



POPULATION DISTRIBUTION OF *CAPRA FALCONERI* (MARKHOR) IN JUTIAL VALLEY OF DISTRICT GILGIT, GILGIT-BALTISTAN

Muhammad Akbar^{1&2}, Mayoor Khan¹, Faisal Hussain³, Syed Naeem Abbas⁴, Ghulam Raza⁵ and Muhammad Ali⁶

¹Wildlife Conservation Society, Gilgit-Balitsitan, Pakistan

²Department of Botany University of Baltistan Skardu, Gilgit-Balitsitan, Pakistan

³Department of Botany, Ghazi University Dera Gahzi Khan

⁴Forest, Parks, Wildlife and Environment Department Gilgit-Baltistan, Pakistan

⁵Department of Natural Resource Management, Gilgit-Balitsitan, Pakistan

⁶Department of Zoology, University of Baltistan, Pakistan

Abstract

This study was carried out to investigate population, distribution and conservation status of *Capra falconeri* (Markhor), in the Jutial valley of District Gilgit, Gilgit-Baltistan. Despite scarcity of natural vegetation and extreme climate, estimated population and distribution of Markhor was not different from this valley. Illegal hunting and poaching, removals of natural vegetation for fodder, firewood and over grazing of pastures by livestock are major reducing factors of Markhor in this valley. Several surveys using direct and indirect counting methods were held in 65 potential habitats during December, 2015 and questionnaire based interviews were held with local hunters and herders. Results revealed that a total of 65 Markhors were observed with the composition of yearling, females and males. The study also showed that population of trophy animals size were identified in the potential areas of Jutial valley has increased considerably whereas that of non-trophy animals have fallen down to the verge of local extinction. The increases are attributed to overwhelming success of community base conservation program, initiated by WWF, WCS and GB Forest & Wildlife department. Efforts to maintain balance between conservation needs of the wild resource and development needs of the dependent communities is required for sustainable management.

Introduction

Gilgit-Balitsitan (GB) lying at the confluence of world's three larger mountain ranges *viz.*, Hindu Kush, Karakoram, and Himalayas (HKH), is endowed with a variety of species, habitats and ecosystems (ICIMOD, 2010; Khan, 2011; Shaheen & Shinwari, 2012). The region has significant populations of several globally important wildlife species including 54 mammal, 230 bird, 23 reptile, 20 cold-water fish and 6 amphibian species (GoP/IUCN, 2002). Huge mountains with snow covered peaks, ravines, valleys and streams with dry alpine scrub vegetation represent a predominantly cold arid and montane climate. It is one of the most important hubs of biological diversity in Pakistan with some of the species being endemic, endangered and globally significant. Jutial valley is situated at upper bank of Gilgit at distance of 2 km from the Gilgit town having an area 40 sq km. The valley is also enriched with the wildlife resources some of the rare wildlife species are found in this valley in ample quantity such as Ibex (*Capra ibex*



sibirica), Snow Leopard (*Uncia uncia*), Markhor (*Capra falconari falconari*), Foxes (*Vulpus vulpus*), Wolf (*Canus lupus*), Musk deer (*Moschus moschiferous*), Chukor (*Alectoris chukar*), Ram Chukor (*Tetra gallus Himalayanses*) and Vultures (*Coragyps atratus*). This valley is bestowed by vegetation with a variety of natural flora which includes the pine forest, medicinal Plants, herbs, shrubs and aromatic plants which are the great source of food and shelter for the Wildlife and also used by the human being for domestic purpose. The medicinal plants found in the valley are widely used in the homeopathic medicines (Rasheed, 2007; Schaller, 2007; Khan *et al.*, 2014a, b).

C. falconeri belongs to the *Carpinae* group of the *Bovidae* family (Schaller, 1977; Roberts, 1977). Five sub-species are reported from Pakistan, and almost all are categorized as “Endangered” (IUCN, 2008). Markhor, recognized as the Flare Horned Markhor, is confined to upper catchments of Indus River and its tributaries in Gilgit-Baltistan (Hess *et al.*, 1997). Like other subspecies of *Caprinae*. Markhor is still threatened for its genetic isolation, specialized habitat requirements, low reproductivity, habitat fragmentation, food competition and excessive hunting (Schakleton, 1997). Markhors are generally found in steppic mountain conditions and where rainfall is low and erratic, and are found between 600-3,600 meter altitudinal ranges (Roberts, 1977). Large mammals, wild and domestic herbivores have been coexisting in Asia’s high mountains since long, which has been destabilized by the ever increasing ecological imbalances between the mountain vegetation and dependent herbivores. Excessive removal of natural vegetation for grazing and domestic energy by ever increasing numbers of human and animal heads have led to widespread degradation of fragile alpine and subalpine pastures, which consequently has threatened the survival of the region’s most threatened wildlife species, their habitats and the mountain ecosystem (Fox *et al.*, 1994 & Jackson *et al.*, 1996). The main objective of study were to; a) assess the population of Markhor in Jutial, b) asses the population trend, age sex, trophy size animals, c) conduct wildlife and habitat assessment surveys, d) assess the record keeping, data collection, handling of field equipments for the study of Markhor, e) collect the socio-economic data for revision of the conservation plan.

Materials & Methods

Site Description

General surveillance was carried out with the help of local peoples/hunters in potential habitats of the Markhor in Jutial valley. During the survey, all visible surrounding areas were scanned carefully for direct observations of the animals, as well their signs of presence *i.e.*, fecal pellets and hair. Based on general surveillance findings, the vantage points were marked for further detail study (Table 1).



Population Estimation

For estimating population, the vantage point method was applied proposed by Shackleton, (2001), the most appropriate method to count wild ungulates in the rugged mountainous habitats. Vantage points (n=5) were selected at such places from where a clear and unobstructed view of the maximum area could be made without detection by the animals. The best time for observation of Markhor is usually 7 to 9 a.m. and 3 to 5 p.m. (Ayaz *et al.*, 2012).

Age/Sex distribution and Identification

All the animals in different herds, observed during scanning, were counted with the help of binoculars (Nikon BM20682, 8-24x25) and spotting scope (Nikon, 20x60). Efforts were made to classify the each observed animal as female, young, yearling and male. Males were further classified by size, using horn length as an indicator of age, as class I (1-3 years old), class II (3-4 years old), class III (5-6 years old) and class IV (>6 years old) as proposed and defined by Schaller and Mirza, (1974) and was also adopted by Awan, (1998). Photographs were taken by using digital camera (Nikkor 36X, 12.1 megapixels). Visual scan based counting of individuals was considered as the exact minimum population of the Markhor at different localities in the area. Besides, direct sighting of animals, information on population and conservation status of Markhor was also collected from local hunters, shepherds and other knowledgeable peoples, using semi structured questionnaires. During present survey, selected vantage point method to assess the population of target species was determined.

Table 1. Description of vantage point of Jutial wildlife potential sites.

Vantage Point	Area observed	Direction of Slop/Aspect	Estimated ariel Distance	Equipment used during survey
Chan Char	Rakhoni Tik	60-80% North	2km	Binocular
Shakoor Ali Camp	Chan Chan Daar	60-80% East	1.2 Km	Sporting scope
Wali Khoni Dar	Daari	60-80% South	2.5 Km	Digital camera
Shokoor Ali Camp	Chan Chan Khor	60-80% North	2 Km	Sporting scope
Plantation Area	Shaye Daar	60-80% East	2 Km	Sporting scope
Helipad area	Bhgno Kho	-----	-----	Binocular
Shakoor Ali Camp	Choki Daar	60-80% East	-----	Binocular
Shakoor Ali Camp	Narkhor Daar	60-80% East	-----	Digital camera
Toch Harayie	Chan Chan Tok	-----	-----	Digital camera
Majeed Dokori	Chani Khor	-----	-----	Binocular



Results

Status of Markhor

Jutial valley is a rugged mountainous area provides suitable climatic conditions and habitat especially for Flare-horned Markhor. The results of the survey clearly showed that climatic factor affect the distribution of Markhor, cloudy weather reduced their visibility. During winter a total of 65 Markhors were observed including 19 yearling, 33 females and 13 males including 3 trophy size animals were identified in the potential areas of Jutial valley (Table 2).

Table 2. Distribution of Markhor according to age/sex in Jutial valley with Mean±SE.

Places	Kids	Yearlings	Female	Male Class-I	Male Class-II	Male Class-III	Mean±SE
Shasher	0	1	1	0	0	0	0.33±0.21
Shakoor Ali Camp	0	2	2	0	0	0	0.67±0.42
Aowali Khoni	0	2	2	2	1	0	1.17±0.40
Shan Khor	0	2	3	2	1	0	1.33±0.49
Shai Daray	0	2	2	0	1	0	0.83±0.40
Helipad area	0	2	8	0	0	1	1.83±1.28
Choki Dar	0	2	4	0	1	1	1.33±0.61
Naro Khur Ddar	0	4	5	0	0	0	1.50±0.96
Tochi Harai	0	2	4	0	1	1	1.60±0.68
Majeed Dokori	0	0	2	1	0	0	0.50±0.34

Population size and trend of Markhor

A total 65 animals were sighted in the entire survey; all of them could be classified as Kids (n=0, 0%), Yearling (n=19, 29%), females (n=33, 50%), males class-I (n=5, 8%), class-II (n=5, 8%), class-III (n=3, 5%), out of total population recorded during the survey (Fig. 1).

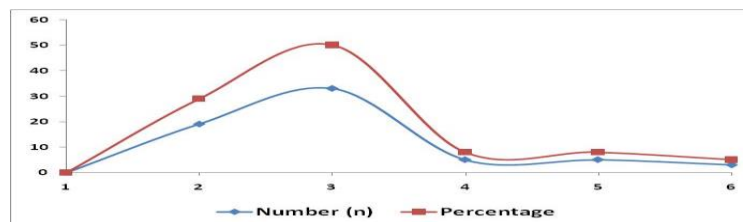


Figure 1. Showing the number & percentages of Markhor in Jutial Valley.

(Axis X: 1= Kids, 2= Yearling, 3=Female, 4= Male Class-I, 5= Male Class-II and 6= Male Class-III)& Axis Y: Population size)



Besides field survey, it is also observed from the potential informants *i.e.* hunters, shepherds, and wood cutters/collectors about various aspects of the population of the target species. The community perception about Markhor population trend over 20 years a gradual increase (more than 50%) with the passage of time (Fig. 2). The community considered that population has increased as a result of ban on illegal hunting by the relevant authority and regular monitoring by Wildlife in collaboration with several conservation agencies.

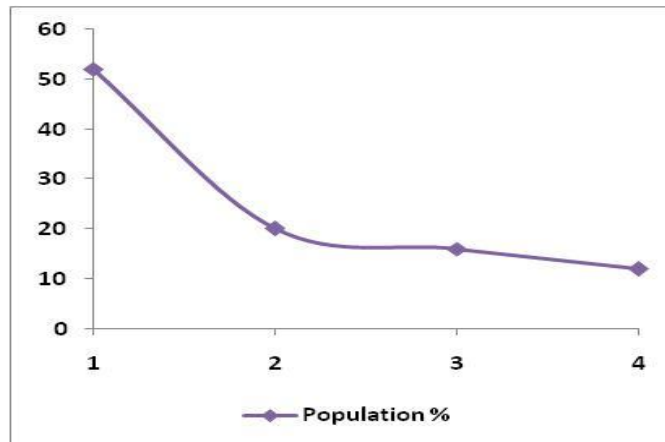


Figure 2. Population trend of Markhor in Jutial valley.

(Axis X: 1=Current population, 2= 5 years ago, 3= 10 years ago and 4= 20 years ago; Axis 2: population %)

Discussion

The wildlife in the region of Gilgit-Baltistan (GB) especially in Jutial valley of mountains above forest zone is surprisingly rich and diverse, with some being endangered and endemic to the region. The study revealed that population and distribution of Markhor varies from place to place, ecological behavior, habitat conditions, food availability, prevailing pressures and conservation measures. The estimated mature individuals of markhor at global level is < 2,500 and the population trend of markhor is “Decreasing” (Valdez, 2008). Stevens *et al.* (2011) recorded the mean group size of markhor in the range of $1.5 \pm SD 0.71$ in eastern forests of Afghanistan.

Hess *et al.*, (1997), Schakleton (1997), Khan (2011) and Khan *et al.*, (2014) reported that populations Markhor outside the protected areas are still negatively influenced by illegal hunting, habitat degradation, slow reproductively and genetic isolation. But an apparent increase in number of trophy size animals might be due to high economic value of the species for local communities even if excessive exploitation is the original cause of the specie’s decline (Lindsey *et al.*, 2007 & Roberts, 1988). However lower female to kid ratio is probably due to higher



mortality and predation on younger crop (Haller, 1992) and may also be due to low reproduction and over harvest of productive males for trophies inside communities management and conservation area (Loveridge, 2006; Khan, 2011 & Khan *et al.*, 2014). IUCN, (2000) reported that habitat loss leads to the extinction of Markhor. Similarly, Shackleton, (2001) stated that the wild lands are shrinking rapidly due to increase in population and their subsequent increased demand for firewood and timber. Ali, (2008) reported that unsustainable use of natural resources by the people lining in and around those areas due to limited livelihood opportunities have led to the depletion of habitat of wildlife and resultantly markhor population is declining in many areas. Habitat loss (Schackleton, 2001; IUCN, 2000 & Arshad *et al.*, 2012) due to anthropogenic pressure owing to the limited livelihood options (Ali, 2008), poaching (Woodford *et al.*, 2004 & Bhatnagar *et al.*, 2009), uncontrolled hunting (Johnson, 1998 & Arshad *et al.*, 2012) and livestock competition for forage (GoNWFP and IUCN, 2004; Woodford, *et al.*, 2004 & Arshad *et al.*, 2012) are the major causes of depletion of this precious resource.

This paper enlightens the importance of suitability of habitat and the disturbance of Markhor population due to human interference however; more comprehensive research study is required to assess the Markhor population status, distribution and other ecological parameters to establish a proper management system.

Conclusions

From the study it might be concluded that the young ones are more affected than the adults in markhor population structure however it varies non-significantly from place to place. The study also demonstrated that the number of non-trophy animals has decreased to the brink of local extinction, the population of trophy animals, which were identified in the prospective areas of Jutial Valley, has expanded significantly.

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