	S1	30	0.3	1.0	P2	S1
41	<i>Saccharum munja</i> Roxb.	10	0.4	4.0	P1	S2	-	-	-	-	-
42	<i>Setaria pallide-fussa</i> (Schumach) Stapf. & Hubba.	20	0.4	2.0	P1	S1	-	-	-	-	-
43	<i>Sida cordata</i> Burm. F.	60	0.9	1.5	P3	S1	-	-	-	-	-
44	<i>Tephrosia purpurea</i> Linn.	20	0.7	3.5	P1	S1	60	0.6	1.0	P3	S1
45	<i>Tragus roxburghii</i> Panigrahi.	50	0.5	1.0	P3	S1	-	-	-	-	-

F=Frequency, D=Density, A=Abundance, P=Presence & Constance, S=Sociability, Dash(-)=Species absent

Table No.4:- Quantitative, Qualitative & Synthetic value of herbs & grasses on the top of protected & unprotected ravine in winter season of 2nd year
Particular of Quadrates - 10 (50 sq.cm.)

Sr. No.	Name Of Species	Top Of Protected Ravine					Top Of Unprotected Ravine				
		F	D	A	P	S	F	D	A	P	S
1	2	3	4	5	6	7	8	9	10	11	12
1	<i>Abutilon indicum</i> (Linn.) Sweet	60	1.4	2.3	P3	S1	40	0.4	1.0	P2	S1
2	<i>Achyranthus aspera</i> Linn.	100	13	13	P5	S4	50	1.3	2.6	P3	S1
3	<i>Argemone mexicana</i> Linn.	30	0.3	1.0	P2	S1	20	0.5	2.5	P1	S1
4	<i>Blepharis malluginifolia</i> Pers.	30	1.3	4.3	P2	S1	20	1.3	6.5	P1	S1
5	<i>Boerhaavia diffusa</i> Linn.	30	0.3	1.0	P2	S1	70	0.7	1.0	P3	S2
6	<i>C. microphyllus</i> (Roth.) Sieb Ex. Spreng	50	0.9	1.8	P3	S2	30	0.3	1.0	P2	S1
7	<i>C. niveus</i> Retz.	60	1.3	2.1	P3	S1	-	-	-	-	-
8	<i>Cannabis sativa</i> Linn.	20	1.2	6.0	P1	S1	-	-	-	-	-
9	<i>Cenchrus ciliaris</i> Linn.	70	0.9	1.2	P4	S2	100	13	13	P5	S4
10	<i>Chrysopogon fulvus</i> (Spreng.) Choir	40	0.4	1.0	P2	S1	-	-	-	-	-
11	<i>Commelina benghalensis</i> Linn.	30	0.3	1.0	P2	S2	-	-	-	-	-
12	<i>Convolvulus arvensis</i> Linn.	60	1.2	2.0	P3	S1	50	0.7	1.4	P3	S1
13	<i>Cymbopogon juarancusa</i> (Jones.) Schult	50	1.6	3.2	P3	S2	30	0.4	1.3	P2	S1
14	<i>Cynodon dactylon</i> Linn. Pers.	100	14	14	P5	S4	50	0.5	1.0	P3	S2
15	<i>Cyperus rotundus</i> Linn.	60	1.2	2.0	P3	S2	-	-	-	-	-
16	<i>Dactyloctenium indicum</i> Boiss.	10	0.1	1.0	P1	S1	-	-	-	-	-
17	<i>Desmostachya bipinnata</i> (L.) Stapf.	40	1.1	2.7	P2	S1	20	0.4	2.0	P1	S1
18	<i>Echinops echinatum</i> Roxb.	10	0.2	2.0	P1	S1	40	0.6	1.5	P2	S1
19	<i>Euphorbia hirta</i> Linn.	40	0.9	2.2	P2	S1	40	0.4	1.0	P2	S2
20	<i>Heteropogon contortus</i> (L.) Roem & Schult.	50	0.7	1.4	P3	S1	-	-	-	-	-
21	<i>Hibiscus micranthus</i> Linn.	50	1.2	2.4	P3	S2	30	1.2	4.0	P2	S1
22	<i>Justicia simplex</i> D. Don.	30	1.2	4.0	P2	S1	50	1.5	3.0	P3	S1
23	<i>Launaea procumbens</i> Roxb. Rammaya & Rajgopal	20	0.4	0.2	P1	S1	50	0.5	1.0	P3	S2
24	<i>Pavonia zeylanica</i> (Linn.) Cav.	20	0.7	3.5	P1	S1	-	-	-	-	-
25	<i>Peristrophe bicalyculata</i> (Retz.) Nees.	40	1.2	3.0	P2	S1	40	1.2	3.0	P2	S1
26	<i>S. spontaneum</i> Linn.	30	1.0	3.3	P2	S1	-	-	-	-	-
27	<i>Saccharum munja</i> Roxb.	20	1.2	6.0	P1	S2	-	-	-	-	-
28	<i>Setaria verticillata</i> (L.) Beauv.	10	0.2	2.0	P1	S1	20	0.2	1.0	P1	S1
1	2	3	4	5	6	7	8	9	10	11	12
29	<i>Sida cordata</i> Burm. F.	40	0.9	2.2	P2	S1	-	-	-	-	-
30	<i>Sida cordifolia</i> Linn.	70	0.7	1.0	P4	S2	-	-	-	-	-
31	<i>Solanum nigrum</i> Linn.	30	0.3	1.0	P2	S1	10	1.2	12	P1	S1
32	<i>Sonchus brachyotes</i> Dc.	20	1.2	6.0	P2	S1	-	-	-	-	-
33	<i>Tephrosia purpurea</i> Linn.	10	1.2	12	P1	S1	100	13	13	P5	S4
34	<i>Tragus roxburghii</i> Panigrahi.	30	0.6	2.0	P2	S2	-	-	-	-	-
35	<i>Tridax procumbens</i> Linn.	10	0.1	1.0	P1	S1	-	-	-	-	-

F=Frequency, D=Density, A=Abundance, P=Presence & Constancy, S=Sociability, Dash(-)=Species absent

Table No.5:- Quantitative, Qualitative & Synthetic value of herbs & grasses on the top of protected & unprotected ravine in summer season of 2nd year
Particular of Quadrates - 10 (50 sq.cm.)

Sr. No.	Name Of Species	Top Of Protected Ravine					Top Of Unprotected Ravine				
		F	D	A	P	S	F	D	A	P	S
1	2	3	4	5	6	7	8	9	10	11	12
1	<i>Blepharis molluginifolia</i> Pers.	10	0.4	4.0	P1	S1	-	-	-	-	-
2	<i>Boerhaavia diffusa</i> Linn.	60	1.3	2.1	P3	S2	50	0.5	1.0	P3	S1
3	<i>Calotropis procera</i> (Ait.) R. Br.	20	0.4	2.0	P1	S1	20	0.2	1.0	P1	S1
4	<i>Convolvulus microphyllus</i> (Roth.) Sieb. Ex. Spreng.	30	1.8	6.0	P2	S1	20	0.2	1.0	P1	S1
5	<i>Cynodon dactylon</i> (Linn.) Pers.	100	7.0	7.0	P5	S4	100	4.0	4.0	P5	S4
6	<i>Cyperus niveus</i> Retz.	70	4.2	6.0	P4	S3	-	-	-	-	-
7	<i>Datura metel</i> Linn.	10	0.2	2.0	P1	S1	10	0.3	3.0	P1	S1
8	<i>Echinops echinatum</i> Roxb.	10	0.2	2.0	P1	S1	20	0.5	2.5	P1	S1
9	<i>Erigon bonariensis</i> Linn.	20	1.2	6.0	P1	S1	50	0.5	1.0	P3	S2
10	<i>Euphorbia hirta</i> Linn.	30	0.3	1.0	P2	S2	40	1.4	3.5	P2	S1
11	<i>Gnaphalium parpureum</i> Linn.	10	0.4	4.0	P1	S1	-	-	-	-	-
12	<i>Heliotropium echwaldii</i> Steud.	40	0.7	1.7	P2	S1	40	0.7	1.7	P2	S1
13	<i>Indigofera linifolia</i> (L.) Retz.	40	0.4	1.0	P2	S1	30	0.3	1.0	P2	S1
14	<i>Kickxia ramosissima</i> (Wall.) Jancher.	70	1.7	2.4	P4	S2	100	4.0	4.0	P5	S4
15	<i>M. indica</i> All.	20	0.3	1.5	P1	S2	-	-	-	-	-
16	<i>Melilotus alva</i> Desr.	30	1.2	4.0	P2	S1	-	-	-	-	-

17	<i>Nicotiana plumbaginifolia</i> Viv.	20	0.2	1.0	P1	S1	-	-	-	-	-
18	<i>Pluchea lanceolata</i> Cl.	10	0.2	2.0	P1	S1	60	1.4	2.3	P3	S2
1	2	3	4	5	6	7	8	9	10	11	12
19	<i>Rumex dentatus</i> Linn.	20	0.3	1.5	P1	S1	-	-	-	-	-
20	<i>Solanum surattense</i> Burm. F.	10	0.2	2.0	P1	S1	40	0.9	2.2	P2	S1
21	<i>Volutarella ramose</i> (Roxb.) Santapau	20	0.3	1.5	P1	S1	20	0.7	3.5	P1	S1
22	<i>Withania somnifera</i> Dunal.	20	0.3	1.5	P1	S1	-	-	-	-	-
23	<i>Xanthium strumarium</i> Linn.	60	0.7	1.1	P3	S5	60	1.6	2.6	P3	S2

F=Frequency, D=Density, A=Abundance, P=Presence & Constance, S=Sociability, Dash(-)=Species absent

Table No.6:- Quantitative, Qualitative & Synthetic value of herbs & grasses on the top of protected & unprotected ravine in rainy season of 2nd year Particular of Quadrates - 10 (50 sq.cm.)

Sr. No.	Name Of Species	Top Of Protected Ravine					Top Of Unprotected Ravine				
		F	D	A	P	S	F	D	A	P	S
1	2	3	4	5	6	7	8	9	10	11	12
1	<i>A.funiculata</i> Train.	30	1.1	3.6	P2	S1	-	-	-	-	-
2	<i>Abutilon indicum</i> Linn.	50	1.2	2.4	P3	S1	-	-	-	-	-
3	<i>Acalypha lanceolata</i> Willd.	20	0.2	1.0	P1	S1	-	-	-	-	-
4	<i>Achyranthes aspera</i> Linn.	60	1.0	1.6	P3	S2	50	0.8	1.6	P3	S1
5	<i>Alysicarpus vaginalis</i> Dc.	20	0.2	1.0	P1	S3	40	0.4	1.0	P2	S1
6	<i>Amaranthus spinosus</i> Linn.	20	0.2	1.0	P1	S1	-	-	-	-	-
7	<i>Aristida adscensionis</i> Linn.	100	2.9	2.9	P5	S4	40	0.4	1.0	P2	S2
8	<i>Boerhaavia diffusa</i> Linn.	20	0.2	1.0	P1	S1	20	0.7	3.5	P1	S2
9	<i>Borreria articulate</i> Linn. F.	70	0.7	1.0	P4	S2	30	0.3	1.0	P2	S1
10	<i>C.ciliaris</i> Linn.	50	1.2	2.4	P3	S1	60	0.8	1.3	P3	S2
11	<i>C.depressus</i> (Linn.) Stocks.	60	1.6	2.6	P3	S2	20	0.2	1.0	P1	S1
12	<i>C.setigerus</i> Vahl.	60	1.3	2.1	P3	S1	20	0.4	2.0	P1	S1
13	<i>Cenchrus biflorus</i> Roxb.	30	0.4	1.3	P2	S1	20	0.2	1.0	P1	S1
14	<i>Chrysopogon fulvus</i> (Spreng.) Choir.	50	0.7	1.4	P3	S2	-	-	-	-	-
15	<i>Commelina benghalensis</i> Linn.	30	1.2	4.0	P2	S1	-	-	-	-	-
16	<i>Convolvulus microphyllus</i> (Roth.) Siev. Ex. Spreng.	50	2.1	4.2	P3	S2	10	0.2	2.0	P1	S1
17	<i>Corchorus aestuans</i> Linn.	30	1.2	4.0	P2	S1	-	-	-	-	-
18	<i>Cymbopogon jwarancusa</i> (Jones.) Schult.	70	1.5	2.1	P4	S1	70	1.3	1.8	P4	S3
19	<i>Cynodon dactylon</i> (Linn.) Pers.	40	1.3	3.2	P2	S2	30	0.3	1.0	P2	S1
1	2	3	4	5	6	7	8	9	10	11	12
20	<i>Cyperus niveus</i> Retg.	40	2.0	5.0	P2	S1	-	-	-	-	-
21	<i>Cyperus rotundus</i> Linn.	50	1.3	2.6	P3	S1	-	-	-	-	-
22	<i>Dactyloctenium indicum</i> Boiss.	30	1.2	4.0	P2	S1	-	-	-	-	-
23	<i>Desmostachya bipinnata</i> (L.) Stapf.	40	0.7	1.7	P2	S2	20	0.2	1.0	P1	S1
24	<i>E.diarrhena</i> Beauv.	20	0.2	1.0	P1	S1	20	0.3	1.5	P1	S1
25	<i>E.dracunculoides</i> Lank.	10	0.2	2.0	P1	S1	-	-	-	-	-
26	<i>E.hirta</i> Linn.	50	0.7	1.4	P3	S1	70	0.7	1.0	P4	S3
27	<i>E.poaoides</i> Beauv.	10	0.2	2.0	P1	S1	-	-	-	-	-
28	<i>E.tenella</i> (L.) P. Beauv. Ex. Roem. & Schult.	20	0.4	2.0	P1	S1	20	0.2	1.0	P1	S1
29	<i>Eragrostis ciliaris</i> (Linn.) R. & Br.	50	0.9	1.8	P3	S3	100	5.0	5.0	P5	S4
30	<i>Euphorbia clarkeana</i> Hook.	50	0.8	1.6	P3	S1	-	-	-	-	-
31	<i>Heteropogon contortus</i> (L.) Roem. & Schult.	70	0.9	1.2	P4	S2	-	-	-	-	-
32	<i>Hibiscus micranthus</i> Linn.	40	1.1	2.7	P2	S2	30	0.3	1.0	P2	S1
33	<i>I.linifolia</i> (L.) Retz.	100	5.2	5.2	P5	S4	30	1.2	4.0	P2	S1
34	<i>I.linnaei</i> (L.) Ali.	30	0.3	1.0	P2	S1	40	0.4	1.0	P2	S1
35	<i>Indigofera cordifolia</i> Heyen. Ex. Roth.	60	3.6	6.0	P3	S1	100	4.1	4.1	P5	S2
36	<i>Justicia simplex</i> D.Don.	60	1.2	2.0	P3	S1	20	0.2	1.0	P1	S1
37	<i>Peristrophe bicalyculata</i> (Retz.) Nees.	40	1.4	3.5	P2	S1	40	0.8	2.0	P2	S1
38	<i>Phyllanthus fraternus</i> Webs.	60	1.6	2.7	P3	S2	-	-	-	-	-
39	<i>S.spontaneum</i> Linn.	50	1.7	3.4	P3	S1	-	-	-	-	-
40	<i>S.verticillata</i> (L.) Beauv.	60	0.9	1.5	P3	S1	30	0.4	1.3	P2	S1
41	<i>Saccharum munja</i> Roxb.	10	0.5	5.0	P1	S2	-	-	-	-	-
42	<i>Setaria pallide-fussa</i> (Schumach) Stapf. & Hubba.	20	0.6	3.0	P1	S1	-	-	-	-	-
43	<i>Sida cordata</i> Burm. F.	70	0.8	1.1	P4	S1	-	-	-	-	-
44	<i>Tephrosia purpurea</i> Linn.	10	0.3	3.0	P1	S1	70	0.7	1.0	P4	S1
45	<i>Tragus roxburghii</i> Panigrahi.	40	1.2	3.0	P2	S1	-	-	-	-	-
46	<i>Trianthema portulacastrum</i> Linn.	10	0.2	2.0	P1	S1	-	-	-	-	-

F=Frequency, D=Density, A=Abundance, P=Presence & Constance, S=Sociability, Dash(-)=Species absent

DISCUSSION

During the course of study on top, it was observed that even some biotic interferences which affected the abundance of herbs & grasses in protected ravines. Generally species of this area showed succession. The species of unprotected ravines were destroyed by over exploitation due to severe grazing by domestic animals & human interference etc. resulting into barred land. Such type observation was made earlier by Bore [1].

From the three season of both year study on the top of protected & unprotected ravines, it was recorded that the number of herbs & grasses species & their frequency, density & abundance mostly always increased in all season in protected ravine in comparison to all season of unprotected ravines.

It was observed from the both year study on top in protected & unprotected ravines that rainy season was very rich in relation to density & number of species & followed by winter & summer. Many annuals & some perennials were occurred in winter season & density of population has been declined due to withdrawal of rainy season & it was least in summer season due to extremely dry & adverse conditions.

The observations were represented on top in protected ravines that the sociability classes 4 & 5 were poorly present due to the poor occurrence of colonial habit. It was also observed by the distribution of species that S1, S2 & S3 were highly present. The unprotected ravines generally occupied by S1 & S2 class.

Presence & Constance classes showed that frequency distribution of the species was high in protected ravines in comparison to unprotected ravines. On the basis of seasonal study, it was recorded that presence & Constance value increase in rainy season in both protected & unprotected ravines of the Ottangan river.

Such type study as Phytosociological analysis & species diversity of herbaceous layer in Rashad & Alabassia localities, South Kordofan state, Sudan, was also carried out dominant species & distribution pattern of species of different sites in both sites recorded by Ismail & Elawad [7].

CONCLUSION

After two year study, on the top of protected & unprotected ravines, it has been concluded that herbs & grasses were highly affected by protection & seasonal change & *Achyranthus aspera* Linn. & *Cynodon dactylon* (L.) Pers. herb & grass in winter season, *Cyperus niveus* Retz. & *Cynodon dactylon* (L.) Pers. grasses in summer & *Aristida adscensionis* Linn; *Justicia simplex* D. Don. grass & herb in rainy season were most dominant species on the basis of abundance in protected ravines whereas in the unprotected ravines *Cenchrus ciliaris* Linn. , *Tephrosia purpuria* Linn. grass & herb in winter season, *Cynodon dactylon* (L.) Pers., *Kicksia ramosissima* (Wall.) Jancher grass & herb in summer season & *Eragrostis ciliaris* (Linn.) R. Br., *Indigofera cordifolia* Heyen. Ex. Roth. grass & herb respectively in rainy season were most successful species on the basis of abundance inspite of biotic interference.

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