RESEARCH ARTICLE

Distribution and Habitat Preference of Four-horned antelope (Chowsingha), *Tetracerus quadricornis* in Kumbhalgarh Wildlife Sanctuary, Rajasthan

Ramchandra Meghwal*, Pankaj Kumar Sen, Chhaya Bhatnagar

Aquatic Toxicology and Wildlife Research Laboratory,
Department of Zoology, University College of Science,
Mohanlal Sukhadia University, Udaipur, India.

Study Area: Kumbhalgarh Wildlife Sanctuary, Rajasamand, Rajasthan

Coordinates : 73°15'E, 25°00'N to 73°45'E, 25°30'N

Key words: Hilly terrain, Wildlife habitat, Ecological boundary

Abstract

Four-horned Antelopes, commonly known as Chowsingha, are unique mammals. Unfortunately the reports on its distribution pattern and habitat preferences are still scanty from south Rajasthan. The present study is an attempt to fill up such gaps of this animal in Kumbhalgarh Wildlife Sanctuary. Results revealed that Chowsingha is present in only four forest blocks out of Thirty four. The relation between the observed distribution pattern, preferred habitats and ecological boundaries of the sanctuary have been tried to correlate.

Introduction

Being the only bovid with four horns, four-horned Antelope (*Tetracerus quadricornis*), commonly known as Chowsingha, is a unique mammal, reveals distinct sexual dimorphism. *Tetracerus quadricornis* is endemic to the Peninsular India and Indus divisions of the Indian sub-region of the Asian Indo-Malayan Region and occurs only in India and Nepal (Prater, 1971; Rice, 1991) and is listed in the vulnerable category of IUCN. It is an herbivore and weighs between 15 to 25 kg (Menon, 2003; Sharma *et al.*, 2009; Leslie & Sharma, 2009; Krishna *et al.*, 2009; Swamy, 2010).

It has been observed from the previous animal censuses in the country that the number of this fascinating antelope is decreasing. Till date the study on Chowsingha has not been taken seriously for the studied area. Due to its vulnerable category, the IUCN also recommended for detailed scientific investigation on it to fill-up the gaps related to its distribution, ecology and

*Corresponding Author: ramchandramlsu@gmail.com

its biology (Mallon, 2003). By keeping the same in mind, the present study was planned to know the distribution and habitat preference of this animal in Kumbhalgarh Wildlife Sanctuary.

Materials and Methods:

Study area: Kumbhalgarh Wildlife Sanctuary (KWLS) which covers 610 km² in area, is altogether having a diagonally shaped corridor (Fig. - 1). It lies approximately 80 km far towards north from Udaipur city in between districts of Rajsamand, Pali and Udaipur. The highest elevation is 1074 m. The forest of the Sanctuary is a mosaic of thorn-mixed forest, dense dry deciduous forest with moist riverine green patches. The Sanctuary is divided into 34 forest blocks for the proper management of the protected area. The macrohabitat of it is divided into three major types: i) grassland or barren land ii) sparse dry deciduous forest and iii) dense dry deciduous forest. The microhabitats were considered as upper zone (approximately one third from the top of the hill), middle zone (the middle one third part of the hill slope) and bottom zone (lower one third of the hill). Whenever, the animal was sighted in a particular habitat, an attempt was also made to note the microhabitat of the area.

For the data collection, pertaining to distribution of Chowsingha, all the forest blocks in the sanctuary were scanned by walking from July, 2013 to June, 2015. Locating the antelope in the field was difficult because of poor visibility in tall grasses and shrubs especially during rain and winter season. Therefore, besides direct sightings, the presence of Chowsingha was also ascertained by indirect evidences like middens occurrences and hoof-marks. Line transects methods was used for data collection using binoculars and camera. Chowsingha defecates at specific defecation sites only which made the task of determining its presence little easier.

Results and Discussion:

Total 49 surveys were carried out in the sanctuary area which evidenced 50 direct sightings of Chowsingha, with 122 hoofmarks and 107 midden occurrences. Out of 34 blocks, the Chowsingha was found to inhabit only in four blocks, namely; Dhana, Ghanerao, Palar and Zeelwara (Fig.- 1; Table- 1). The data obtained from the three years of field study have been compiled month-wise (Fig.- 2). Maximum direct sightings were in the months of April, May and June as these being the summer months, the vegetation was sparse. No sighting was registered in rainy season. This was only due to the over growth of vegetation that hindered the direct sighting and concomitantly the washing out of the indirect evidences through flowing

Figure -1: Map of KWLS; arrows indicating the locations where Chowsingha was located.

rain water. However, it is a common hindrance usually occurs while studying wildlife population dynamics in jungle areas (Manchiryal *et al.*, 2015; Mishra & Bisht, 2015).

Table 1: Distribution sites of Four-horned Antelope in KWLS

S.No.	Name of the block	Terrain	Type of habitat	Distance from Human settlement
1	Dhana	Hilly forest	Dense dry deciduous	A small human settlement (c.25 house hold) is present at periphery.
2	Ghanerao	Less-hilly, undulating with flattish outskirts	Grassland or barren land, Sparse dry deciduous forest	A township (c.1000+ house hold) are present at periphery
3	Palar	Hilly	Dense dry deciduous forest	No human settlement inside/ periphery
4	Zeelwara	Less-hilly with flattish outskirts	Grassland or barren land, Sparse dry deciduous forest	A small human settlement (c.300+house hold) are present at periphery

Table 2: Microhabitat preference of Four-horned Antelope in KWLS

S.No.	Microhabitat type	Type of evidence			Percentage
		Direct	Meddens	Hoofmarks	
1	Upper zone of hills	4	24	12	14.34%
2	Middle zone of hills	15	10	10	12.56%
3	Lower zone of hills	10	21	8	13.97%
4	valley	21	52	92	59.13%
5	Near Human colonization	0	0	0	00%

Table- 2 shows the various microhabitats in the sanctuary where the animals were sighted. Data clearly indicates that the most preferred site of Chowsingha was the open areas existing between the hills. It was observed that during confrontation with the animal, it sought the nearest tree and hid behind it. If the distance between observer and animal was larger, it just sprinted up the hill and become out of sight.

At the turn of the 20th century, Chowsingha were distributed across the Indian subcontinent (Jerdon, 1874; Murray, 1884; Blanford, 1888), but in the course of time, the same distribution has been reported to be highly fragmented (Walther, 1990; Krishna *et al.*, 2009). Rice (1991) reported, in India the species was restricted at 83 locations (69 protected areas, six reserve forests and eight forest divisions) only. The review report on this species by Krishna (2006) accounts its presence from 104 sites (76 protected areas, 13 forest divisions, six reserve forests, seven districts and two locations) in India. Sharma *et al.* (2013) have described the distribution of the

Chowsinghaat a finer scale within tropical dry deciduous forests in central India.

In state Rajasthan, the maximum population of Chowsingha is confined to four protected areas of its Southern part, namely Kumbhalgarh Wildlife Sanctuary, Phulwari-ki-nal Wildlife Sanctuary, Todgarh-Raoli Wildlife Sanctuary and Sitamata Wildlife Sanctuary (Koli & Bhatnagar, 2011; Sharma, 2014). It occurs in low densities in its whole distribution range in Rajasthan (Rice, 1991; Sharma, 2006; Krishna *et al.*, 2009; Sharma *et al.*, 2013).

As per our observations, the distribution of Chowsingha in Kumbhalgarh Wildlife Sanctuary was quite restricted in only 4 out of a total of 34 blocks. Further, even within the blocks their distribution was found to be patchy. It was also noticed that the antelopes are not distributed in such areas where anthropogenic pressure are higher.

Chowsingha prefers the thorn-mixed forest found in a hilly terrain (Prater, 1971; Sharma *et al.*, 2009; Baskaran *et al.*, 2009). In our study all the four blocks where we found directly or indirectly the traces of Chowsingha were rich in thorny shrubs and trees. Some of the noticeable floral species were *Zizyphus mauritiana*, *Phoenix sylvestris*, *Anogeissus pendula*, *Capparis decidua*, *Capparis sepiaria*, *Emblia officinalis*, *Dendrocalamus strictus*, *Lannea grandis*, *Boswellia serrata*, *Lantana camara*, etc. These blocks also have the hilly terrain covered by grass species like *Sehiman urvosum*, *Dicanthium annulatum*, *Eremopogon foveolatus*, *Apluda mutica*, *Heteropogon contortus* etc. which altogether offers a suitable habitat for Chowsingha.

Conclusion:

As is evident from the map, the sanctuary is of a linear shape that varies in diameter at various places. As usual the outer boundry of the sanctuary is densely surrounded by the villages. The area of the sanctuary which is narrow is obviously nearer to the human populations and that always keep away this Chowsingha. Interestingly, the four locations where we estimated the presence of more Chowsingha are considerably far from human colonization. It was also predicted by Baskaran *et al.* (2009) that the distribution of Chowsingha is adversely affected by human disturbance.

Large number of Chowsingha sightings pertains to open areas between hills which seem to be the most preferred habitat in our study. This habitat represents by short grass and more open canopy (below 0.4) as compared to the other sanctuary area. This habitat seems to be ideal for Chowsingha for better visibility to detect and escape predators.

Figure 2: Mean ($\pm$ SE) representing direct/indirect evidences of Chowsingha, noted during studied period (year 2013 to 2015)

Acknowledgements:

The authors are thankful to the Department of Forests, Rajasthan for permitting to carry out the work in Kumbhalgarh Wildlife Sanctuary. The authors also gratefully acknowledge Dr. Satish Kumar Sharma, Assistant Conservator of Forests and Dr. Vijay Kumar Koli for their valuable inputs to construct the manuscript.

References:

- Baskaran, N., Desai, A.A., & Udhayan, A. (2009): Population distribution and conservation of the four-horned antelope (*Tetracerus quadricornis*) in the tropical forest of Southern India. *Int. J. Environ. Sci. Technol.*, 2(3): 139-144.
- Blanford, W.T. (1888): The Fauna of British India, including Ceylon and Burma Mammalia. Taylor and Francis, London, UK. 519-521.
- Jerdon, T.C. (1874): **A Handbook of the Mammals of India**. Mittal Publications Delhi, India, 273-275.
- Koli, V.K. & Bhatnagar C. (2011): Mammalian fauna in Sitamata Wildlife Sanctuary, Rajasthan. *Geobios*, 38: 157-160.
- Krishna, Y.C. (2006): **Estimating occupancy and assessing the influence of covariates on the distribution of the four-horned antelope (*Tetracerus quadricornis*) in a South Indian tropical forest**. M.Sc. thesis, Manipal University, Karnataka, India.
- Krishna, Y.C., Peter, J.C., Krishnaswamy, J. & Narayanarao, S.K. (2009): Distributional and ecological review of the four-horned antelope, *Tetracerus quadricornis*. *Mammalia*, 73: 1-6.
- Leslie, D.M. Jr., & Sharma, K. (2009): *Tetracerus quadricornis* (Artiodactyla: Bovidae). *Mammalian Species*, 843: 1-11.
- Mallon, D.P. (2003): *Tetracerus quadricornis*. In: **IUCN Red List of Threatened Species**. www.iucnredlist.org.
- Manchiriyala, R., Desai, A.A., Mushkam, S. & Predit, P.P. (2015): Evaluating the Feasibility of Using Pellets to Assess Age, Relative Abundance and Habitat of Nilgiri Tahr (*Nilgiritragus hylocrius*) in Mukurthi National Park, of Nilgiri Biosphere Reserve, India. *Ambient Sci.*, 02(2): 08-17.
- Menon, V. (2003): **A field guide of Indian mammals**, Published by: Wildlife Trust of India, India. pp. 200.
- Mishra, S.R. & Bisht, H.K. (2015): Evidences Dependent Population Distribution Patterns of Tiger and Leopard in Similipal Tiger Reserve, Odisha, India. *Ambient Sci.*, 02(2): 42-44.
- Murray, J.A., (1884): **The vertebrate zoology of Sind**. Published by: Richardson and Co., London. pp. 424.
- Prater, S.H. (1971): **The Book of Indian Animals**. Published by: Bombay Natural History Society, p. 271-272.
- Rice, C.G. (1991): The status of the four horned antelope *Tetracerus quadricornis*. *J. Bom. Nat. Hist. Soc.*, 88: 63-66.
- Sharma, K. (2006): **Distribution, status, ecology and behaviour of the four-horned antelope *Tetracerus quadricornis***. PhD Thesis, Mumbai University, Mumbai, India.
- Sharma, K., Chundawat, R.S., Gruisen, J. V., & Rahmani, A.R., (2013): Understanding the patchy distribution of four-horned antelope *Tetracerus quadricornis* in a tropical dry deciduous forest in Central India. *J. Trop. Ecol.*, 29: 1-10.
- Sharma, K., Rahmani, A.R., & Chundawat, R.S. (2009): Natural history observations of Four-horned antelope *Tetracerus quadricornis*. *J. Bom. Nat. Hist. Soc.*, 106 (1): 72-82.
- Sharma, S.K. (2014): Faunal and Floral Endemism in Rajasthan (With Notes On Endemic Biota of Adjoining States), Himanshu Publications, Udaipur, New Delhi.
- Swamy, K. (2010): **Ecology of four horned antelope (*Tetracerus quadricornis*) in Talamalai Plateau, Sathyamangalam Wildlife Sanctuary, Tamilnadu, southern India**. PhD thesis, AVC College, Tamilnadu, India.
- Walther, F.R. (1990): Spiral-horned antelopes. In: Parker, S. P. (ed). **Grzimek's Encyclopedia of Mammals**. New York: McGraw-Hill. Volume 5, pp. 344-359.