INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print), 2222-5234 (Online)
http://www.innspub.net
Vol. 20, No. 5, p. 87-94, 2022

RESEARCH PAPER OPEN ACCESS

The Status of the Endemic Chiltan (Wild Goat) Markhor in Hazarganji Chiltan National Park, and Identification of Negative Incentives and Proposing Positive Needed Actions

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Key words: Balochistan, Endemic species, Markhor, Hazarganji Chiltan national park.

http://dx.doi.org/10.12692/ijb/20.5.87-94 Article published on May 24, 2022

Abstract

This research primarily aimed to investigate the population status, population pattern growth, exploration of negative factors that resists their population and establishment of positive actions for maintenance of Chiltan Markhor in Hazarganji Chiltan National Park. Data was collected directly from the local community, wildlife department and from the Forest Department officials through occasional meetings and surveys. Result showed that the population of Markhor was found to be increasing from 1975 till 2008 and then their population density declined drastically making in consideration number of anthropogenic and environmental factors such as drought, climatic factors, food unavailability and rise in hunting. Thus, it is recommended that continuous surveys conduction, taxonomic status determination of flora and fauna of the park, implication of wildlife legislatives against overhunting, proper vaccinations, determination of species distribution and habitats hotspots through GIS database and analysis of proper genetic makeup for crossing with domestic goats are necessary from zoological point of view in order to restore the Markhor population in the park and round about territories.

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Introduction

Balochistan, the largest province of Pakistan having an area of 350,000 sq. km have the smallest number of inhabitants about 0.7 million in the country. It lies between 24°32'N and 60°70'E. Having a coastline of nearly 770 km long. The province has high mountains which reach an elevation of above 2,300 m and valleys that are around 1,500 m above sea level (Bazai and Panezai, 2020). The Sulaiman range, the Toba-Kakar-Kakar Khurasan range, and the Central Brahui range are the major high mountains of the province. The Khirthar range, Pab range, Chagai and Raskoh hills, Siahan range, Central Makran Coastal range, and Makran coast range are included in the low mountains. Sizeable sandy plains are also found in Chagai and Kharan districts. River plains are narrow and limited. Tidal plains are found particularly at Ras Malaan, Ormara, Pasni, Gwadar and Jiwani. The Forest areas are located in Ziarat, Harboi, Qila, Saifullah and Zhob districts. The province is very important due to the prevalence of mammalian species found in the mountains and desert areas. 2 national parks and 1 wildlife sanctuary and 8 game reserves have been established in the province for the preservation of wildlife species (Khan & Siddique, 2009).

The province has juniper forests (*Juniperus excelsa)* covering nearly an area of 140,000 hectares. The province is also blessed with some of the world's finest wetland habitats that attract a variety of water birds such as geese, ducks, cranes, herons, and several species of waders. There are four species of threatened mammals in Balochistan; two are Critically Endangered – the Balochistan Black Bear (Ursus thibetanus) and the Chiltan Markhor (Capra aegagrus chialtanensis). Two species are Endangered – the Straight Horned Markhor (Capra falconeri jerdoni) and the Urial (Ovis vigeni) (Khan and Siddiqui, 2011). Hazarganji Chiltan National Park, located nearly 20 Km in southwest of Quetta (Balochistan province), is mainly a home for Chiltan Markhor (Chiltan Wild Goat). Markhors live in mountainous terrain, and are found between an elevation of 600 and 3,600 m range. They usually occupy scrub forests primarily the Oaks (Quercus ilex), Pines (Pinus gerardiana), and Juniper forest (Juniperus excelsa polycarpos). They are diurnal animals that are generally active during the early morning and late afternoon. They are characterized by a seasonal shift in their diets, such as in the spring and summers, they depend on grazing, but in winters, they turn to browse, sometimes standing on their hind legs to reach high branches (Afsar and Bano, 2013). Winter is the season where their mating takes place, during which the males fight each other by lunging, locking horns and attempting to push each other off balance. The gestation period lasts 135–170 days and usually results in the birth of one or two kids, though rarely three. Living in flocks is a major characteristic of Markhors. Markhor population comprises adult females and kids, with adult females making up to 32% of the total population and kids making up 31%. Adult males comprise nearly 19% (Kakakhel, 2020). From the perspective of the Persian language, the name "Markhor" is referred to "Snake Eater". It is scientifically approved that Markhors do not eat snakes at all and they belong to the herbivorous community of ungulates. Most probably, the name is a corruption of Pushto words Mar (Snake) and Shkur (Horn), i.e., the animal with twisted horns that resembles a snake shape. In terms of taxonomy and population, the status of the Chiltan Markhor, has always been questioned by researchers, wildlife lovers and other interest groups. Due to the lack of scientific data in this regard, this study/research is, therefore, mostly and manifestly based on literature review, field visits, discussions with stakeholder communities (mostly females), direct and indirect interaction with the Park Management and other Wildlife experts. Markhor is endemic in Pakistan and it is currently recorded as one of the critically endangered species in the IUCN Red Databook. Markhor, also known as the Chiltan Goat, was limited to four or five populations around Quetta, the main one being on the Chiltan range in the early 1970s. Schaller and Mirza (1971) reported 107 Markhors population (Sherani, 2020). By 1975, the population was estimated to be approximately 200 Schaller and Mirza. In 1980 the

Hazar Ganji National Park was established and strict protection for the first decade enabled them to increase to the number of nearly 480 by 1990, which grew to 800 in 1997 (Roberts, 1998). Markhor is listed among the Protected species of mammals in Balochistan, animals that shall not be hunted, killed, or captured according to Schedule III Balochistan Wildlife (Protection Preservation, Conservation and Management) Act 1974 (Ghalib *et al.,* 2007). Apart from other genetic characteristics, one of the identification classes for different sub-species of Markhor is the horn shape (T. J. Roberts), several species are recognized, but even this can vary greatly even within the same population confined to one mountain range; Hazareganji Chiltan National Park in Pakistan (Balochistan) could be considered an example where horn configuration, within the same Markhor (wild goat) population within the same ecological Zone, offers numerous different shapes. The figure 01 shows the shape variation of horns in different Markhor sub-species. And figure 02 & 03 showing male and female Chiltan Markhor.

Materials and methods

Study area

The Hazarganji-Chiltan national park is among the 25 declared national parks of Pakistan, which falls under the IUCN Category V (Protected Landscape) established in 1980, covering a total area of 27,421 hectares and it includes the Hazarganji State Forest and the Chiltan Protected Forest. It lies between 290 59'-300 07'N, 660 24'-660 54'E in the Balochistan Province and lies on an average of 20 Km from the provincial capital, Quetta. The area is characterized by a mountainous and rocky precipitous slope which is divided by valleys, gullies, and deep ravines (Ghalib, Jabbar & Zahra, 2007). Table 01 shows the details of the national park under study. The park was established in the year 1980 in order to guard the Chiltan Markhor habitat and also to provide entertaining and educational facilities to the people.The National Park occupies areas in the districts of Quetta and Mastung measuring 27,421 hectares of total land. The elevation of the park ranges from 5,500 feet near the gate on Quetta-Karachi National Highway to 10,850 feet (at the summit of Chiltan Peak). The species is endemic to the Hazarganji Chiltan National Park by virtue of its ecological distribution; it is not found anywhere else except in the study area. The land is rugged and mountainous with precipitous slopes divided by deep ravines, gullies and valleys, thus providing suitable environmental conditions for Chiltan (White Goat) Markhor,

Study design

Field surveys were conducted on the departments which have direct charge of the Hazarganji national park, such as the forestry department, agriculture department, wildlife department and EPA Balochistan. Secondary data was collected and then refined to show a precise and related data finding.

Results and discussion

The species is very rare in Balochistan now, but still, many people do hunting (Ali *et al*., 2015) for prize and trophy earning purposes as it is the rarest animal, so it has great importance in the hunter's community.

Table 1. National parks of Balochistan.

Name	District	Location/ Area	Area	Founded to protect
Hazarganji-Chiltan	Quetta and Mastung	29°59'N 66°24'E	27,421 ha	Chiltan Markhor
Hingol	Lasbela, Gwadar and Awaran	25°30'N 65°30'E	619,043 ha	Marine, estuarine and terrestrial fauna (marsh crocodile, green turtle, masher fish, Sindh ibex, pangolin and leopard)

According to the research findings, from 1975 to 2008, the Markhor community increased in the mountains of Chiltan from 1975 till 1998, but it was not very late in 2008 when due to prize hunting and overpopulation of the human community and several climatic factors (droughts) had altered their growth and their population started to decrease from that point on until the government has to recognize the

Hazarganji as a national park in order to preserve the remaining population of Markhor. Several surveys were done for this research work to collect and draft a data related to specifically Hazarganji Chiltan National Park Chiltan Wild Goat.

Table 2. Estimated Tribal composition of villages in the Custodian Community of Hazarganji Chiltan National Park.

S.no	Village	Tribe	Population %
1	Muhammad Hassani	Muhammad Hassani	90
		Pirkani	10
2	Pindrani	Raisani	100
3	Ziarat	Rakhshani	70
		Mengal	10
		Muhammad Shahi	5
		Raisani	5
		Haroni	5
		Muhammad Hassani	5
4	Shahdini	Samalani	90
		Bangulzai	10
5	Mirani	Raisani	100
6	Bisham	Samalani	60
		Muhammad Shahi	20
		Sheikh Haroni	15
		Raisani	5
7	Umarabad	Sumalani	100
8	Mian Ghundi	Shahwani	100
9	Hazarganji	Sumalani	90
		Jattak	10
10	Kanak	Raisani	100

Table 3. Number of Households and estimated age/sex composition of villages in the Custodian Community of Hazarganji Chiltan National Park.

S.No.	Village	Compound*	Age/Sex composition of villages			
			Males	Females	Children	Total
1	Muhammad Hassani	40	150	145	180	475
2	Pindrani	40	95	85	120	300
3	Ziarat	60	205	220	175	600
4	Shahdini	100	268	370	832	1470
5	Mirani	50	170	132	298	600
6	Bisham	400	1268	1211	1421	3900
7	Umarabad	40	215	175	110	500
8	Mian Ghundi	30	100	78	122	300
9	Hazarganji	35	215	185	100	500
10	Kanak	415	1395	1385	1720	4500
11	Totals	1210	4081	3986	5078	13145
12	Percentage of the total	-	31.05	30.32	38.63	100

Custodian community

Custodians play a major role in an animal's life for it to survive and flourish. According to the survey research, the custodian community of the Hazarganji Chiltan national park was found to be mainly comprised of the Brahvi-speaking population. (Table 02 & 03) shows an elaborated distribution of custodians of Hazarganji Chiltan National Park Chiltan Wild Goat comprising park.

Table 4. Number of plant species in Hazarganji Chiltan National Park, preferred by Chiltan Markhor.

S.No.	Scientific Names	Local Names	Status (Tree, Shrub, Herbs or Grasses)
1	*Ficus johannis*	Injeer	Found both in tree and bush form
2	*Fraxinus xanthoxyloides*	Shishar	Tree
3	*Juniperus excelsa polycarpos*	Hapurs	Tree
4	*Pistacia khinjuk*	Kasoar	Tree
5	*Pistacia cabulica*	Shinay	Tree
6	*Amygdalus brahuica*	Mazhmunk	Shrub
7	*Caragana ambigua*	Makhi	Shrub
8	*Cerasus rechingrii*	Chank	Shrub
9	*Cotoneaster afghanica*	Sehchob	Shrub
10	*Daphne mucronata*	Phiphal	Shrub
11	*Lonicera hypoleuca*	Adang	Shrub
12	*Spiraea brahuica*	Gringosehchob	Shrub
13	*Ferula costata*	Cheir	Herb
14	*Ferula oopoda*	Ushi	Herb
15	*Ferula ovina*	Kamha	Herb
16	*Heliotropium dasycarpum*	Sagdaru	Herb
17	*Avena sterilis*	kholambae	Grass
18	*Chrysopogon aucheri*	Kaj	Grass
19	*Chrysopogon jawarancusa*	Hawae	Grass
20	*Pennisetum orientale*	-	Grass
21	*Phacelurus speciou*s	Adin	Grass
22	*Poa bulbulosa*	Lashabae	Grass
23	*Stipa trichoides*	Gasht	Grass
24	*Tetrapogon villosus*	-	Grass

Flora of park

According to the research findings number of plant species have been found in Hazarganji Chiltan national park; table 4 shows the major species of trees, shrubs and grasses on which the Hazarganji Chiltan National Park Chiltan Wild Goat feed on for their survival and wellbeing.

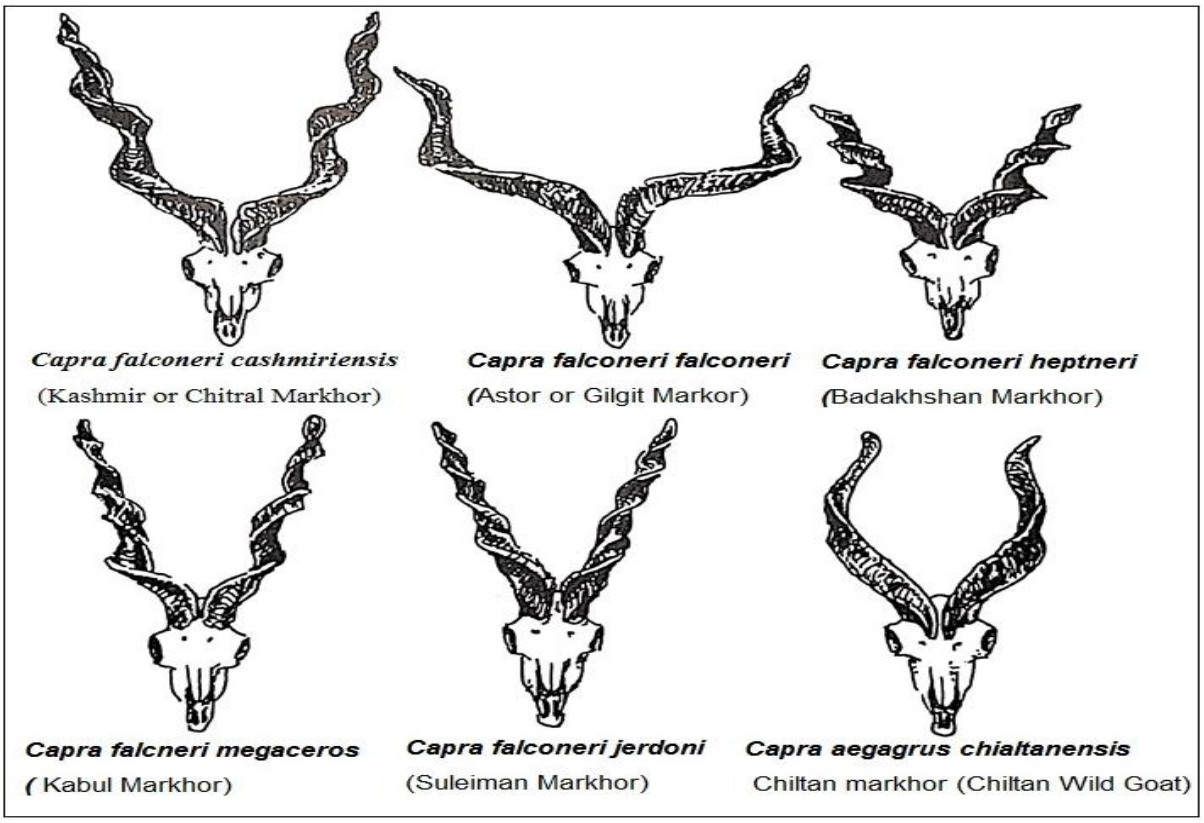

Fig. 1. Markhor sub-species Source: (Haider *et al.*, 2021) (Schaller and Khan, 1975).

Census

Hazarganji Chiltan National Park Chiltan Wild Goat population census was accessed by obtaining raw data first from different departments of the government of Balochistan and then extracting the target data from it. The female population of Markhor (Chiltan White goat) was found to be highest throughout the years of the research, as clearly indicated in Fig. 04.

Fig. 2. Showing original photographs of Male and female chiltan Markhor in Chitan mountains.

Fig. 3. Showing dominant male Chitan Markhor.

There was a gradual increase in the male population from 1996 to 1997 and then 1998, but the Markhor population dropped drastically in 2008. In Fig. 2, the total population of males and females are also listed altogether for an easy understanding of the population pattern, where the years 1996, 1997 march and 1998 show a rise in Markhor population but 1997 July and 2008 indicated with grey and blue color shows a decline rate.

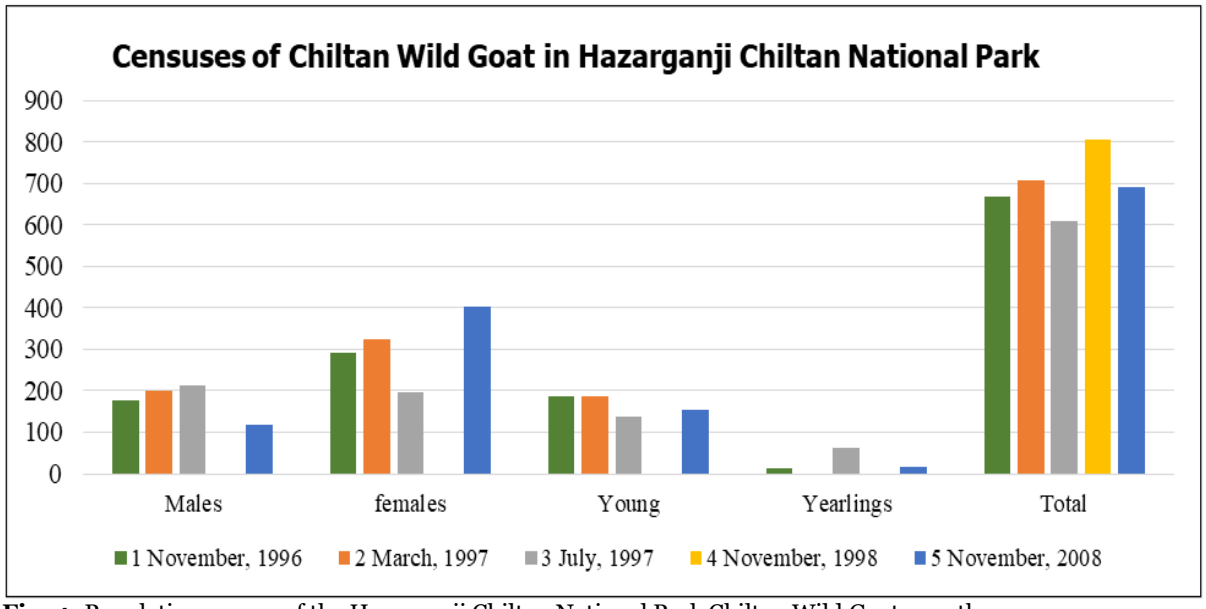

Fig. 4. Population census of the Hazarganji Chiltan National Park Chiltan Wild Goat over the years.

Fig. 04 and 05 shows the population census of Markhor in the year 2008. Each category is denoted with a different color. The bar chart clearly shows how the female population (47%, pick color) is exceeding the male population, since the males' Markhors are preferred for hunting and trophy-winning purpose (indicated by red color, 6%) and the rarest among all the categories is the male adult population (Green color, 3%) which clearly defines that male population is declining at a higher rate than being restocked, hunting along with other environmental conditions are causing this decline.

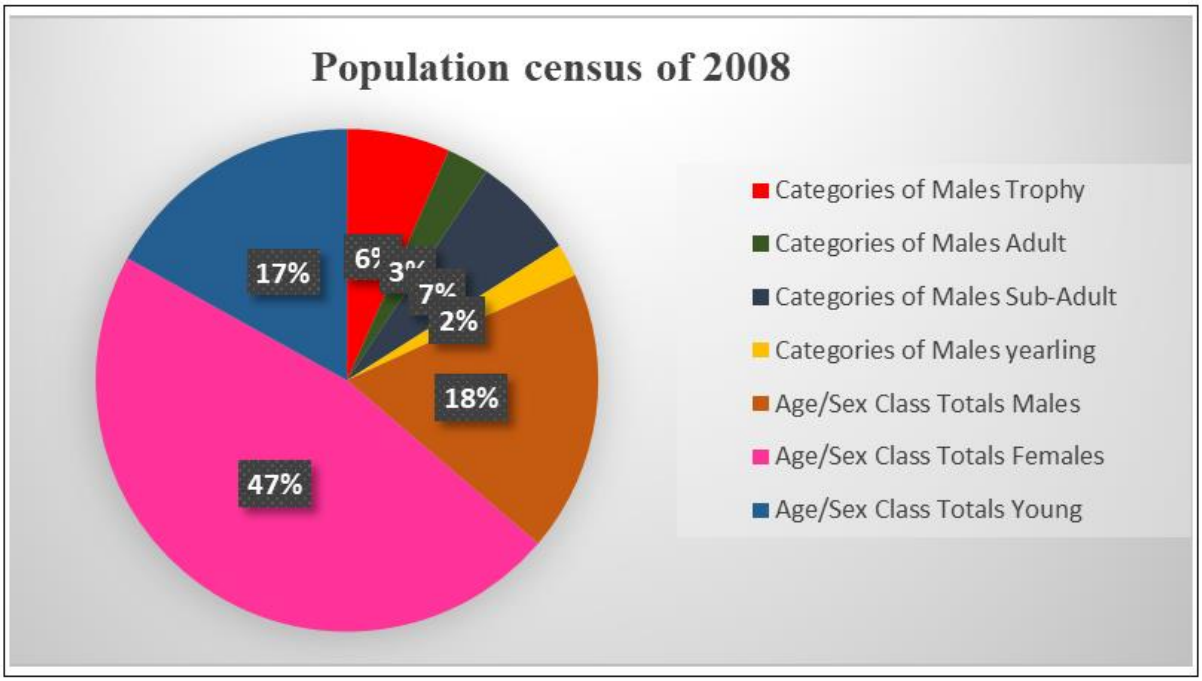

Fig. 5. Summary of the field Data from Summer Census of the Hazarganji Chiltan National Park Chiltan Wild Goat, November 2008.

Conclusion

The sudden decline in 2008 and continued decline in the population of Markhors might be due to the prevalence of drought conditions since the food availability and the shelter has always proved to be a key to the survival and production of the population, which has been demonstrated in the study area.

The high-quality habitat populates a greater number of Wild Goats while the low-quality habitat supports lower numbers of Goats because food (quality plus quantity) considered as a component of the environment greatly influences an animal's survival chance and their ability to multiply.

Recommendations

Based on findings it is recommended that Regular surveys need to be conducted to study the population trends, detailed biological studies (taxonomical checklist) of flora and fauna of the park, Illegal hunting is still obvious and can be minimized by adopting the better management skills, Introduction of vaccination, drenching and spraying (against Ecto and Endoparasites) through the Livestock Department in the target area at least twice a year. Establishment of GIS database for HGCNP, will be helpful in finding the species hotspots, their distribution and habitat mapping of the area for increased protection, conduction of DNA analyses of the species to determine its true genetic affinities would involve the testing of Chiltan Wild Goat as well as wild and domestic goats and wild goat from other parts of Pakistan; for example, C. f. cashmiriensis, C. f. falconeri, C. f. megaceros, C. f jerdoni, and possibly from further afield.

Acknowledgment

The author is thankful to all coworkers who helped in the research for data collection from various departments and to all the faculty members of the forest and wildlife department and to the staff of Chiltan Hazargangi National park for their support and approval of the area.

Financial support

This research project was supported by Forestry and Wildlife department under Ten billion tsunami tree project (TBTT) for scholars of Sardar Bahdur Khan University.

Conflict of interest

The author has no conflict of interest.

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