

On the Distribution of Punjab Urial (*Ovis vignei punjabiensis*)

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Abstract

The Punjab urial (*Ovis vignei punjabiensis*) is endemic to northern Punjab, Pakistan and is currently classified as endangered in the IUCN (2003) Red Data Book for mammals. The aim of this study was to describe the current distribution of Punjab urial in Salt and Kala Chitta Ranges. This animal once occupied mountainous terrain throughout northern Punjab, however, due to a combination of un-sustainable subsistence and recreational hunting, lamb capture, habitat alteration and disease its population has greatly been reduced to an estimated total of about 1,000 heads inhabiting less than one-third of their original range.

Keywords: Punjab urial, *Ovis vignei punjabiensis*, Kala Chitta, Salt Range, distribution.

Introduction

The Punjab urial (*Ovis vignei punjabiensis*) is endemic to northern Punjab, Pakistan and is currently classified as endangered (IUCN, 2003). Apart from its trophy value in sport hunting, it is also traditionally prized as a pet by animal collectors. The Punjab urial is the principal mammalian game species of the scrub forest in Salt and Kala Chitta Ranges (Aleem 1977, Mirza *et al.* 1980, Chaudhry *et al.* 1988). In the Salt Range and the low hill tracts in southern NWFP it is typically associated with lower rounded stony hills sparsely covered with wild olive (*Olea ferruginea*) and phulai (*Acacia modesta*) (Roberts 1997). The distribution of the subspecies in Pakistan is between the Indus and Jhelum rivers at elevations of 250 -1,500 m. The taxonomic status of the urial population living along the west (right) bank of the Indus River is uncertain (Schaller and Mirza 1974, Frisina *et al.* 2001).

The first documented record of Punjab urial in Salt Range occurred in 1621, by emperor Noor-ud-Din Muhammad Jehangir, who hunted urial near the River Jhelum (Quddusi 1970). Punjab urial is known to have a restricted distribution range and found only in the Salt and Kala Chitta Mountain Ranges and is confined by a coniferous forest belt in the north the Jhelum River in the east and south and Indus River in the west (Schaller and Mirza 1974, Schaller 1977). Schaller (1977) suggested that the animal must have immigrated from the west, a herd perhaps crossing the Indus at a time when landslides temporarily dammed the river in the mountains. It formerly was distributed throughout these mountains, but it underwent a substantial decline in the twentieth century. By the early 2000s the greatest concentration occurred within the Salt Range, mainly at Kalabagh in the western extremity near the River Indus.

There is no way to know precisely the historic population size. Reports from expeditions, naturalists, and hunters to the region in the early 1900s (Lydekker 1913, Burton 1920, Stockley 1922, Mounfort 1969) suggest that urials were once plentiful in the mountains of northern Punjab, but no figure has ever been given. Schaller (1977) gave quantitative figure and depicted that the world population of this subspecies may not exceed 2,000 animals. Mirza *et al.* (1980) estimated 2,157 animals in the total range. Currently the Kalabagh Game Reserve supporting almost 50% population of the Punjab urial. Few assessments of Punjab urial status have been conducted. With the exception of observations made by Mounfort (1969), Schaller and Mirza (1974), Schaller (1977), Chaudhry *et al.* (1988) and Mirza *et al.* (1980), virtually nothing is known about this species (Edge and Olson-Edge 1987).

For the effective management of a species or population, Rubin *et al.* (1998) stressed for the need of accurate knowledge of its spatial distribution, with this aim, present study to describe the current distribution of Punjab urial in Salt and Kala Chitta Ranges was conducted.

Materials and Methods

The Salt Range area was surveyed twice per year in April and December from 1999 to 2001 to obtain data on urial distribution and abundance. All surveys were conducted on foot and urial observations were made from ridges and in ravines in the early morning and evening, using high magnification spotting scopes and binoculars. When an urial herd was located the number of individuals was counted. Presence or absence of urial was confirmed from direct (sightings) or indirect (pellets and foot prints) evidences. The distribution study in Kala Chitta Range was based on short surveys (one week for the whole range) conducted at three locations. Locations of the evidences or sightings were recorded with the help of a GPS. In addition, the above-mentioned two methods were employed to collect information about urial distribution.

Published data and official reports were reviewed to summarize the distribution of Punjab urial. Questionnaires were sent to district wildlife officers of the Salt and Kala Chitta ranges and to hunting associations. Sixty five professional hunters, about one hundred livestock shepherds (aged approximately 45 years and older) were interviewed from 1999 to 2001 to gather anecdotal information on urial distribution and status.

Areas of suitable habitat for urial were identified using a geo-rectified September 2001 landsat-7 image of the study area and then surveyed to record presence or absence of urial. The Punjab urial range was determined by plotting all sightings from the literature and those collected by this study during 1999 -- 2001. The probable distribution of Punjab urial was plotted based on locations and geographic features that were considered barriers to dispersal (e.g. Indus River). Because Schaller and Mirza (1974) suggested that the taxonomic status of urial living along the west bank of the Indus River is uncertain, this estimated distribution should be viewed as conservative.

The position of all evidences of presence of the animal were recorded using Garmin III GPS receivers. These locations (waypoints) were later converted into geographic information system (GIS) as shape files, and were displayed over Landsat-7 satellite data using ESRI's ArcView ver. 3.1 software with Image Analysis module. A five-kilometer buffer was established around each waypoint. Using visual interpretation from Landsat-7 data, these buffer regions were further modified by excluding clearly unsuitable habitat such as flat plains and agricultural land. Thus, 13 populations were mapped in the Salt Range and their ranges were calculated using GIS.

Results

During this investigation 867 direct observations of urial were made. These observations revealed that the distribution of urial was not continuous in the Salt and Kala Chitta Ranges. Observed discontinuities resulted in the fifteen small, scattered populations in the range of distribution of this subspecies (Fig 1): (1) Bagh Nelab area, (2) Akhori, (3) Kalabagh Game Reserve, (4) K. garden and Thoa, (5) Sodhi Wildlife Sanctuary, (6) R. Wasnal, (7) Nillawahan, (8) Sardi and M2, (9) Chhumbi Surla Wildlife Sanctuary, (10) Gharibwal, (11) Jalalpur Sharif Wildlife Sanctuary, (12) Tilla, (13) Nilli and Phadial, (14) Taraki, (15) Lehri and (16) Makhad Sharif on River Indus, with major concentration in the Kalabagh Game Reserve. Only one population has more than 300 animals and only 2 populations have ≥ 80 animals. Currently urial occupy an estimated 1,265 km² in the Salt Range, supporting about 80% (860) urial population.

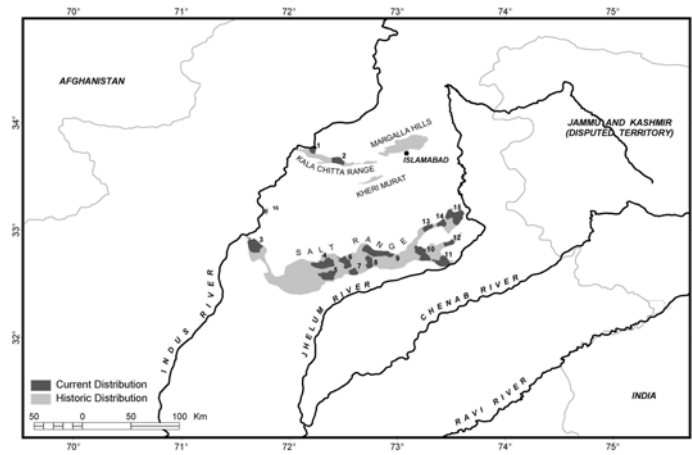


Fig. 1. Total estimated distribution of Punjab urial (*Ovis vignei punjabiensis*) based on the results of field surveys conducted in 1999 – 2002.

Figure 1 illustrates the current estimated range and the historical distribution of Punjab urial at the beginning of the twentieth century. Punjab urial were mostly observed at sites with in low hills or on undulating ground deeply intersected with narrow gullies and ravines, knife edges or ridges of red marl, against which their foxy red coats are hardly visible, except at close quarters.

Historically the range of distribution of Punjab urial included the Margalla Hills Range, Kala Chitta Range, Khair-i- Murat Range and Salt Range (Table I). Our review of all historical evidence of presence suggests that a minimum of two populations of Punjab urial have been extirpated (Table II).

Table I. Historic Range of the Punjab urial.

Locality	Approximate Area (km²)
Margalla Hills Range	436.86
Kala Chitta Range	321.65
Kheri Murat Hills	50.40
Salt Range	4334.40
Total Range	5143.31

Table II. Punjab urial populations lost in Pakistan since 1935.

Population lost (evidence of loss)	Evidence of existence
Margalla Hills, IUCN (1992), Present study Kheri Murat Hills, Roberts (1997), Present study	Burton (1920), GOP (1968), Roberts (1966) GOP (1968), Roberts (1966)

The Salt Range constitutes almost 84% of Punjab urial historic range, but the area used by urials within the Salt Range has declined by about 70% from the historic range. Over the entire range of distribution, we estimate a decline of 73% in area of occupancy.

Discussion

This investigation yielded a decline of more than 70% in the range of distribution and of almost 50% in numbers. This calculated high rate of decrease in range is mostly due to the fact that the large valleys amounting to approximately 1,000 km² were once freely used by urial for inter mountain movements but are now occupied by relatively dense human populations and have largely been converted to agricultural use. Human settlement in the valleys has rendered most of them unsuitable as urial habitat. Many authors (Geist 1971, Bleich *et al.* 1990) highlighted the importance of availability of areas within mountain ranges for long- term survival of mountain sheep. The decline in distribution apparently accelerated with increasing fragmentation of the surviving urial population due to more extensive cultivation, construction of new roads and other human development within the urial range.

This investigation concluded that urial in the Salt and Kala Chitta Ranges exhibited a fragmented distribution and that ≥ 15 populations existed as a result of this fragmentation. These populations have been forced in to the most isolated portions as isolated remnant populations of questionable viability, separated from former ranges by highways, fences and residential areas. Berger (1990) and Krausman *et al.* (1999) suggested that mountain sheep populations fewer than 50 individuals may be susceptible to extinction. Rubin *et al.* (1998) suggested for bighorn sheep that fragmentation is typically seen as detrimental to population viability in the long run, but a certain degree of fragmentation is an inherent component of population structure.

According to Hess *et al.* (1997) Punjab urial are found as small scattered populations throughout the Kala Chitta and Salt Range. Several factors increase in poaching, grazing pressure, natural resources exploitation, pet trade (Awan 2001) construction of roads and use of off- road vehicles, the loss of habitat to urban development and agriculture coupled with reduced law enforcement and major social changes has resulted in reduction in number and range. Similar factors were identified by Valdez *et al.* (1995) in reduction in numbers and range of wildlife in Mongolia.

Over the last decades, intermountain valleys and foothill areas reduced in Pakistan due to urban development and agriculture and this process is still going on. This may have serious consequences on populations of urial as well as on entire ecosystem in Salt Range.

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