

City	GPS coordinates	Number of visits	Dorcas Gazelle	Dama Gazelle	Barbary Sheep	Barbary stag	Wild Boar	Zebra	Giraffe
Fez	34N -5W	4/1/1	5/9/6			2/0/1	0/1/1		
Meknes	33.9N -5.6W	4/2/1	8/2/2						
Rabat	34N -6.9W	4/2/1	7/5/7	1/0/0					
Salé	34N -6.8W	1/1	0/1			1/0			
Marrakech	31.6N -8W	3/1/1	32/9/9		0/4/2	0/0/1	4/2/0	0/0/2	
Casablanca	33.5N -7.6W	1/1	10/12/3			0/1		0/0/1	0/0/1
Safi	32.3N -9.2W	1/0	1/-						
Taroudant	30.5N -8.9W	1/1	1/3						
Asilah	35.5N -6W	1/0	2/-						
Taza	34.2N -4W	1/0	2/-						
Tanger	35.8N -5.8W	2/1/1	0/3/0						
Total			137	1	6	6	8	3	1

Table 1. Table of cities in which ungulate parts were observed showing coordinates of the city, number of repeat surveys in the markets for 2013/2014 and numbers of each species observed 2013/2014

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The Ungulate Community of upper Humla, North-Western Nepal

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INTRODUCTION

The dramatic increase of altitude in Nepal from the tropical lowlands in the south up the steep mountains of the Himalayan range to the rolling alpine grasslands of the trans-Himalayas on the Tibetan plateau in the north results in a variety of different habitats, which comprise a large diversity of flora and fauna. The Himalayan region is recognized as a global biodiversity hotspot (Myers et al. 2000). In the north-western corner of Nepal lies the remote district of Humla which borders the Tibetan Autonomous Region in China on the north and is situated in the south-western corner of the Tibetan plateau (MacNally 1998). Upper Humla contains trans-Himalayan habitats with its alpine grasslands being roamed by a diverse but little described ungulate community, which is the subject of this report.

We report the findings on ungulate species recorded in the area during research expeditions conducted in 2013 and 2014 for snow leopard *Panthera uncia* and grey wolf *Canis lupus* respectively. These expeditions have revealed the presence of many ungulate species of interest such as Tibetan gazelle *Procapra picticaudata*, argali *Ovis ammon*, kiang *Equus kiang*, and blue sheep *Pseudois nayaur* in this yet relatively intact alpine grassland ecosystem.

STUDY AREA

The study area is situated in the trans-Himalayan landscapes of Limi Village Development Committee (VDC) of Humla district in Nepal (Figure 1). Two study sites, *Ngin khola* and *Chyakpalung*, ranging in elevation from 4500m to 5200m above sea level, were explored during the early summer months of May-July in 2013 and 2014. The habitat is characterized by alpine steppe vegetation (Schaller 1998) and is home to a diverse high-altitude wildlife community including snow leopard, wolf, red fox *Vulpes vulpes*, Tibetan fox *Vulpes ferrilata*, Himalayan marmot *Marmota himalayana*, blue sheep and kiang (personal observations). The closest permanent settlements to the study area are Jhang and Halji village in Limi valley, and can be reached within 1-2 days of walking. A dirt road from Jhang to the Chinese border to the North has been in place for a few years, but traffic is extremely low (1-2 vehicles per day) and limited to the snow free summer months of June to August. No permanent human settlements are found in the study area due to the harsh climatic conditions, but nomadic pastoralists herd

their yaks and sheep in the area for 1-2 summer months. The people of Limi valley belong to the Tibetan ethnic group known as Lama and are closely tied to the Tibetan culture. For their livelihood they grow crops and keep livestock such as yaks *Bos grunniens*, horses *Equus ferus caballus*, sheep *Ovis aries* and goats *Capra aegagrus hircus*.

METHOD

The valleys of the area were frequently scanned by binoculars and a spotting scope from appropriate vantage points to search for ungulates. Observations were made for about half an hour at each vantage point. Once animals were sighted, information on herd size, demographics, habitat type, dominant topographic feature, direction and distance were noted, and the locations were marked with a GPS unit (Jackson and Hunter, 1996). In addition all opportunistic observations of ungulates were recorded in the same manner during the entire study periods.

RESULTS

Tibetan gazelle distribution update

Four individuals of Tibetan gazelle *Procapra picticaudata* were seen during June 2013 within a herd of kiang at location one (Figure 1). A group of six Tibetan gazelles were again encountered in the same area during June and July of 2014 on multiple occasions. In summary these sightings took place around two locations approximately 5km apart from each other (location one: 81.60652°E, 30.3804°N, elevation: 5017m above sea level; location two: 81.61273°E, 30.40163°N, elevation: 4950m above sea level). The Tibetan gazelles were often seen in proximity to kiang aggregations.

Tibetan Antelope: Historical presence

The historical presence of Tibetan antelope in the rolling grasslands of the *Chyakpalung* area has been reported by local people. Horns of Tibetan antelope have been observed in local houses in Halji village (Figure 4). The horns are used by the villagers while conducting a special worship for their land. However, reports regarding the current presence of the species in the area are lacking and also the research teams did not record the species in either year, which supports the possibility of their local extinction.

Other ungulates: argali, kiang and blue sheep

In the *Chyakpalung* area abundant kiang aggregations comprising around 571 individuals during 2013 and an estimated 800 individuals during 2014 were recorded. Other documented ungulate species in the *Chyakpalung* area were argali *Ovis ammon* and blue sheep. During July 2013 three adult female argali accompanied by two lambs were sighted in a rocky hillslope (Figure 5). During July 2014 again a single argali was seen almost at the same location in proximity to an aggregation of approximately 50 kiangs (Figure 6). In *Ngin khola* blue sheep was the main recorded ungulate during both years, with one single kiang recorded only during 2014.

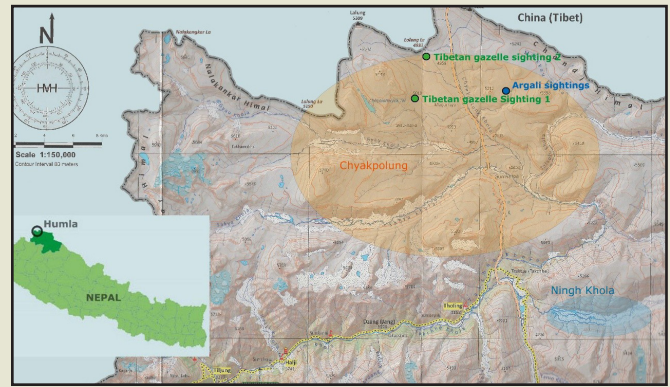


Figure 1. Study location in upper Humla with the sighting locations of Tibetan Gazelle indicated by green circles, and the sighting location of argali indicated by the blue circle. Kiang were observed within the entire Chyakpalung area which is indicated by the transparent orange eclipse, while for the second study site Ngin Khola, indicated by the blue transparent eclipse, blue sheep was the main observed ungulate species (Map modified from Himalayan Map-house 2011 and Wikimedia 2014).



Figure 2 and 3. A group of six Tibetan gazelles at sighting location two during June 2014.



Figure 4. Horn of a Tibetan antelope in a local house in Halji village, Limi valley.



Figure 5. A group of three (only two visible) adult argali with two juveniles seen during July 2013. Sighting location at 81.6696°E, 30.3834°N, and 5033m above sea level.

DISCUSSION

Our documentation of Tibetan gazelle represents a distribution range update for the species in Nepal. Currently Nepal is not listed in the IUCN assessment as a range country for this species with conservation status 'Near Threatened' (Mallon and Bhatnagar 2008). However, the national red list series for Nepal reports the species from the central region of Nepal in *Korralla* and *Dhalung* in the Mustang district within the Annapurna Conservation Area (Jnawali et al. 2011).



Figure 6. One argali sighted in proximity to kiang in July 2014. Sighting location at 81.659695°E, 30.383391°N, and 5033m above sea level.

The Tibetan antelope is classified as 'Endangered' by the IUCN Red List with a decreasing population trend and expected regional extinction in Nepal (Mallon 2008). The lack of sighting reports from our study area during both research expeditions support the possibility of their regional extinction. However a more detailed study seems required to confirm this assumption.

The documentation of argali in this area also represents a distribution range update for the species in Nepal. The argali is IUCN red listed as 'Near Threatened' and the population size of argali in Nepal is unknown (Harris and Reading 2008). But the Nepalese population is assumed to be small with its presence only confirmed for the *Damodar Kunda* rangelands of Mustang district of Annapurna Conservation Area. The subspecies reported for this north-central region of Nepal is the Tibetan Argali *Ovis ammon hodgsoni* (Shrestha et al. 2005, Jnawali et al. 2011).



And finally also documentation of kiang represents a species distribution update for Nepal. Kiang are IUCN red listed as 'Least Concern' (Shah et al. 2008), but in Nepal they have been up to date documented only from Mustang district (Jnawali et al. 2011). The entire *Chyakpalung* area contains an intact high-altitude alpine grasslands ecosystem which is inhabited by a diverse and specialized herbivore community and contains a rich flora. These facts combined with the absence of permanent human settlements render the area as of great potential for developing into a protected area in the future.

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