

VEGETATION TYPES IN THE HABITAT OF MARKHOR IN HAZARGANJI/CHILTAN AND TAKATU HILL, BALUCHISTAN

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ABSTRACT

The vegetation of Hazarganji - Chiltan and Takatu Hill were studied in November, 1989 by Quadrat method. Three plant communities were recognized, namely *Juniperus macropoda* - *Ephedra nebrodensis* - *Daphne oleoides* community, *Sophora griffithii* - *Artimisia maritima* community *Juniperus macropoda* - *Perovskia abrotanoides* community.

First two communities were found the best for food and shelter of Markhor - Hazarganji and Chiltan in summer and winter seasons. The third community was found in the habitat of markhor in Takatu hills, which needed protection against biotic interference. On the basis of this investigation, Takatu hill is recommended as a new national park for the province.

INTRODUCTION

The Hazarganji - Chiltan National Park lies at a distance of 15 km from Quetta, on Quetta - Karachi Highway. It covers an area of 13,166 ha. Work on the establishment of the park was started in 1978 and was continued upto June 1987. It was declared a National Park in 1980. Fencing was done on its 30 km long boundary and 46 km jeepable roads were constructed in the Park.

Maximum temperature in summer is 40°C, while minimum temperature falls down to 12°C. In addition to Chiltan Markhor (*Capra falconeri chiltanensis*), Jackal (*Canis aureus*), Sessiee (*Ammoperdix graseo galaris*), Cat (*Felis cheus*),

Hare, (*Lepus nigricollis*), Porcupine (*Hystrix indica*), Chukor (*Alectoris chukar*), snakes and Afghan tortoises are found in this park.

In order to investigate the Markhor habitat, studies were carried out in Chiltan nulla, Shamtar, Kangri, Garrakh, Wastangai, Duzchor, Zawar Khan, Tut Band, Razo and Hazarganji nullahs to investigate vegetation types in them.

MATERIAL AND METHOD

For the study of vegetation, 35 quadrats (relevés) were laid out in comparatively homogeneous sites within the Park. Observations of vegetation like coverage abundance, dominance, density, life forms and phenological approaches were noted. The size of the sample plot was 100 m². The vegetation data was recorded and analyzed after the method of Braun - Blanquet (1965) and the community tables prepared according to the preferential constant dominant species method of Cetik (1971). Nomenclature of the plants was after Stewart (1972).

DISCUSSION

Kangri nulla, Shamstar and Doschor, are the ideal Markhor summer habitats at 2300 m - 2500 m, where the parent rock is mostly calcareous and the soil has clay loam texture. The grasses form the dominant community. Their presence ranges from 60 - 80%. Some condominant species, which are consistently present are *Juniperus macropoda*, *Ephedra nebrodensis*, *Daphne oleoides*, *Caragana*

ambigua, *Ferula kastata*. Other associates are *Pistacia khinjuk*, *Fraxinus xanthoxyloides*, *Plectranthus rugosus*, *Polygonum sp.* *Teucrium stocksianum*, *Scabiosa cana*.

At Chiltan side, *Rumex hastatus* is one of the constant dominant species on the moist sites along the sides of the nulla beds. It is also one of the best palatable species for the animal. Sporadic growth of *Pistacia khinjuk* and *Fraxinus xanthoxyloides* needs improvement in both Danani and Tut nullahs. This side needs attention because it forms a good habitat for the animal, and improvement of vegetation is necessary for shelter. The habitat can be improved in the *Artimisia maritima* community, because the soil is deep with sandy clay loam texture.

In Takatu mountains, the habitat of the animal was studied. The vegetation community consists of *Artimisia maritima*, *Cymbopogon jwarancusa* and *Ephedra nebrodensis*. The community occurs near Zawar Khan at an elevation of 2200 m. The total number of species in 100 m² plot was found to be 200 -250. Some of the common species are *Caragana ambigua*, *Berberis beluchistanica*, *Plectranthus rugosus*, *Sophora griffithii*, *Minuartia sp.* *Acantholimon polystachyum*, *Scabiosa cana*. *Ziziphora sp.* *Lallementia royleana*, *Onosma hispidum*, *Salsola kali*, *Paracyrum asperum*, *Nepeta bracteata*, *Astragalus trichocarpus*, *Agropyron cristatum*, *Silene brahuica*, *Onosma hookeri*, *Bromus japonicus*, *Cousinia onopordioides*, and *Thymus serpyllum*. Along the nulla beds, a number of species occur in abundance, *Sophora griffithii*, *Fraxinus xanthoxyloides*, *Buddlei sp.* *Prunus eburnea*, *Verbascum thapsus*, *Salvia glutinosa*, *Lactuca viiminea*, *Dianthus annulatum*, *Echinops griffithii*, *Centaurea depressa*, *Othonnopsis intermedia*, and *Perovskia abrotanoides*, *Artimisia maritima*. Different palatable grasses like *Sripa arabica*, *Eragrostis poaeoides*, *Tetrapogon*

villosus, and *Cymbopogon jwarancusa* are quite common on slopes.

Near band nulla at 2600 - 2800 m, *Juniperus macropoda* community is spread on steep slopes on calcareous rocks. In 100 m² sample plot, 14 species consisting of *Perovskia abrotanoides*, *Rosa moschata*, *Ephedra nebrodensis*, *Pistacia khinjuk*, *Caragana ambigua*, *lonicera quinquelocularis*, *Contoneaster nummularia*, *Berberis balucistanica*, *Prunus eburnea*, *Fraxinus xanthoxyloides*, *Ferula feotida*, *Mentha serpyllum*, and *Salvia cabulica* were noted. *J. macropoda* was the constant dominant species here. This site can be the best habitat, if protection from grazing and cutting of the juniper is ensured. Both palatable and shelter species are found in abundance there. The coverage and abundance values for shelter species like *J. macropoda*, *Pistacia khinjuk*, *F. xanthoxyloides*, *Daphne oleoides* range upto 80%, while the density of the dominant species range from 200-300 plants in 100 m².

CONCLUSIONS

The community of *Juniperus, macropoda - Ephedra nebrodensis* was recognized at Chiltan at 2300 - 2500 m elevation. The community was quite rich in coverage and abundance of species with large number of food and shelter plants. It was found to be the best habitat for summer.

The other community consisting of *Sophora griffithii* and *Artimisia maritima* was comprising the habitat for winter seasons. The community provides sufficient food and shelter to the animals. Some palatable species are *Fraxinus xanthoxyloides* and *Prunus eburnea*. The community includes sufficient number of palatable and shelter species for the animal in winter, when it comes down for its dwelling in the season.

The 3rd community was determined in Takatu Hills. The community though possess both shelter and food species, but as yet needs sufficient protection of the habitat. Near band nulla *Juniperus macropoda* and *Perovskia abrotanoides* has good coverage and abundance values. From the study of the vegetation it seems, that sufficient palatable species are in existence for summer and winter habitats. The site needs full protection and needs the status of a new national park.

Consequently, the present species are sufficient enough to provide food and shelter to the animal in these areas. However, improvement in vegetation for food and shelter is also necessary with the increasing number of animal populations.

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Table No.1 Winter habitat (Hazarganji)

Sophora griffithii	- Artimisia maritima			Community		
	1	5	7	Presence	Frequency %	Constancy class
Quadrat No.						
Area (m ²)	100	100	100			
Elevation (m)	1200	1600	1900			
Direction	N	S	E			
Slope (%)	50	55	60			
Parent rock	Lime stone	Lime stone	Lime stone			
Hcl reaction	++	++	++			
Vegetation coverage & abundance (%)	90	85	80			
Total No. of species	34	28	26			
<u>Ist Storey</u>						
<i>Fraxinus xanthoxyloides</i>	1	1	-	2	66	III
<u>2nd Storey</u>						
<i>Sophora griffithii</i>	2	2	2	3	100	V
<i>Artimisia maritima</i>	2	1	2	3	100	III
<i>Daphne oleoides</i>	1	2	-	2	66	III
<i>Prunus eburnea</i>	1	+	0	2	66	III
<i>Ephedra procera</i>	+	1	-	2	66	III
<u>3rd Storey</u>						
<i>Plantago ciliata</i>	+	1	-	2	66	III
<i>P. ovata</i>	+	+	-	2	66	III
<i>Orobanchae aegyptica</i>	+	-	+	2	66	III
<i>Valerianella oxyrrhyncha</i>	1	-	+	2	66	III
<i>Plectranthus rugosus</i>	+	-	+	2	66	III
<i>Prangos pabularia</i>	1	-	+	2	66	III

<i>Verbascum erianithum</i>	+	+	1	2	66	III
<i>Salvia cabulica</i>	+	-	1	2	66	III
<i>Othonnopsis intermedia</i>	+	-	1	2	66	III
<i>Bupleurum falcatum</i>	0	+	+	2	66	III
<i>Plantago ciliata</i>	+	1	-	2	66	III
<i>Teucrium stocksianum</i>	+	-	1	2	66	III
<i>Heliotropium cabulicum</i>	+	+	-	2	66	III
<i>Paracyrum purpureum</i>	0	1	+	2	66	III
<i>Nepeta bracteata</i>	+	-	1	2	66	III
<i>Ferula kastata</i>	+	1	-	2	66	III
<i>Perovskia abrotanoides</i>	0	+	1	2	66	III
<i>Descuraina sophia</i>	0	+	+	2	66	III
<i>Scabiosa cana</i>	+	+	-	2	66	III
<i>Stachys parviflora</i>	+	-	1	2	66	III
<i>Lamium amplexicaule</i>	+	+	-	2	66	III
<i>Polygala chinensis</i>	+	-	1	2	66	III
<i>Silene conoidea</i>	+	-	+	2	66	III
<i>Calendula arvensis</i>	+	-	+	2	66	III
<i>Hyoscyamus niger</i>	-	+	1	2	66	III
<i>Nepeta bracteata</i>	+	-	1	2	66	III
<i>Nonea cuspidata</i>	+	-	+	2	66	III
<i>Cynoglossum glochidiatum</i>	+	+	-	2	66	III
<i>Campanula colorata</i>	+	+	-	2	66	III
<i>Pulicaria gnaphaloides</i>	+	1	-	2	66	III
<i>Verbascum thapsus</i>	-	+	+	2	66	III
<i>Cenchrus pennisetiformis</i>	+	-	1	2	66	III
<i>Eragrostis poaoides</i>	-	1	+	2	66	III
<i>Bromus tectorum</i>	+	-	+	2	66	III
<i>Allium capitellatum</i>	-	1	+	2	66	III
<i>Hedysarum wrightianum</i>	-	+	1	2	66	III
<i>Scorzonera tuberosa</i>	-	+	+	2	66	III
<i>Echinops griffithianus</i>	+	+	-	2	66	III

Table No.2 Summer habitat.Site Hazarganji/Chiltan

<i>Juniperus macropoda</i> - <i>Ephedra nebrodensis</i> - <i>Daphne oleoides</i> Community						
Quadrat No.	8	10	11	Presence	Frequency (%)	Constanty class
Area (m ²)	100	100	100	"	"	
Elevation (m)	2300	2400	2500			
Direction	N	S	W			
Slope (%)	80	90	80			
Parent rock	Calcareous	Calcareous	Calcareous			
Hcl reaction	++	++	++			
Vegetation coverage & abundance (%)	95	90	85			
Total No.of spp.	37	37	35			
<u>Ist Storey</u>						
<i>Juniperus macropoda</i>	3	3	3	3	100	V
<i>Pistacia khinjuk</i>	2	-	-	-	30	II
<u>2nd Storey</u>						
<i>Ephedra nebrodensis</i>	3	3	3	3	100	V
<i>Daphne oleoides</i>	3	2	2	3	100	V
<i>Cotoneastar nummularia</i>	3	-	2	2	66	III
<i>Lonicera quinquelocularis</i>	2	1	-	2	66	III
<i>Caragana ambigua</i>	1	2	-	2	66	III
<i>Berberis baluchistanica</i>	2	+	-	2	66	III
<i>Jasminum humile</i>	1	+	-	2	66	III
<i>Prunus eburnea</i>	1	2	-	2	66	III
<i>Spirae brahuica</i>	1	0	2	2	66	III
<i>Artemisia maritima</i>	1	+	-	2	66	III
<u>3rd Storey</u>						
<i>Rumex hastatus</i>	1	-	+	2	66	III
<i>Thymus serpyllum</i>	1	-	+	2	66	III
<i>Salvia microsiphon</i>	+	1	-	2	66	III
<i>Nonea caspica</i>	1	-	+	2	66	III
<i>Perowskia abrotanoides</i>	1	+	-	2	66	III
<i>Hedysarum wrightianum</i>	1	+	-	2	66	III
<i>Paracyrum purpureum</i>	+	1	-	2	66	III
<i>Zataria multiflora</i>	+	-	1	2	66	III
<i>Cnaphalium lutealbum</i>	-	+	1	2	66	III
<i>Ocimum sanctum</i>	+	+	-	2	66	III
<i>Onosma hookeri</i>	+	-	1	2	66	III
<i>Stellaria kotschyana</i>	1	-	+	2	66	III

<i>Eromastachys thysiflora</i>	+	-	1	2	66	III
<i>Scorzonera virgata</i>	+	+	-	2	66	III
<i>Veronica biloba</i>	+	-	+	2	66	III
<i>Onobrychis tarriafolia</i>	+	1	-	2	66	III
<i>Minuartia sp.</i>	-	+	+	2	66	III
<i>Plectranthus rugosus</i>	+	1	-	2	66	III
<i>Amaranthus hybridus</i>	-	1	+	2	66	III
<i>Astragalus trichocarpus</i>	1	+	-	2	66	III
<i>Teucrium stocksianum</i>	-	+	1	2	66	III
<i>Lepidium draba</i>	1	-	+	2	66	III
<i>Centaurea iberica</i>	-	+	+	2	66	III
<i>Phlomis stewartii</i>	1	-	+	2	66	III
<i>Aquilegia vulgaris</i>	-	+	1	2	66	III
<i>Acantholimon stocksii</i>	-	1	+	2	66	III
<i>Gaillonia eriantha</i>	-	+	+	2	66	III
<i>Achillea santolina</i>	-	1	+	2	66	III
<i>Saccharum griffithii</i>	-	+	1	2	66	III
<i>Mentha serpyllum</i>	+	-	+	2	66	III
<i>Dianthus annulatum</i>	-	+	1	2	66	III
<i>Buplerum falcata</i>	1	-	+	2	66	III
<i>Ferula ovina</i>	-	+	1	2	66	III
<i>Prangos pabularia</i>	1	+	-	2	66	III
<i>Pulicaria gnaphaloidea</i>	-	+	+	2	66	III
<i>Polygala chinensis</i>	1	-	+	2	66	III
<i>Lactuca serriola</i>	-	+	+	2	66	III
<i>Calendula arvensis</i>	+	-	1	2	66	III
<i>Poa bulbosa</i>	+	1	-	2	66	III
<i>Bromus japonicus</i>	-	1	+	2	66	III
<i>Melica persica</i>	-	+	1	2	66	III
<i>Acantholimon munroanum</i>	-	+	1	2	66	III

Table No.3 Habitat Takatu Hils and Band Nallah

<i>Juniperus macropoda</i> - <i>Perovskia abrotanoides</i> Community						
Qudrat No.	15	18	20	Presence	Frequency %	Constancy class
Area (m ²)	100	100	100			
Elevation (m)	2600	2700	2800			
Direction	N	S	E			
Slope %	70	80	90			
Parent rock	Calcareous	Calcareous	Calcareous			
Hcl reaction	++	++	++			
Vegetation coverage & abundance (%)	80	75	75			
Total No.of spp.	36	25	20			
<u>Ist Storey</u>						
<i>Juniperus macropoda</i>	3	2	2	3	100	V
<i>Pistacia Khinjuk</i>	1	-	1	2	60	III
<i>Fraxinus xanthoxyloides</i>	1	+	1	3	100	III
<u>2nd Storey</u>						
<i>Perovskia abrotanoides</i>	2	3	1	3	100	V
<i>Ephedra nebrodensis</i>	1	+	-	2	66	III
<i>Artimista maritima</i>	1	+	-	2	66	III
<i>Cargana ambigua</i>	+	1	-	2	66	III
<i>Rosa moschata</i>	1	+	-	2	66	III
<i>Lonicera quinquelocularis</i>	+	1	-	2	66	III
<i>Prunus eburnea</i>	+	+	-	2	66	III
<i>Cotoneaster nummularia</i>	1	+	-	2	66	III
<i>Berberis balochistanica</i>	+	-	1	2	66	III
<u>3rd Storey</u>						
<i>Salvia glutinosa</i>	+	1	-	2	66	III
<i>Centaurea depressa</i>	-	1	+	2	66	III
<i>Dianthus annulatum</i>	+	-	1	2	66	III
<i>Othonnopsis intermedia</i>	+	1	-	2	66	III
<i>Verbascum thapsus</i>	+	-	+	2	66	III
<i>Lactuca viminea</i>	+	+	-	2	66	III
<i>Echinops griffithii</i>	1	+	-	2	66	III
<i>Mentha serpyllum</i>	+	1	-	2	66	III
<i>Ferula foetida</i>	+	-	1	2	66	III
<i>Eragrostis poaeoides</i>	+	-	1	2	66	III
<i>Tetrapogon villosus</i>	+	-	1	2	66	III
<i>Onosma hispidum</i>	+	+	-	2	66	III

<i>Plectranthus rugosus</i>	-	1	+	2	66	III
<i>Acantholimon polystachyum</i>	+	1	-	2	66	III
<i>Scabiosacana</i>	+	-	1	2	66	III
<i>Agropyron cristatum</i>	+	-	1	2	66	III
<i>Silene brahuica</i>	1	+	-	2	66	III
<i>Lallementia royleana</i>	+	-	+	2	66	III
<i>Cousinia onoporoides</i>	+	+	-	2	66	III
<i>Salsola kali</i>	+	+	-	2	66	III
<i>Bromus japonicus</i>	1	-	+	2	66	III
<i>Astragalus trichocarpus</i>	+	-	1	2	66	III
<i>Ziziphora tenuior</i>	+	+	-	2	66	III
<i>Verbascum erianthum</i>	+	-	+	2	66	III
<i>Eremurus aucherianum</i>	-	+	1	2	66	III
<i>Stipa pennata</i>	1	-	+	2	66	III
<i>Melica persica</i>	+	+	-	2	66	III

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