



## Short Communication

# Population and Distribution of Flare-Horned Markhor (*Capra falconeri falconeri* Wagner 1839) in District Swat, Khyber Pakhtunkhwa, Pakistan

Syed Fazal Baqi Kakakhel\*, Asad Ullah and Abdur Rashid

Centre of Plant Biodiversity, University of Peshawar, Khyber Pakhtunkhwa, Pakistan

### ABSTRACT

Studies were carried out on the population and distribution of 'Near Threatened' Markhor sub species Flare-horned Markhor (*Capra falconeri falconeri* Wagner 1839) in District Swat covering an area of 5337 km<sup>2</sup> in 2013. The population survey was conducted in two phases *i.e.* December 21-24 in Kalam and December 26-29 in Mankial valleys. Vintage point count surveys revealed that the Markhor preferred habitats in Kalam and Mankial valleys in District Swat. Among the six sub valleys of Kalam, only Shahoo and Mahodand valleys have some population of Flare-horned Markhor whereas in Mankial the sub valleys of Basharai, Tanazgah and Bara Dara are the main habitats of this Markhor. The total number of Markhor recorded in Kalam and Mankial valleys was 136, out of which 84 were recorded in Kalam valley and 52 in Mankial valley. Among the 84 animals found in Kalam 26 were females, 23 males of unidentified horn size, 12 young of six months and four yearling males of 18 months age; the number of males with more than 36'' horn size was five, 18'' to 36'' and 18'' horn size, seven each. While among the 52 animals observed in Mankial 14 were female, 15 males of unidentified horn size, five young of six months and five yearling males of 18 months. Three males had the horn size more than 36'', eight of 18'' to 36'' horn size and two of 18'' horn size.

#### Article Information

Received 21 April 2015

Revised 02 October 2016

Accepted 04 October 2016

Available online 10 February 2017

#### Authors' Contributions

All the authors jointly conceived, designed, analyzed, edited, wrote the article and contributed to all the sections of the article.

#### Key words

*Capra falconeri falconeri*, Distribution, Endangered, Population, Kalam, Mankial

Pakistan has a rich diversity of wild caprines (sheep and goats). There are caprine species in Pakistan divided in to 7 species and 5 subspecies (Mirza, 1975; Hesse *et al.*, 1977; Roberts, 1997; Chaudhry, 2011) *i.e.*, Western Himalayan goat (*Naemorhedus goral*); blue sheep (*Pseudois nayur nayur*); Sind wild goat (*Capra aegagrus blythi*); Chiltan wild goat (*Capra aegagrus chialtnensis*); Asiatic or Himalayan ibex (*Ibex siberica*); flare horned markhor (*Capra falconeri falconeri*); straight horned markhor (*Capra falconeri megaceros*); blandford urial (*Ovis vignei blandfordi*); Afghan urial (*Ovis vignei cycloceros*); Punjab urial (*Ovis vignei punjabiensis*); Ladakh urial (*Ovis vignei vignei*); Marcopolo sheep (*Ovis ammon polii*). These can be separated on the basis of horn shape. There is also a considerable variation in size between the northern Himalayan population and those inhabiting the hotter drier mountain ranges to the South. Markhor is classified as endangered species by the IUCN (2015). However, each species has its own ranking, both sub species *Capra falconeri falconeri* and *Capra falconeri megaceros* are endangered. Markhor sub species *Capra*

*falconeri falconeri* has been classified as near threatened according to IUCN 2015 on CITES Appendix-1 and being a CITES species trade of Markhor and its products is prohibited (CITES, 2015). However, the number of CITES permits for trophy hunting of Markhor in Pakistan has been enhanced from six to 12; the quota has further been distributed by Government of Pakistan as four permits each for Khyber Pakhtunkhwa, Gilgit Baltistan (flare-horned) and Balochistan (straight-horned).

Markhor are gregarious, females with young males associate in small herds, but when the terrain is of restricted nature they associate in large herds. Adult males lead a solitary life; join female herds in November and stay with them till early spring. The Markhor feed early in the morning and late in the evening but in mid-winter they have been observed feeding intermittently throughout the day.

Most of the world population of markhor lives in Pakistan where two sub species are recognized *i.e.* flared horned markhor *Capra falconeri falconeri* and straight horned markhor *Capra falconeri megaceros* (Shaller and Khan, 1975; Hesse *et al.*, 1997). Markhor are typically associated with steppe mountain conditions and regions of meager erratic rainfall. Markhor are quite adaptable ecologically, being found at 600 meters elevation in the

\* Corresponding author: [asadbotanist@yahoo.com](mailto:asadbotanist@yahoo.com)

0030-9923/2017/0002-0747 \$ 9.00/0

Copyright 2017 Zoological Society of Pakistan

completely treeless hot and arid hills of the southern part of the Suleiman range (straight horned) and up to 3600 meters in the Himalayas (flared horned) in association with juniper (*Juniperus excelsa*) and birch (*Betula utilis*) scrub forest. According to Shaller and Khan (1975), the animals may range in altitude from as low as 700 m to 1000 m in some of the hills bordering the Indus basin to as high as 4000 m during summer. Flared-horned Markhor is mainly confined to small, scattered populations along the Indus and its tributaries in Khyber Pakhtunkhwa and Gilgit Baltistan as well as along Kunar (Chitral) river and its tributaries in Khyber Pakhtunkhwa.

They are associated with the oak (*Quercus baloot*) scrub forests in Chitral (flared horned) and with *Pinus gerardiana* and *Juniper* scrub forests in the northern part of Balochistan and South Waziristan (straight horned). The flared horned markhor are found in the north of Chitral town, southwards in to Dir and west wards into Swat Kohistan. They occur on slopes of Ladak Sar and Mankial in Swat Kohistan (Roberts, 1997). The present study was carried out to determine the distribution, population size and status of markhor sub species *Capra falconeri falconeri* to ascertain trophy size markhor for future conservation interventions. This study will also help in planning for conservation and future endeavors regarding this 'near threatened' sub species of markhor.

#### Materials and methods

Study was carried out in Kalam and Mankial Valleys of district Swat in December 2013 during the rut season during December 21-24 in Kalam Valley and December 26-29 in Mankial Valley. The study area lies between 34° 34' to 35° 55' North latitudes and 72° 08' to 72° 50' East longitudes with an area of 5337 km<sup>2</sup>. It is bounded on the North by Chitral and Ghizer Districts of Gilgit Baltistan, on the East by Shangla and Kohistan, on the South by Buner and Malakand and on the West by Dir Upper and Dir Lower Districts. The present work was confined to Kalam and Mankial valleys, located in the extreme north of Swat District. Kalam valley is located between 35° 26' and 35° 40' North latitudes and 72° 12' and 72° 45' East longitudes with an area of about 2094 km<sup>2</sup>. It is bordered with Gilgit and Chital Districts in the North, Indus Kohistan in the East, Bahrain Kohistan in the South and Dir District in the West. Mankial valley is spread over an area of 130 km<sup>2</sup> between 35° 15' to 35° 25' North latitudes and 72° 36' to 72° 47' East longitudes. It has boundaries with Kalam Valley in the North, Bahrain Valley in the South, Kohistan District in the East, and Balakot and Swat River in the West. Topographic maps Survey of Pakistan, G. I. Sheet No. 43 A/1, 43 A/2, 43 A/4 to 43 A/12, 43 A/14, 43 A/15, 43 B/2, 43 B/5, 43 B/6, 43 B/9, 43 B/10 having scale 1:50

km published by Survey of Pakistan 2001 were used to locate District Swat in general and 43 A/11 was used for Kalam and Mankial valleys.

The major valleys were subdivided in to sub valleys for more intensive studies. The beginning of snowfall was focused for investigation of the population and distribution to ensure the survey during maximum congregation of animals in herds (Khan, 2006). A questionnaire was also provided to the local community to record their opinion. The population survey was conducted by 28 wildlife observers in 14 parties. In some cases where the observers were illiterate symbols were used for conducting the survey. In case of the party with less educated members, the crude record was immediately brought to the notice and reviewed by the trained wildlife staff and community members and was fairly recorded with the help of the memory of recorders. Care was taken in the selection of observers as they were trained before starting the survey. The vantage points had already been selected and shown to the surveyors. The dates and the times were assigned to each party. However, for the unpredictable factors like the weather conditions, logistics etc. it was flexible for the party to spend as much time at each point for credible observations.

Markhor survey was conducted using vantage point count method (Jackson and Hunter, 1996; Arshad *et al.*, 2012a). Animals were observed with the help of binoculars 20x50mm and spotting scope 20 x 60mm during the dawn and dusk. Vantage points were randomly selected by dividing a major watershed in to relatively small sections, each of which was manageable in terms of its size (10 km<sup>2</sup> to 100 km<sup>2</sup>). Vantage points were based on the geographical features of valleys and sub valleys, the whole tributary drainage or sub drainage, particular hill slopes and basins. The timings of observations by each party at the specific site were so adjusted that the observation at the nearby site were simultaneous to avoid the chance of duplication of observing the same animal by two parties at the sites where the parties were to scan during observation, were well clear to them.

#### Results

The total number of markhor recorded in Kalam and Mankial valleys was 136, out of which 84 were recorded in Kalam valley and 52 in Mankial valley. Among the 84 animals observed in Kalam 26 were females, 23 males of unidentified horn size, 12 young of six months and four yearling males of 18 months age. The number of males with more than 36'' horn size was five, 18'' to 36'' and 18'' horn size, seven each. While among the 52 animals observed in Mankial 14 were female, 15 males of unidentified horn size, five young of six months and five yearling males of

**Table I.- Number of animal, males, females, young of 6 months, yearlings of 18 months, male horn sizes of 18", 18" to 36" more than or 36" and herd size in Kalam (21-24 December 2013) and Mankial (26-29 December 2013).**

Name of valley	Total Animals	Unidentified horn size males	Females	Young of 6 Months	Yearling males of 18 months	Male Horn size			Herd size
						18"	18" to 36"	> 36"	
<b>Kalam Valley (Shahoo and Mahodand sub Valleys)</b>									
Shahoo sub Valley	36	9	10	6	2	4	3	2	1-7
Mahodand sub Valley	48	14	16	6	2	3	4	3	1-12
<b>Mankial Valley (Basharai, Tanazgah and Bara Dara sub Valleys)</b>									
Basharai sub Valley	18	5	5	0	3	0	3	2	1-4
Tanazgah sub Valley	13	4	4	0	2	0	3	0	1-3
Bara Dara sub Valley	21	6	5	5	0	2	2	1	1-5
<b>Total</b>	<b>52</b>	<b>15</b>	<b>14</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>8</b>	<b>3</b>	

18 months. Three males had the horn size more than 36", eight of 18" to 36" horn size and two of 18" horn size. The male and female population was 46 males in Kalam and 33 males in Mankial and 26 females in Kalam and 14 females in Mankial. The herd size recorded in Kalam was 1-12 while in Mankial the herd size recorded was 1-5. Herds in each herd class were also noted in all the valleys and sub valleys viz., unidentified horn size males, females, young of 6 months, yearling males of 18 months and male with 18", 18" to 36" and more than 36". These results were based on actual sighting rather than the estimation. The distribution of animals remained confined to Kalam and Mankial valleys i.e., the animals were not reported to move to other valleys. Based on practical sighting it was noticed that in Kalam valley Markhor prefer Shahoo and Mahodand sub valleys and select Basharai, Tanazgah and Bara Dara sub valleys in Mankial valley (Table I).

#### Discussion

The global population of adult Markhor was estimated to be less than 2,500 individuals (Valdez, 2008). Various authors have reported on the threats to Markhor population. IUCN (2000) reported habitat loss; Shackleton (2001) increase in human population; Lydekker (1898), Burrard (1925) and Stockley (1936) poaching in 19<sup>th</sup> century; Johnson (1998), Woodford et al. (2004), IUCN (2000), GoNWFP and IUCN (2004) livestock competition. Markhor occurs mainly in highly fragmented populations of (less than 100 individuals) that are threatened by habitat loss, uncontrolled poaching, illegal hunting, poaching and forage competition from domestic livestock (Weinberg et al., 1997). Markhor has to compete with domestic goats for forage. Main threats to Markhor in the study area are livestock competition and habitat loss. The Snow leopard (*Panthera uncia*) is the main predator in these valleys. Other threats include the increasing human population, habitat destruction, and over exploitation of the flora of these habitats. This research is in conformity with previous

studies carried out by IUCN and MACP (Arshad et al., 2012a).

#### Conclusions

The population in each of the valleys of Kalam and Mankial has not yet reached the level of trophy hunting program based on 1% of the population and needs more conservation efforts. In Kalam valley five valley conservation committees and in Mankial the Mankial Community Organization (MCO) are working in close collaboration with KP Wildlife Department and accordingly Valley conservation funds have been established in each valley for conservation of *Flare horned Markhor*. But the population of *Flare horned Markhor* has not yet reached the harvest level. Therefore, at the moment the communities are not getting financial benefits from this sub species. Further, the Government can further strengthen the Valley Conservation Committees by providing funds to the valley conservation funds.

#### Statement of conflict of interest

Authors have declared no conflict of interest.

#### References

- Arshad, M., Qamer, F.M., Saleem, R. and Malik, R.N., 2012a. *Biodiversity*, **13**: 78-87. <https://doi.org/10.1080/14888386.2012.684206>
- Burrard, G., 1925. *Big game hunting in the Himalayas and Tibet*. H. Jenkis, London.
- Chaudhry, A.A., 2011. Role of protected areas in the conservation of species and ecosystems. *Proc. Pakistan Congr. Zool.*, **31**: 11-29.
- CITES, 2015. *Conference of parties 10*. [www.cites.org/eng/disc/cop/php](http://www.cites.org/eng/disc/cop/php) [Accessed on 4 December 2016].
- GoNWFP and IUCN Pakistan, 2004. *Chitral – An integrated development vision (Chitral Conservation Strategy)*. IUCN-Pakistan and Government of NWFP, Karachi, Pakistan, pp. 14-

- 103.
- Hesse, R., Bollmann, K., Rasool, G., Chaudhry, A.A., Virk, A.T. and Ahmad, A., 1997. *Wild sheep and goats, and their relatives, Pakistan, Status survey and conservation action plan for Caprinae*. IUCN. pp. 239-260.
- IUCN, 2015. *IUCN red list of threatened species. A global species assessment*. IUCN, Gland, Switzerland and Cambridge, UK. <http://www.iucnredlist.org/photos/2015>.
- IUCN, 2000. *Biodiversity action plan for Pakistan*. <http://www.iucn.pk/publications/Biodiversity%20Action%20Plan.pdf>.
- Jackson, R. and Hunter, D.O., 1996. *Snow leopard survey and conservation handbook*. International Snow Leopard Trust, Washington.
- Johnson, K.A., 1998. *Status of Suleiman Markhor and Afghan Urial populations in the Torghar Hills, Balochistan Province, Pakistan*.
- Khan, B., 2006. *Markhor Survey in Suleiman Mountain range, District Zhob, Balochistan*. WWF-Pakistan.
- Lydekker, R., 1898. *Wild oxen, sheep and goats of all lands*. Rowland Ward, London. <https://doi.org/10.5962/bhl.title.8851>
- Mirza, Z.B., 1975. A census of Chiltan Markhor *Capra hircus* in Chiltan range, Quetta. *Pakistan J. Zool.* **7**: 214-216.
- Roberts, T.J., 1997. *The mammals of Pakistan*. Ernest Benn, Ltd., London, England, pp. 195-199.
- Shackleton, D.M., 2001. *A review of the community-based trophy hunting programs in Pakistan*. Prepared for the Mountain Areas Conservancy Project (MACP) with the collaboration of IUCN-Pakistan, NCCW, MoELGRD, pp. 59.
- Schaller, G.B. and Khan, S. A., 1975. *Biol. Conserv.*, **7**: 185-198.
- Stockley, C., 1936. *Stalking in the Himalayas and Northern India*. Herbert Jenkins, London.
- Valdez, R., 2008. *Capra falconeri*. In: IUCN 2015, IUCN Red List of Threatened Species. Version 2015. 2. <http://www.iucnredlist.org>. [Accessed on 4 December 2016].
- Weinberg, P.I., Valdez, R. and Fedosenko, A.K., 1997. *J. Mammal.*, **78**: 826-829. <https://doi.org/10.2307/1382940>
- Woodford, M.H., Frisina, M.R. and Awan, G. A., 2004. *Game Wildl. Sci.*, **21**: 177-187.