Short Note

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An update on the Tibetan argali *Ovis ammon hodgsoni* in Nepal

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Abstract: In Nepal, the Tibetan argali *Ovis ammon hodgsoni* was documented from the Mustang and Humla districts until 2013. In 2016, we observed a young ram in the Dolpa district, providing the third locality record. We compiled historical data and our own observation data from 2013 to 2016 to discuss the present distribution of the Tibetan argali in Nepal. We suggest reassessing the National Red List to reclassify it as either "endangered" or "vulnerable". We recommend management of livestock numbers, promotion of traditional practice of rotational grazing and raising conservation awareness, especially among herders visiting the argali habitat, for long-term conservation of the species in Nepal.

Keywords: conservation awareness; distribution; Nepal; *Ovis ammon hodgsoni*; reclassification; Tibetan argali.

The globally "near threatened" argali *Ovis ammon* (Linnaeus, 1758) is the largest of wild sheep inhabiting mountains, steppe valleys, open desert habitats and alpine grasslands of central Asia between 3000 and 5500 m above sea level (asl) (Schaller 1998, Harris and Reading 2008). Of the nine sub-species proposed for the argali (Fedosenko and Blank 2005, Wilson and Reeder 2005), Schaller (1998) refers to the argali found on the Tibetan Plateau as the Tibetan argali *O. ammon hodgsoni* (Blyth, 1841). Its distribution is restricted to China, India and Nepal, and the sub-species is listed on Appendix I of the Convention on International Trade in Endangered Species (CITES) (Jnawali et al. 2011).

The Tibetan argali is a rare ungulate of the Tibetan Plateau with an estimated global population of <7000 individuals in the wild (Schaller 1998). Its population in Nepal is considered to be small (Jnawali et al. 2011) with no estimates available of its population (Harris and Reading 2008). The sub-species is protected by the National Parks and Wildlife Conservation Act 1973 of Nepal (recently amended in May 2017) and has been assessed as data deficient in the country (Jnawali et al. 2011).

At present, the Tibetan argali is reported from two locations in the Transhimalayas of Nepal, Mustang district (Koirala and Shrestha 1997) and Humla district (Werhahn et al. 2015), both of which lie close to the international border between Nepal and the Tibetan Autonomous Region (TAR) of China.

Poaching for trophy and meat, habitat encroachment by large herds of livestock coupled with competition for food and habitat loss due to infrastructure development are considered to be the main threats to the argali across its range (Schaller 1998, Harris and Reading 2008). However, Shrestha et al. (2005) reported that food competition between domestic livestock (usually goats, *Capra aegagrus hircus*) and argali in the Damodarkund area is likely to occur only when livestock numbers increase by two- or three-fold. In this light, whether or not all these threats are related to a decline in argali numbers, remains an open question.

We opportunistically collected data on the Tibetan argali during different research expeditions (on which Tibetan argali was not the target species but rigorously recorded) in different Himalayan landscapes of Nepal from 2013 to 2016 and compiled information from published and unpublished literature. Only live sightings have been considered to infer the present distribution of argali in Nepal (Figure 1).

Shah (2003) mentioned the argali presence only in Mustang district of the Nepalese Himalayas. Chetri and Pokharel (2005) documented a total of 77 argali in the upper Domodarkund (within the Mustang district) in July 2002 thereafter no further surveys on the argali have been

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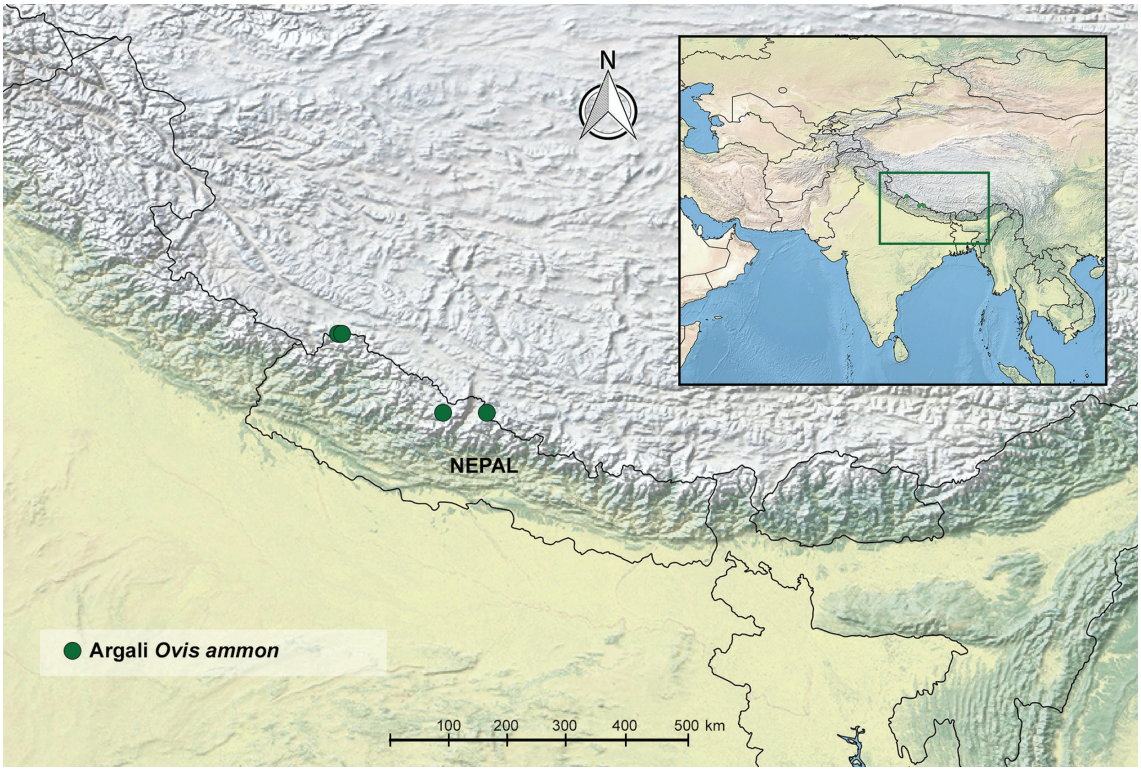

Figure 1: Locations with confirmed sightings of the Tibetan argali in Nepal (circles).

conducted in the area (T. Dahal personal communication 2016). The first author observed two adult rams in the upper Damodarkund (28.9847° N, 84.1782° E) at 5360 m asl, in 2016. (One of the two rams appears in Figure 2B). The trends of argali sightings in the Mustang district suggest the possibility of the presence of a resident population in the area.

Mitchell and Punjo (1976), cited in Shah (2003), presented historical records of the Tibetan argali from the districts of Gorkha [currently Manaslu Conservation Area (MCA)], Sankhuwasabha [currently Makalu Barun National Park (MBNP)] and Rasuwa [currently Langtang National Park (LNP)]. Similarly, Hooker (1854), cited in Schaller (1977a), mentioned an argali presence in the Taplejung district [currently Kanchenjunga Conservation Area (KCA)]. Observation of an argali skull in a villager's house in the late 1980s suggested its presence in the Mugu district (K. Shah personal communication 2017). The Tibetan argali in MCA has been already considered locally extinct (Shah 2003). The first author did not see any indication of the argali presence in LNP during three visits in 2013; the first and the last author did not get any indications of their presence in KCA during the research expeditions in September 2016 and May 2017. The Tibetan argali report from MBNP remains unconfirmed while no follow-up study has been done on argali in Mugu district. Lack of reports by local people or by the National Park and Conservation Area staff mentioning any direct and indirect evidences for the argali presence, for several years since their historical mentions, imply that the subspecies is not found at present in LNP, MBNP, KCA, MCA and Mugu. For an overview of the Tibetan argali records in Nepal, see Table 1.

The last four authors reported five argali (three adult ewes and two juveniles) in 2013 (Figure 2C) while the first and the last authors observed an adult ewe in 2014 in the alpine grasslands of Humla district (Werhahn et al. 2015). Five adult ewes were observed from the same area in 2015 (R.P. Lama personal communication 2015). The second and the third authors observed one young ram in 2016. The argali sightings in Humla of multiple animals including adult rams, adult ewes and juveniles consecutively from 2013 to 2016, hints the presence of a small transboundary population in the area.

Schaller (1977b) provided indirect evidence for the historical presence of the Tibetan argali in Dolpa district in the form of several argali skulls observed in Shey monastery and Namdo area. Wegge and Oli (1997) also suspected that the sub-species may persist in the region. But no researchers ever succeeded in confirming its presence in the region until 2016 when the first and the last authors observed a young ram in the alpine grassland

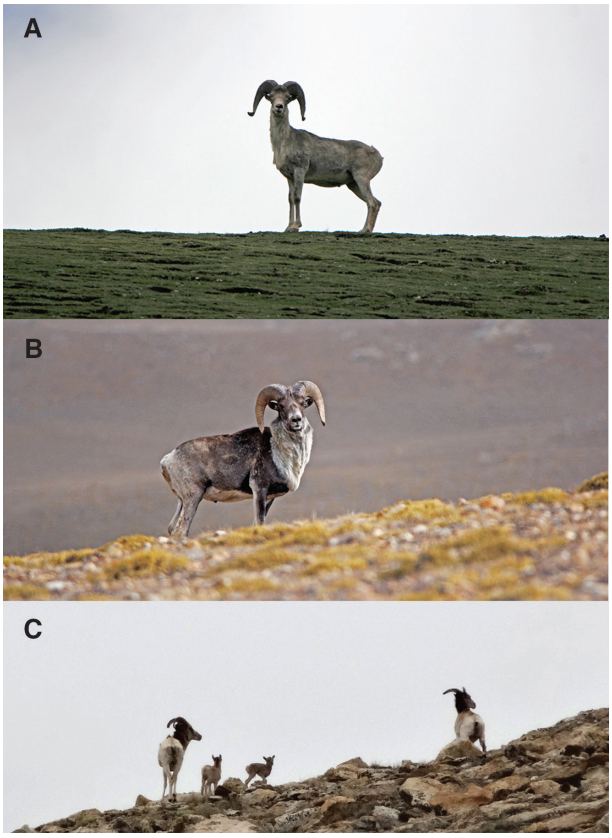

Figure 2: Photographs of the Tibetan argali from Dolpa, Mustang and Humla districts of Nepal.
(A) A young male argali seen during August 2016 in the alpine grassland of Nulungsumda within Charka VDC of Dolpa district, © Naresh Kusi. (B) One of the two adult males argali seen during November 2016 in upper Damodar kunda, © Naresh Kusi. (C) A group of three (only two visible) adult females with two juveniles seen during July 2013 in the alpine grasslands of Chyakpalung within Limi VDC of Humla district, © Geraldine Werhahn.

of Nulungsumda (28.9896°N, 83.4819°E) at 4787 m asl (Figure 2A).

Local herders in Nulungsumda reported seeing a pair of Tibetan argali consisting of an adult ram and an adult ewe since 2012. The alpine grasslands in the area are contiguous with the argali habitats in TAR of China which might have favored this local recovery in the upper Dolpa (G.B. Schaller personal communication 2016). Our sighting supports the discussion by Prater (1971) who mentioned the possibility of the Tibetan argali occasionally crossing into Nepal from TAR of China. But the presence of only two individuals does not yet represent a viable resident population. More importantly, the two individuals are most likely to belong to a larger population on the other side of the border.

Local villagers in Koma, within the Dolpa district, reported sightings of a Tibetan argali in the upper Namdo valley until 2014 where the rolling alpine grasslands provide good argali habitats. The exceptionally cold winter of 2014 that created a long-lasting snow cover might have influenced this local extirpation of argali, as the sheep are reported to be able to cope only poorly with long durations of constant snow cover which prevents foraging (Schaller 1998).

Habitat encroachment by livestock has been considered as a serious threat to the Tibetan argali in Nepal (Shah 2003). For millennia, a sympatry between domestic yak and argali have been observed across much of their range, which possibly indicate that they are not competitors. It could be misleading to infer, from a mere sighting of these two species grazing together, that foraging by domestic yaks are detrimental to the argali population as this is unlikely to happen unless the primary conditions for competition to occur (such as overlap in resource use, mainly diet and habitat, and the short supply of shared resources) are met (R. Shrestha personal communication 2018). However, through systematic sampling, Namgail et al. (2007) demonstrated that interference competition (not resource competition) does occur between livestock and argali. Uncontrolled feral dogs have also been reported to chase and kill argali (Mallon et al. 1997).

Shah (2003) reported an indiscriminate hunting of argali in the upper Damodarkund by Chinese hunters during winter every year. But an on-site verification to this seems necessary (R. Shrestha personal communication 2018). However, the location of Nulungsumda along the traditional trade route between Dolpa and Mustang districts certainly pose poaching risk.

With the here presented information on the Tibetan argali in Nepal we suggest that the National Red List series should be reassessed as the argali population in the country qualifies for “endangered” under criterion D (<250 mature individuals). But as the argali habitats in all three locations are contiguous with the Tibetan Plateau of TAR, the possibilities of rescue efforts cannot be neglected. This leads to a regional adjustment, according to the International Union for Conservation of Nature (IUCN) regional guidelines, proposing the species to be put as “vulnerable” (IUCN 2012).

We recommend management of livestock numbers to ensure habitat maintenance and quality, and promotion of traditional practices of rotational grazing as a way forward. This will favor coexistence between argali and livestock and enhance conservation awareness among the livestock herders visiting the argali habitat, eventually helping to improve the Tibetan argali conservation in Nepal.

Table 1: Records of the Tibetan argali in Nepal.

Location	District	Year	Record type	Location	Elevation (m asl)	Habitat type	Current status	Reference
Chyakpalung	Humla	2013–2016	Live sighting of five individuals (three adult ewes and two juveniles) in 2013, an adult ewe in 2014, five adult ewes in 2015 and a young ram in 2016	30.3724° N, 81.6367° E	4940	Alpine grassland with rolling hills	Present today	Werhahn et al. (2015), R.P. Lama (personal communication 2015), R. Acharya and Y. Ghimirey (personal observation 2016)
Nulungsumda,	Dolpa	2016	Live sighting of a young ram	28.9896° N, 83.4819° E	4787	Alpine grassland with rolling hills	Present today	N. Kusi and G. Werhahn (personal observation 2016)
Upper Damodarkund	Mustang	1997–2016	Live sighting of 10 individuals (1997), an adult ram (2001), 23 individuals (2002), 77 individuals (2002) and two adult rams (2016)	28.98465° N, 84.17819° E	5360	Alpine grassland with rolling hills	Present today	Koirala and Shrestha (1997), Shah (2003), Chetri and pokharel (2005), N. Kusi (personal observation 2016)
Mugu village	Mugu	NA	Observation of skulls at a local villager's home	Not available (NA)	NA	NA	Historically present, no present report so far	K. Shah (personal communication 2017)
NA	Gorkha	NA	NA	NA	NA	NA	Unconfirmed historical record	Mitchell and Punjo (1976) cited in Shah (2003)
NA	Rasuwa	NA	NA	NA	NA	NA	Unconfirmed historical record	Mitchell and Punjo (1976) cited in Shah (2003)
NA	Sankhuwasabha	NA	NA	NA	NA	NA	Unconfirmed historical record	Mitchell and Punjo (1976) cited in Shah (2003)
Yangma	Taplejung	NA	NA	NA	NA	NA	Unconfirmed historical record	Hooker (1854) cited in Schaller (1977b)

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