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**Research Article**

# ANALYSIS OF GORAL POPULATION AND ITS EXTINCTION CAUSES IN DISTRICT BUNER, KHYBER PUKHTUNKHWA

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## ABSTRACT

Current study was conducted to know the Eco-biology of Goral species with reference to its distribution range, extending in District Buner Khyber Pakhtunkhwa. The species are distributed in the whole District at various goral points, which were frequently visited, the points in are; Nanser, Kingargalay, Babosar, Mirdara, Gokand, Shangla-Buner Border, Elum Mountain, GarrooBarkalay, Mahaband and Malka. The Phyto-sociological studies on the habitat suggest the presence of at least 99 species of endospermic plants, distributed with a low constancy of appearance with three well defined vegetation layers; i.e. tree (22 species), shrubs (25 species), herbs (31 species) and grasses (21 species). *Dodonea viscosa* is the most prominent species among shrubs in the goral habitat in District Buner. The prominent threats leading to the extinction of Goral includes deforestation, lack of proper habitat, illegal anthropogenic over hunting, over grazing and most importantly lack of public awareness about wild life importance.

**Keywords:** Goral; Population; Extension causes; District Buner; Pakistan

## INTRODUCTION

The etymology of the generic name is *nemoris* (Latin: a young goat), therefore *Nemorhaedus* refers to a goat-like animal and its habitat in forested regions. The species name, *goral,* is a local name for the animal from north-eastern India (Gotch, 1979).

Goral shares the sub order Ruminantia with Deer, Antelopes and Sheep/Goats. The members of this sub-order have some form of horns (born on bony pedicles or cores, prominent in males); selenodont teeth, specialized for grinding food with a sideway motion; and a multi-chambered stomach, with digestive process involving regurgitation of partly digested food and cud-chewing (Fakhar-i-abbas, 2006).

Order Artiodactyla, Sub order Ruminantia, Family Bovidae, Sub family Caprinae, Tribe Rupicaprini (Corbet and Hill**,** 1980). Sokolov (1953) placed *Nemorhaedus* in its excluded the rupicaprines, *Rupicapra* (chamois) and *Oreamnos* (mountain goat). The genus *Nemorhaedus* contains one species, *Nemorhedus gora* (Allen, 1930). However, some authors consider there to be two species, *N. goral* and *N. cranbrooki* (Nowak and Paradiso*,* 1983).

Groves and Grubb (1985) suggested that there are six species (*N. goral, N. baileyi, N. caudatus,* and three species from the genus *Capricornis*). Honacki indicated that *N. baileyi, N. caudatus,* and *N. cranbrooki* also are valid (Mead, 1989).

There is no agreement to the number of valid subspecies (Allen, 1930). The division of goral into species and geographic races is difficult for they show few distinguishing characters when series are compared. Generally accepted subspecies are; *Nemorhaedus goral arnouxianus, Nemorhaedus goral caudatus, Nemorhaedus goral goral* and *Nemorhaedus goral griseus*. Gorals are smaller and osteologically distinct from the serow (Allen, 1930). Gorals are the smallest of the rupicaprines. Shoulder height ranges from 570 to 711 mm in the USSR, 580mm for males and 601 for females of "cranbrooki" (Zhang, 1987).Mass is approximately 22 to 35 kg (Primrose, 1911). The horns are short (127 to 178 mm is typical, but 235 mm is known). For "cranbrooki" ranges for males=125 to 160 mm for males and for females, range=118 to 150 mm (Zhang, 1987).

There is a small pre-orbital gland; the goral lacks the large, acute depression on the lacrimal that is distinct on the serow. The maxillaries have lost contact with the nasals on the lateral edges, so that the nasals are supported only by their proximal ends. The molars and premolars are similar to those of the serow except that the teeth are smaller and the buccal surfaces of the premolars in the upper jaw are nearly smooth, without the vertical ridges at Second and fifth lateral metacarpels are present instead of just the fifth as in the serow (Allen, 1930).

Length of head and body is approximately 820 to 1300 mm; length of tail is 76 to 203 mm. For "cranbrooki"

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length of body averages 953 mm for males and 987 mm for females, and length of tail averages 108 mm for males and 109 mm for females (Zhang, *et al.,* 1987). The goral has a short, woolly undercoat, covered by long, coarse guard hairs. Males have a short, semierect mane, except in "cranbrooki" (Zhang, 1987).

Coloration varies from buffy gray to dark brown to a bright foxy red to tawny buff. There usually is a white patch on the throat and a dark stripe. Females have four mammae. Pedal inter-digital glands are present as are glands behind the horns, but there are no inguinal glands (Sokolov, 1953).

Measurements of the skull (in mm) are: condylobasal length, 164 to 230 zygomatic breadth, 90 to 102 width across molars, 58 to 63 length of upper molar row, 62 to 71. The following cranial measurements (in mm presented as mean and range for males and females, respectively) are for "cranbrooki". Length of craniumm, 202, 189, to 210, 206, 195 to 205, zygomatic breadth, 91.3, 87 to 95, 90.5, 86 to 95, length of upper teeth row, 60.7, 54 to 68, 62.5, 59 to 66, length of horn core, 85.3 (n=1), and diameter of horn core, 21.8, 19 to 23, 15.5, 15 to 16 (Mead, 1989).

Color of pelage varies greatly with locality. The most common color is gray; browns and yellows added from various shades of grayish brown, dark brown, dark yellow, ashy gray, yellowish brown, and bright foxy-red (Allen, 1930). Most have a white to white with pale-ochreous bordered throat patch. Some forms have distinct black dorsal stripes (Dolan, 1963). The winter pelage is coarse, with guard hairs 67mm long and the underfur 25 to 30 mm long. The summer coat is similar but shorter and more sparse (Geptner *et al.,* 1961). Dental formula is i 0/3, c 0/0, p 3/3, m 3/3, total 30. Geptner *et al.* 1961 indicated that the dental formula is 32, with the occasional addition of a lower canine (Mead, 1989).

Sexual maturity is achieved in the second or third year, but mating seems not to occur until the third year (Bromlei, 1956). Breeding begins in the period from late September to November in the far north and from early November into December in the south (Zhang, 1978).

Myslenkov and Voloshia (1978) found that 85% of copulations were in November, with probability of copulation period lasting 20 to 30 hours. Gestation lasts approximately 180 days. Normally only one kid is produced, although two can occur, especially in captive populations (Dobroruka, 1968). Females when accompanied by young tend not to aggregate. Kids are born between April and May and stay with the mother for about 1 year. Some captive gorals live longer than 17 years (Nowak and Paradiso, 1983).

The current study was carried out in District Buner with the aims to produce public awareness and Goral's conservation in the area of District Buner.

## MATERIALS AND METHODS

A total of 10 stands, each representing tracts having relatively homogenous phytohabitat conditions, were established in different parts of District Buner, having favourable habitat under direct exploitation of the grey goral. The location of these stands has been presented in the table in this chapter, and tentatively indicated on the map of area. All these stands were physically visited during spring and early summer of 2012-2013 for the collection of data on the phyto-habitat parameters.

In each stand 9-10 transects were randomly selected to sample all possible microhabitat variations and species diversity and abundance. The length of a 50 m long transects line, touching the plant or passing through an imaginary plant canopy was directly recorded, along with its species. The total length of the transect line shared by the plants of different species was then worked out through regular pooling. The cover occupied by each plant species was then calculated by dividing the total length shared by each plant species by the length of the transect line (50 m) and converted into percentiles.

The data on absolute cover occupied in a total 10 stands was analyzed through two ways indicator species analysis, using TWINSPAN (a DOS based computer programme). The groups of transects, having reasonable similarity in the species composition and cover, were identified, using ordination achieved through TWINSPAN. Each of the group was recognized as a plant community and was named after the plant species contributing significant cover.

## FIELD VISITS

Ten places in the district, considered probably containing Goral, were brought under study, having favorable habitat under direct exploitation of the grey Goral. The location of these places in the district has been presented in the table below. The sites were frequently visited during 2012-2013 for the collection of Goral data and people were interrogated. More attention was given to the threats, causing Goral extinction.

## QUESTIONNAIRES

The local hunters, prominent persons and staff of the wild life department of the area were contacted for the presence of the grey goral, using colored photograph of the grey goral and its local name. The area was also physically scanned for the presence of some indirect indications of the species, like, foot prints, fecal pellets, hair etc. The potential areas, exhibiting the indirect evidences of the presence of goral and confirmed by the information available with the local people, were then earmarked for the further studies.

Behavior was observed with taking care not to disturb the animal. Observations were recorded as field notes and organized subsequently to develop inferences on

the general behavior of this species. The activities were categorized as *resting* (relaxed posture with no activity: standing, sitting or lying down), *feeding* (on wild vegetation or cut forage), *rumination* (regurgitating and chewing: standing or sitting), *agonistic* (alert posture: upright tail, forceful striking of fore-legs against ground), *sleeping* (lying down with eyes closed) and *other activities* (mainly moving with no apparent aim plus minor activities, like urination, defecation, drinking, etc.).

Binoculars were used in order to see the distant habitats and valleys where goral resides. It helped in diagnosis of vegetation at each Goral point and other factors affecting Goral's life and population.

Digital cameras were used in order to click images of the important habitats and footsteps of goral. It helped in collection of snaps of various localities containing Goral population.

GPS (Global Postioning System) was used in order to study the elevation, latitude and longitude of the area. A digital machine for this purpose was brought into action. It helped in locating the sites containing Goral. It helped in comparing the locality with other international spots of Goral.

Elders of the area were interrogated about the population size of certain animals ago, in order to compare the population with current population and thus obtain a graphical change in the population. These elders contained persons aging more than fifty years. Thus they had a sound knowledge of Goral population in the area decades back in time. They testified decline in Goral population in the area because of over hunting and habitat destruction.

Maximum help was taken from local people and wild life watchers because they are familiar with the area and have a sound knowledge of the habitats and behavior of animals (Table 1).

## RESULTS

### Introduction to study area

District Buner is sandwiched by the District Mardan, Swabi, Haripur, Shangla, Swat and Malakand. It is a hilly area and is surrounded by steep mountains on every side. Because of presence of hills, it provides a suitable habitat to the Goral population. Much of the hills in the District are covered by deciduous forests and thus providing better phyto-habitat for wild life. Among some other vital mammal species, these forests inhabit Goral also. Regular habitat destruction is a severe threat to Goral population in the District (Figure 1).

Goral is fast-footed animal and during field visits it is difficult to observe it. So, other collections including fecal samples and paw's prints are collected during study. The paw shape is like the common goat, while the fecal pellets are smaller in size than that of grazing sheep. The photo shows the fecal collection in mountainous habitat. It can be seen the pellets are smaller in diameter than common sheep pellets (Figure 2).

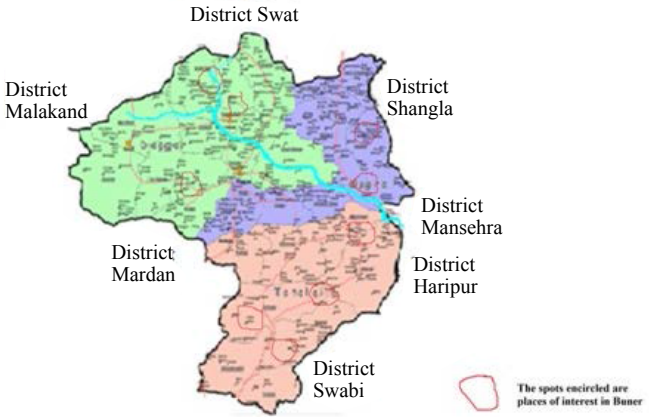


**Figure 1:** District Buner Map (By WFO, District Buner, 2009).

**Figure 2:** Fecal sample of Goral.

| Locality | N° | E° | Altitude | District |
|---|---|---|---|---|
| Nanser | 34°26.752°-29.512 | 72°17.627°-20.406° | 864-1626m | Buner |
| Elum | 34°36.099'-38.492' | 72°18.394'-21.802' | 1100-1500m | Buner |
| Kohay | 34°27.752-29.512 | 72°17.627-20.40 | 1345-2606m | Buner |
| Babosar pirbaba | 34° 23.636-25.732 | 72°23.280-26.811 | 800-1345m | Buner |
| Merdara amnawr | 34° 13.963-22.527 | 72°27.416-37.968 | 720-1234m | Buner |
| Mangal thana | 34° 15.435-17.315 | 72°39.127-42.445 | 1004-1999m | Buner |
| Gokand | 34° 17.128-19.495 | 72°34.753-39.968 | 1000-1232m | Buner |
| Malka | 34° 19.188-20.527 | 72°41.483-45.258 | 1494-2039m | Buner |
| Chagharzo | 34° 25.122-24.324 | 72°34.345-45.321 | 1200-1456m | Buner |
| Ambela | 34°14.112'25.732 | 72°44.568-47.260' | 981-1523m | Buner |

**Table 1:** Table shows an account of Goral points dispersed in District Buner.

Valleys, densely covered by shrubs are the favorite habitats of Goral. Interestingly, such spots are common in the District. The ten stands under study are all covered with a dense cover of shrubs, commonly including *Dodonea viscosa* species. These shrubs provide them a better place to hide during day hours. While, at night they can be seen wandering in the fields. They graze there in morning and at night. The day time they can't be seen, it is because it is their resting period. Removal of these shrubs for fuel by the human population of these stands causes threat to Goral population because the Goral do not find place to hide and are thus easily hunted.

The steep mountainous line is part of Sakra range. It is a long range, up to District Mardan in the west. The peaks of this range are covered with shrubs including *Dodonea viscosa* and some other species that is why Gorals inhabit even these peeks.

Human being is the only species, which is increasing successively globally. Human population pressure on the biosphere is directly affecting the wild life. It is because human use the forests and animals for their use like fuel, leather products, meat etc. The increase in human population means increase in needs, which results in exploitation of the natural resources including wild life and forests.

The above photo shows village Nanser, District Buner as a sample of increasing human population in District Buner at Goral points, this destroys the natural silence of the forests necessary for the wild life.

The people of these nearby villages cut trees for fuel, graze their domesticated sheep and goat in these forests, kill wild animals for meat and exploit the natural resources.

**Map Village Kohay and Nanser: (Part of the area of interest)**

Village Nanser and Kohay are important places containing Goral population. It is surrounded by high mountains from each side. Various ranges including Sakra range, Babozay mountains, and Sabaga mountains are present here. Collectively these mountains provide Goral with a favorite habitat (Figure 3).

The peaks are covered with trees and shrubs and thus Gorals have a pretty chance of hiding themselves.

Kohay village and Nanser are separated from each other by a mountainous range among it as shown in the above snap. This special range includes Badrtangi, Chorbanda, Sabaga and Sakra range (Tables 2-5).

Nanser game reserves contain a pretty population of Goral. The documented data shows that successful population size of Goral exists in the area of interest. Young babies were also observed in this stand.

During field visits many prominent persons of the area were interrogated about Goral population in their

| | |
|---|---|
| **Sex** | 501143 |
| **Male** | 249917 |
| **Female** | 251226 |
| **Density (per Sq.Km)** | 272 |
| **Annual Growth Rate** | 3.80% |

**Table 2:** Table showing Human Population status in District Buner

| | |
|---|---|
| **Total Area** | 1743.67 Sq Km i.e. 4,25,757 Acres |
| **Agricultural land** | 36,880 Acres |
| **Irrigated Land** | 37,316 Acres |
| **Rain Fed Land** | 99,562 Acres |

**Table 3:** Table showing Land details of District Buner.

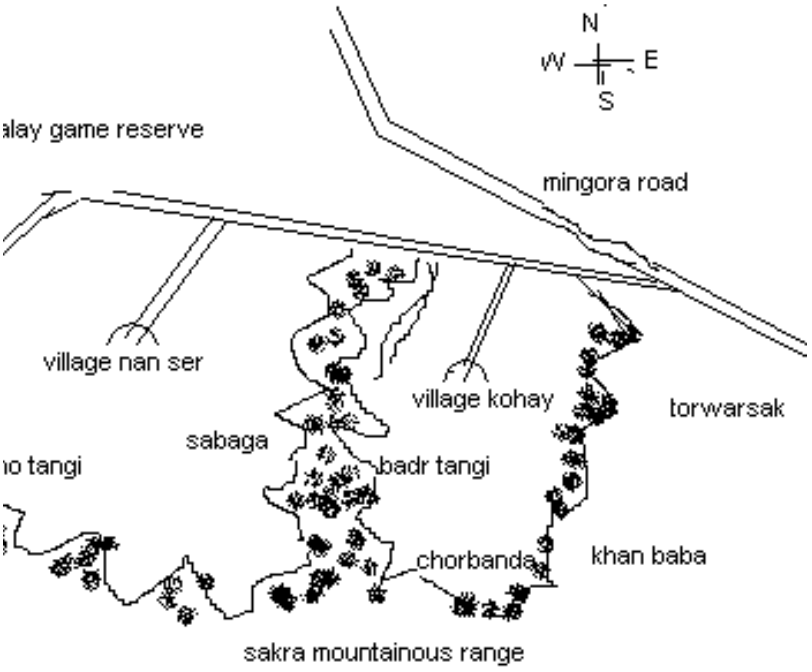


**Figure 3:** Map showing Goral habitat at Village Kohay and Nanser.

| Locality | N° | E° | Altitude | District |
|---|---|---|---|---|
| Nanser | 34°26.752°-29.512 | 72°17.627°-20.406° | 864-1626m | Buner |
| Elum | 34°36.099'-38.492' | 72°18.394'-21.802' | 1100-1500m | Buner |
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| Malka | 34° 19.188-20.527 | 72°41.483-45.258 | 1494-2039m | Buner |
| Chagharzo | 34° 25.122-24.324 | 72°34.345-45.321 | 1200-1456m | Buner |
| Ambela | 34°14.112'25.732 | 72°44.568-47.260' | 981-1523m | Buner |

**Table 4:** Table gives an account of Goral points dispersed in District Buner.

| Serial No | Area Name | Goral No. | Male No. | Female No. | Young's |
|---|---|---|---|---|---|
| 1 | YakhTangi | 5 | 1 | 2 | 2 |
| 2 | BoseraGata | 4 | 1 | 2 | 1 |
| 3 | SarDeray | 3 | 1 | 1 | 1 |
| 4 | GataGaray | 4 | 1 | 2 | 1 |
| 5 | AmoTangi | 5 | 1 | 2 | 2 |
| 6 | LoiPitaw | 6 | 2 | 2 | 2 |
| 7 | Kohay | 3 | 1 | 1 | 1 |
| 8 | ShamshadTangi | 4 | 1 | 2 | 1 |
| 9 | LoyaGoday | 4 | 1 | 2 | 1 |

**Table 5:** Goral population at Nanser Game Reserve.

| Goral point | No in 1990 | No in 1997 | No in 2002 | No in 2007 | No in 2013 |
|---|---|---|---|---|---|
| Nanser | 147 | 105 | 80 | 60 | 47 |
| Elum | 211 | 189 | 165 | 99 | 85 |
| Babosar Pir Baba | 35 | 27 | 21 | 17 | 09 |
| Merdara Amnawar | 67 | 53 | 42 | 35 | 17 |
| Mangal Thana | 33 | 27 | 21 | 17 | 13 |
| Gokand Shangla border | 113 | 92 | 77 | 61 | 29 |
| Malka | 114 | 99 | 76 | 53 | 34 |
| Chagharzo | 677 | 564 | 453 | 342 | 256 |
| Ambela | 100 | 80 | 55 | 43 | 34 |
| Kohay | 321 | 234 | 165 | 132 | 65 |

**Table 6:** Goral population declines in ten stands of District Buner in decades.

respective era. Skilled hunters were of the opinion that proper hunting does not affect Goral population but the young unskilled hunters do not know the right time to hunt and thus kill pregnant Goral females.

Young hunters catch the babies or kill them. As clear, young babies is the potential source of race continuation of a species. Killing babies means killing the future generation of Goral.

It is suggested, strict actions should be taken against those who are found guilty of harming the young babies of Goral.

Researches should be encouraged in this connection. The babies should be supervises so that they may be secured of any possible threat (Table 6).

A continuous decline in Goral population is seen. The bar graphs show a disastrous decrease in Goral population size in District Buner annually. It is because the habitat is continuously destroyed and the animal is hunted mercilessly.

The wild life department is working for the conservation of this precious gift of nature, but unfortunately the public negligence and understatement of wild life importance leads to havoc.

New forests should be installed in those areas where the previous trees have been cut or torched.

Substitute sources of fuel wood should be provided in order to reduce deforestation. Instead of cutting wood for timber, iron furniture should be introduced. The phyto-habitat of Goral must be checked regularly, and habitat conservation must be achieved.

It is hoped the above suggestions will bring a positive change and the day will not be far, when again Gorals will be seen in pretty number in the District.

## DISCUSSION

Gorals presently occur only in Asia, the swat locality for the goral, with the main surviving population in the Indus Kohistan mountainous region (Robert, 1977). Dolan (1963) indicated that *N. g. goral* extends into the Russian territory (Tadzhikskaya), but this record appears not to be substantiated recently.

Gorals are common to Asia hence are found in Pakistan as well. In Khyber Pukhtunkhwa province it is mainly found in northern areas in elevation up to 3000 m. Likewise, it is found in hilly parts of District Buner including Nanser, Kingargaly, Gokand, Amnawar and Mangalthana etc. These are the main sites of Goral in District Buner.

Goral is mainly found in Oriental region on the world including countries like Pakistan and India. Those areas of China, which are in contact with the Himalayan region of Pakistan, northern border, also contain Gorals in large number. Distribtion of Gorals throughout central and eastern China apparently is changing rapidly, they occur in Hunan, Schiuan, Fujian, Shaannxi, Shanxi, Heibi, Xizang, Hubei, and Yunnan, but are absent from Nei Mongol (Allen, 1930).

The northern distribution of gorals occurs from Manchuria (Heilongjiang and Jilin) into North Korea (presently southern extension in Korea is unknown) and on into the coastal mountains of the Sikhote-Alin' range of southeastern Siberia. Presently, gorals are expirated from the area adjoining the Bureinsk Range within the last century (Nasimovitch, 1955).

Change in Goral population occurs either because of migration, urbanization, seasonal changes, hunting or habitat destruction.Goral restriction into a specific area is because of physical and seasonal barriers. Physical barriers include presence of sea, mountain, motorways or cities. While, seasonal barriers are temperature variations, flooding, snowfall and other affecting fluctuations in weather.

Where they do occur, gorals appear to be most common along the steep cliffs adjacent to the ocean up to 1,000 m elevation (Nasimovitch, 1955). *Nemorhaedus* typically are found in rugged, wooded, mountainous terrain at elevation of 1,000 to 4,000 m. Gorals in Pakistan are found in the sclerophyllus forest zone, a subtropical pine community between 940 and 2,000 m elevation. Here, gorals live in a plant community of *pinusroxburghii, Quercusincana,* and *Berberis*. In Punjab province the goral ranges from 820 to 1,500 m elevation. Gorals in Swat Province frequent precipitous cliffs up to 1,950 m elevation (Roberts, 1977).

Gorals are known as cliff lovers, as they like and inhabit cliffs better than plan habitats. The locations where Gorals were reported in District Buner are elevated and cliffs existed there.

"Cranbrooki" is reported to live in mountain forests from 2,000 to 4,500 m elevation in southern China (Zhang, 1987).

Gorals are found at high elevations in various parts of the world. Gorals at District Buner are also at elevations up to 3000 m. They are found at sub-tropicaldeciduous forests in these mountains. Commonly grey Goral is found in District Buner. Other sub species of Goral are found in other parts of the country including Gilgit, Mansehra and other northern parts of Pakistan.

The diet of *N. g. caudatus*is widely varied consisting of graze and browse species; seasonal changes in diet are known (Bromlei, 1956). "Cranbrooki" graze on sunny, grassy slopes, feeding mainly on *Usnea* and other lichens and grasses (Zhang, 1987).

Gorals in District Buner graze upon common grasses including crops of wheat, maize and pea plants. The common grass by which Goral graze in District Buner is *Cynodondatyolon,* named (Kabal). In densely covered mountains lichens are used as main source of feeding for Goral. During research trips, many lichens of trees were found scratched by Gorals for food.

Nasimovitch (1955) found gorals to be tree and shrubbrowsers (evergreen herbage, broadleaf trees, and shrubs as principal foods) during winter months. Gorals feed in the morning and late in the evening (Mead, 1989).

During winter months, fodder become scarce for Gorals, and they start using different foods including leaves of various evergreen shrubs in their vicinity. Because of their feeding in dark, they cannot be seen easily. The grass covered with dew drops serve them both as food and water source. The water balance in their body is balanced by their strong Homeostatic conditions inside their body.

A species has a specific range of tolerance to all the different biotic and abiotic factors depending upon its genetic potentials. It can amiably tolerate the changes in the environmental conditions, if they remain within the range of tolerance of the species. The continuous availability of all such factors ensures the presence of a particular species in a geographic locality. The changes in the habitat can also be tolerated by the species, if they remain within permissible limits of its specific range of tolerance. The effective development of management plan for a species requires a study on the total Ecobiology of the species, so that the limiting factor could be well imagined and the requirements of the animal are well understood.

Gorals are the smallest of the rupicaprines. Shoulder height ranges from 570 to 711 mm in the USSR, 580 mm for males and 601 for females of "cranbrooki" (Zhang, 1987).

Mass is approximately 22 to 35 kg (Primrose, 1911). The horns are short (127 to 178 mm is typical, but 235 mm is known). For "cranbrooki" ranges for males=125 to 160 mm for males and for females, range=118 to 150 mm (Zhang, 1987).

Goral is 95 to 130 cm in length and weighs 35 to 42 Kg. It has a gray or gray brown coat with tan legs, lighter patches on its throat, and a single dark stripe along its spine. Males have short manes on their necks. Both males and females have backward-curving horns, which can grow up to 18cm in length. Its ears and horns can be as long as 6 cm. In addition to some peculiarities in the form of the skull, gorals are chiefly distinguished from the closely related serows in that they do not possess a gland below the eye, nor a corresponding depression in the skull.

Gorals associate in small groups of 12 or fewer individuals during most times of the year. Seasonal migrations usually are <2 km in steep, rocky regions. During summer months in USSR, gorals usually do not travel <1 km from the steep sea cliffs (Nasimovitch, 1955). Gorals do not move or take flight until the intruder is almost upon them. When in flight, they often bound away uphill, with long leaps in an irregular pattern; they are expert climbers. Gorals at rest tuck their legs under the body and head, with the neck directed forward flush against the ground, making concealment effective (Mead, 1989).

During the mating season, males may occupy and mark territories of from 22 to 25 ha by means of the glandular secretion on rocks and vegetation. In southern USSR, gorals form no harems, and each male mate with no more than six females. Vocalization is reported as only a hissing alarm snort (Myslenkov and Voloshina, 1978).

They live in small bands of four to twelve individuals at a place. The animal is crepuscular in nature, being most active in the early morning and late evening. After morning grazing, it often drinks and then rests on a rock ledge through the day. It feeds on leaves and associated softer parts of plants, mainly grasses.

It is very agile and can run fast. Due to its coloration it is very difficult to sight it, especially since it spends much of the day lying still. However, it is hunted by various predators. When threatened, the goral will vocalize with hissing or sneezing sounds.

Some of the most important companions of Man, like, cattle, sheep/goat, along with goat-antelopes, shrub and musk oxen, gazelles and their relatives, belong to family Bovidae, the largest family of the artiodactyls with 49 genera and 155 species (Walker *et al*., 1964).

It can live for 14 to 15 years. The female gives birth after a gestation period of 170 to 218 days, usually to a single offspring. The young are weaned at 7 or 8 months of age and reach sexual maturity at round 3 years. Its breeding season is from April to September. It produces single baby a year. It does not drink water in large amount and the conservation of water in body occurs by active homeostasis in its body. Its poops sized 0.5 cm in diameter. Thus they can be distinguished from the poops of grazing domestic sheep which ranges from 2 to 3 cm in diameter. It is friendly Rhesus monkey, thus the presence of rhesus monkey in an area indicates the presence of goral in the respective vicinity.

Goral when gets frightened, runs with a high speed but then suddenly stops in order to see whether the predator is still following him, the hunters get a golden chance to shoot it during this stay. Human activities caused decline in Goral population. It was found that most of the Goral points of the District were destroyed because of deforestation and other exploiting habits of human being. These points had a dense population of Goral in recent past. In a decade, a prominent decline was seen because of over hunting, lawlessness, lack of awareness and habitat destruction.

## CONCLUSION

It was concluded from the study that the major threats leading to the extinction of Goral in district Buner includes deforestation, lack of proper habitat, illegal anthropogenic over hunting, over grazing and most importantly lack of public awareness about wild life importance.

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