

BHARAL – THE MOST SIGHTED UNGULATE OF NANDA DEVI NATIONAL PARK

by V.P. Uniyal

Introduction

The blue sheep or bharal (*Pseudois nayaur*), in both structure and habit, occupies an intermediate place between sheep and goats. It has affinities with both genera, i.e. *Ovis* and *Capra*, but according to habitat requirements and behavior, it is closer the goat (Schaller, 1973). The blue sheep lives in one of the remotest spots on earth. They prefer habitats in the higher ridges of the Himalayas between the timber and snow lines. Like sheep, they graze on open grassy slopes, but like goats, they climb well, even on precipitous cliffs (Prater, 1980). They alternately forage and rest throughout the day.

Bharal live in groups of 10 to 50, but sometimes as many as 200 may congregate. The available estimates of population densities range from 0.9 to 2.7 animals/km² (Schaller, 1977; Wegge, 1979; Wilson, 1984; Fox *et al.*, 1986; Chundawat *et al.*, 1991). Due to their excellent camouflage and the absence of cover in their environment, bharal remain motionless when approached. Once they are noticed, they scamper up the precipitous cliffs. The habitat requirements of bharal are very similar to those of snow leopard (*Panthera uncia*). Both prefer rocky cliffs and steep slopes. It is also the main ungulate prey of the snow leopard (Jackson and Ahlborn, 1984; Chundawat, 1992).

Bharal has a wide range of distribution across the major mountain ranges of the Himalayas, stretching from Baltistan in Kashmir, eastward across Tibet and into Yunnan, Szechwan, Kansu and Shensi provinces of China (Schaller, 1973). Its distribution has also been documented from the extreme northeast corner of Pakistan in the Karakoram ranges and all along the Himalayas in India (Gee, 1964; Dang, 1967; Roberts, 1977;

Schaller, 1977; Ali, 1981; Fox *et al.*, 1986; Chundawat, 1992).

Information on bharal is very limited. A recent study on its behavior and other ecological aspects was conducted in Nepal. Schaller (1973) surveyed the Kang Chu valley of eastern Nepal and studied the activity pattern, food habits, group size, courtship rituals and aggressive behavior of blue sheep. Wilson (1981) studied the ecology and habitat utilization of bharal in the Dhorpatan Shikar Reserve in Nepal. However, very little information on bharal in India is available. A few survey reports have documented the presence of blue sheep in the Trans and western Himalayan regions, but detailed studies are still needed. Chundawat (1992) studied the population structure, distribution and habitat use of bharal and the food habits of snow leopard in the Hemis National Park in Ladakh. Mishra (2001) studied the livestock grazing impacts on the native wildlife habitat in Spiti valley of Himachal Pradesh.

Study Area

The Nanda Devi National Park (NDNP) is located within the high mountain ranges of Garhwal Himalaya and is one of the most important wilderness sites and a treasure trove of western Himalayan biodiversity. Nanda Devi is the second highest peak (7,817 m) in India and is considered to be the world's second toughest peak to climb. Due to its floral and faunal richness, the entire basin was declared a sanctuary in 1939. The whole area was later upgraded to the Nanda Devi National Park in 1982 and, therefore, completely protected with no human interference allowed inside the national park area of 624.62 km². Subsequently, in 1988 the area was notified as India's second

Biosphere Reserve and designated as the Nanda Devi Biosphere Reserve (NDBR). Realizing the importance of its biological diversity and the occurrence of several rare and endangered floral and faunal species, NDBR was listed as a World Heritage Site in December 1988.

The national park has a wide range of altitudes – from 1,800 m to 7,817 m above sea level – with a unique topography and climate that supports diverse habitats, species richness, communities and ecosystems. The high percentage of endemic species also adds to the conservation values of the park. The park supports about 620 plant species, 18 mammal species, 200 species of birds and a large insect fauna, including about 35 species of butterflies, many of which are in the endangered category. The important mammals of the park are goral (*Naemorhaedus goral*), Himalayan tahr (*Hemitragus jemhalicus*), leopard (*Panthera pardus*), Himalayan musk deer (*Moschus chrysogaster*), snow leopard (*Panthera uncia*), serow (*Capricornis sumatrensis*) and bharal (*Pseudois nayaur*). Earlier surveys on mammals in NDNP were conducted by Dang (1961), Khachar (1978), Tak (1986), Lamba (1987), Sathyakumar (1993), Arora *et al.* (1995) and Uniyal (2002).

The present survey was carried out in the NDNP during the expedition conducted by the Garhwal Rifles Regiment Centre, Lansdown, known as the "Clean Nanda Devi Expedition 2001." The author had the opportunity to join this expedition from 26 August to 14 September 2001, and thus was able to study the floral and faunal diversity in the park.

The trekking commenced from Lata Village (2,100 m) and further camps were established at Lata Kharak ((3,800 m), Dharansi (4,200 m),

Dibrugheta (3,500 m), Deodi (3,600 m), Ramni (3,600 m), Bhujgarh (4,000 m), and Sarsopatal (4,300 m). A trek distance of about 75 km was covered from Lata village to Sarsopatal base camp.

Methodology

The field observations on mammals were made in the upper ridges, hill slopes and alpine pastures adjacent to each camping site. These observations coincided with the animal's foraging time in the early morning and late afternoon hours. The area was thoroughly scanned with the help of binoculars. Different parameters viz aspect, slope, habitat, altitude, time, number of individuals and distance, etc. were recorded. GPS was used to record the locations of bharal sightings.

Results

During the expedition, goral, tahr, musk deer, bharal, red fox, weasel and pika were sighted on several occasions in different locations. A total of 245 bharal were sighted at eight different locations in ten groups between 4,300 to 4,500 m altitude. Group sizes varied from 10 to 55 individuals. The largest group size of 55 bharal was sighted on the way to the Devastan base camp area (4,500 m), which was also the highest elevation point reached during the present expedition. The smallest group size of 10 bharal was observed at the Patalkhan (4,300 m) area. The majority of groups sighted were mixed groups of adults and sub-adult males and females. Grasses preferred by bharal included *Danthonia* sp., *Stipa* sp., *Festula* sp., *Kobresia* sp. and the legume *Thermopsis* sp. in alpine pastures. Bharal was also observed browsing on *Juniperus* sp. below the Sarsopatal camp.

Table 1: Sighting details of Bharal in NDNP

Locations	Altitude (m)	Slope*	Aspect	Sighting Time	Distance (ocular)	Activity	Habitat type**	No. of sightings	
								Direct	Individuals
Dharansi	4,300	A	NW	0630 h	1 km	Feeding & moving	Alpine pasture	1	35
Malla Dharansi	4,400	B	NE	0730 h	1.5 km	Feeding & moving	Rocky & glacier	1	45
Patakhani	4,300	C	NE	0930 h	100 m	Moving	Cliffs	1	10
North Sanctuary	4,300	A	NW	1615 h	500 m	Feeding & moving	Alpine pasture	2	24
Sarsopatal	4,300	A	NE	1700 h	20 m	Resting (lying on ground)	Alpine pasture	1	36
Malla Sarsopatal	4,300	B	NE	1400 h	50 m	Resting (lying on ground)	Alpine pasture	1	20
Devastan area	4,500	C	NE	1130 h	100 m	Resting (lying on ground)	Rocky & glacier	1	55
ND base camp area	4,300	C	NW	0930 h	30 m	Grazing & moving	Rocky & glacier	2	20

*Slope categories: A=Smooth (<30° with less rock cover); B=Steep (>40° with medium steepness and rocky boulders); C=Scree (>60° with high steepness with rocky boulders)

**Habitat type categories: Alpine pastures=full with grass cover, little base ground and rocks; Rocky=25 to 50 % rock coverage; Cliffs=steeper undulating slopes with more than 50% rocky boulders; Glacier=ice covered slopes

Predation

Snow leopard has been reported as the main predator of bharal, while red fox is a second possible predator (Wilson, 1981). No bharal kills were encountered during the expedition. One fresh scat of snow leopard was recorded in Sarsopatal and two pugmarks in Dharansi and the Pataalkhan area, but there were no direct sightings of snow leopard. A red fox was sighted in the bharal habitat near malla Dharansi.

The present short survey revealed that the NDNP provides adequate food, habitat and a human-free environment. The larger group sizes also indicated that bharal is the most conspicuous ungulate in this national park.

Recommendations

Many aspects of the behavior, distribution, habitat, and predation of bharal remain unexplored in this high potential habitat. So far, such a high density of bharal has never been reported from the western Himalayan region. A detailed long term study on the population structure, distribution and habitat utilization of bharal in this area is thus a high priority. It is important to generate baseline data on various aspects of the behavior and conservation of this species. This will be of immense use to wildlife managers for effective management of this priority conservation area.

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