PERIODIC REST FROM LIVESTOCK GRAZING IMPROVES THE RANGELANDS OF MITHAWAN, D. G. KHAN

Mahmood Nasir* and Mohammad Noor**

Abstract

The inhabitants of Mithawan protect family owned rangelands in summer each year by constructing loose stone walls for free grazing during winter. In October 1995, species wise cover percent, density and above ground biomass data were collected to detect vegetation differences between protected and unprotected area. Twenty 1 m^2 quadrats were studied randomly in both the areas.

The cover percent (10%) and above ground biomass (216 kg/ha) of *Chrysopogon aucheri* were higher three times in protected area than that of unprotected area, but its density remained unchanged which shows that the species is a grazing resistant. The cover percent (5%), above ground biomass (78 kg/ha) and density (3) of *Cymbopogon jawarancusa* were higher in un-protected area. The data show that *Chrysopogon aucheri* is a decreaser while *Cymbopogon jawarancusa* is an increaser under prevailing free grazing in Mithawan rangelands. The higher cover percent, above ground biomass and density of *Chrysopogon aucheri* and *Eleusine compressa* in protected area reveals that the grazed rangelands of Mithawan can be improved by providing periodic rest from grazing during growing season.

Introduction

Protection from grazing is often used to improve the vegetation of heavily grazed rangelands. Vegetation changes in the protected and grazed areas have been compared by various researchers in different ecozones. Airdried above ground biomass and vegetation cover percent in the protected area was significantly higher compared to adjacent grazed area (Khan, 1977 and Noor 1978 & 1989). Richard and Cushing (1982), Thurow *et al.* (1986), Tucker (1987) and Schulz and Leininger (1990) found that as a result of protection from grazing substantial increases in biomass, vegetation cover and density had occurred. This study was conducted to determine changes in vegetation in protected and unprotected sites located in arid ecozone, Mithawan.

Material and Methods

* Deputy Inspector General of Forests, Ministry of Environment, Islamabad

** Watershed Management Specialist, Pakistan Forest Institute, Peshawar

The Mithawan hill torrent is approximately 993 k.m^2. The Dholi pilot watershed project a component of Mithawan hill torrent was implemented on 2861 ha, in 1995. The cultivated and range area constitute 204 ha (7%) and 2657 ha (93%) respectively. The elevation varies from 600 to 1300 meters. The human and livestock population were estimated at 3400 person and 5998 animal heads. Population of sheep, goats and cattle was 2937, 2123 and 716 heads respectively. Livestock rearing is the major economic activity and it contributes more than 60% to the family income. The system of construction of lose stone walls has been developed by the local tribes after centuries of evolution.

The terrain is hilly, rugged steep and rock outcrop is common. The area is dissected by gullies and streams. The parent material consists of conglomerate, shale, sand stone and limestone. The fans and foot slopes were dissected due to lowering of base level and meandering effects of Siri nullah. The soil is course textured, have high infiltration and low water holding capacity. Agriculture depends upon the perennial flow of water from Siri nullah.

The area falls in summer precipitation zone. The mean annual rainfall is 200 mm and 45% of it occurs in the form of conventional summer shawers. The mean maximum and minimum annual temperatures are 40°C in June and 7°C in January. May and June are the hottest dry months. (FAO, 1995).

Vegetation

The relief, slope, aspect and altitude determines the vegetation of the area. The rainfall pattern favours the growth of warm season vegetation. Main species of the area are:

Trees/Shrubs

Acacia modesta, Prosopis ceneraria, Salvadora oleoides, Zizyphus mauritiana , Zizyphus nummlaria, Indigofers oblongiflia, Astragalus spp *Nepata* spp. *Grewa* spp., *Tamorix dioica* and *Stocksia* spp.

Grasses

Chrysopogon aucheri, Cymbopogon jawarancusa, Aristida depressa, Heteropogon contortus, Saccharum munja, Eleusine compressa, Cenchrus ciliaris, Hyparrhenia spp. and *Lasiurus sindicus.*

Livestock production is an important component in Mithawan. Year long free uncontrolled grazing on range lands is common in the form of sedentary and semi-nomadic grazing patterns. The inhabitants exclude the livestock from

agricultural lands and adjoining grasslands by constructing loose stone walls.

The species wise cover percent, density and above ground biomass data were collected from grazed and ungrazed area of Soharbun in October 1995, using random sampling procedure. Twenty $1m^2$ quadrats were studied in each of grazed and ungrazed area. In each quadrat, species wise cover percent and density data were collected on field data form. Each species within the quadrat was clipped with hand shear for estimating the above ground biomass. The clipped material was put in a paper sac, weighed with spring balance and green weight in gms recorded and labeled. The clipped material was sun dried and air dried weight in gms was recorded when the weight of a species remained constant for three days. Average species wise airdried above ground biomass, cover percent and density were calculated for each quadrat. The average air dried above ground biomass of a species in gms/$1m^2$ quadrat was multiplied with 10 to calculate its biomass in kg/ha (Hussain, 1968).

Results and Discussions

The vegetation cover percent, above ground biomass (kg/ha) and density were substantially higher in protected area as compared with unprotected area. The average species wise cover percent, above ground biomass in kg/ha and density of common species in both the areas are presented in Appendix 1.

Vegetation cover percent

The cover percent of *Chrysopogon aucheri* was three fold higher in the protected area when compared with unprotected area. The cover percent of *Cymbopogon jawaranncusa* was higher twice in the unprotected area than that of protected area. The cover percent of *Indigofera* did not differ in both the areas. The cover percent of *Eleusine compressa* was appreciably more in the protected area as compared with unprotected areas.

The lower cover percent of *Chrysopogon aucheri* and *Eleusine compressa* in the grazed area shows that these species are preferred by the livestock over *Cymbopogon jawaruncusa* and *Indigofera* spp.

Biomass

The biomass of *Chrysopogon aucheri* increased manyfold in the protected area than that of area open to grazing. The biomass of *Cymbopogon jawaroncusa* in unprotected and protected area was 78 kg/ha and 40 kg/ha,

respectively. The above ground biomass of *Eleusine compressa* in the protected area was 48 kg/ha and 19 kg/ha in unprotected area. Similarly the above ground biomass of *Indigofera* spp. was not appreciably different in both the areas. Non difference of the above ground biomass of *Indigofera* spp. and *Cymbopogon jawarancusa* between the unprotected and protected area indicates than these two spp. are less preferred by the livestock.

Density

The density of *Chrysopogon aucheri* and *Cymbopogon jawarancusa* remained unchanged in both unprotected and protected areas. The density of *Eleusine compressa* was substantially high in the protected area than that of grazed area and is attributed to the runner growth form of the species. The density of *Indigofera* remained identical in both the areas.

The results of this study area consistent with other studies on the subject in different parts of the world. These studies showed that livestock exclusion increase the vegetation cover percent, above ground biomass, density of palatable species and is a cost effective method of improving grazed degraded rangelands (Khan, 1977; Noor, 1978, 1989, Thurow *et at.,* 1986' Tucker, 1987 and Schulz and Leiniuger, 1990).

Conclusion

Protection from livestock grazing during active growing season enhanced the cover percent, above ground biomass and density of palatable species. The non appreciable difference in density of *Chrysopogon aucheri* and *Eleusine compressa* in protected area shows that the species diversity and the productivity of arid rangelands of Mithawan can be increased manifold without artificial reseeding by affording livestock grazing during growing season. It is emphasized that this range improvement practice shall be extended to the community rangelands of Mithawan to bring these areas to their full potential, boost watershed value, increase livestock production and decrease tend of flooding.

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Appendix 1. Average cover percent, above ground biomass (kg/ha) and density of common species in Mithawan, October 1995.

Species	Unprotected area			Protected area		
	Cover %	Biomass (kg/ha)	Density	Cover %	Biomass (kg/ha)	Density
Chrysopogon aucheri	3.3	50	2.4	10.0	216	3.5
Eleusine compressa	3.3	19	2.5	2.3	48	4.0
Cymbopogon jawarancusa	5	78	3.0	2.6	53	3.0
Tetrapogon villosus	0.3	4	1.0	1.5	9	3.0
Heteropogon contortus	0.3	9	0.6	0.8	12	0.5
Indigofera oblongifolia	0.5	94	1.0	3.8	109	1.0
Grewia spp.	2.5	–	–	2.5	13	0.4
Nepata spp.	7.6	40	2.5	2.3	16	1.0