Caprinae

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Newsletter for the Caprinae Specialist Group

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COVER PHOTO: male ibex in Tadjikistan by H & CATs Member Conserv.

NOTES AND NEWS

Dear Members of the IUCN/SSC Caprinae Specialist Group,

For the next four years (2017–2020) we will be chairing this group. During this period, we would like to focus our work to four issues: (i) revitalising our newsletter Caprinae News; (ii) strengthening our network; (iii) updating the Caprinae IUCN Red List; (iv) supporting initiatives relevant to Caprinae conservation, research and management.

Caprinae News will be published once per year and we would like to ask for each of us to contribute at least two articles in this four-year period. Guidelines for authors have been included in this issue. Promoting the existence of our bulletin is a key activity for all members of our group and ought to be a priority for us.

The Caprinae Specialist Group must be a platform to exchange experiences and to know what happens with these 35 (or so) species around the World.

IUCN wishes to update the Red List and, as experts, we shall have to work on it. Red List authority Stefan Michel will coordinate this task for the group.

Finally, our mission will be to participate to, endorse, support, or suggest initiatives on conservation of Caprinae.

We would like to welcome the new members and thank the old ones for staying with us in the current quadrennium.

Sandro Lovari and Juan Herrero
Co-Chairs

RECOVERY OF MOUNTAIN UNGULATES IN Tajikistan THROUGH COMMUNITY-BASED HUNTING MANAGEMENT

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Background

Tajikistan is a mountainous, landlocked country in Central Asia. Its population was 8 million in 2013 and continuous to grow. Mountains cover more than 90% of the country, with the mountain systems of Hissar-Alay and the Pamirs with peaks up to 7,495 m (Peak IsmoilSomoni) being the most important. Four species of Caprinae are found in Tajikistan: Asiatic ibex *Capra [ibex] sibirica*, Heptner's markhor *Capra falconeriheptneri*, Marco Polo argali*Ovisammonpolii* and Severtzov's argali *O.a.severtzovi* as well as Bukhara urial*Ovisvigneibochariensis* and putative Ladakhurial*O.v.vignei*. The last one had been confirmed with a single individual killed by shepherd dogs on 2014 and is currently functionally extinct, despite regular unconfirmed sightings of vagrant individuals from adjacent Afghan Wakhan.

Community-based wildlife management is a recent development in Tajikistan. During and after the Tajikistan's civil war (1992–1997) poaching was rampant when food was insufficient, arms were easily accessible, and enforcement of hunting regulations was virtually absent. Populations of all wild sheep and wild goat species as well as other wildlife suffered from this intensive pressure. On 2003, when the first author of this article started working on natural resources management in the Pamirs, local people expressed their concern about declining wildlife populations, while recalling that previous traditional systems of hunting had been more effective than contemporary bans and permit requirements.

In Tajikistan as in most other post-Soviet countries, hunting and wildlife management are not bound to land ownership and user-rights. Rights and responsibilities on wildlife can be assigned to legal persons, who are supposed to prevent poaching, conduct monitoring and other activities and can offer hunting opportunitiesbased on allocated quotas.Under this system, already since the early 1990s most of the Marco Polo argali range areas has been assigned to hunting concessions, with growing or stable argali numbers in some areas, but poor or no management and subsequent poaching in other areas. Until the adoption of the law "On hunting" (2014) hunting was also possible in unassigned areas, based on permits issued by the forestry and wildlife authorities. Although no longer foreseen in the law, the authorities still issue such permits.

Since 2008, with support from foreign organizations as the Germany's international cooperation agency (GIZ: Gesellschaft für Internationale Zusammenarbei) on behalf of the Government of Germany, Zoological Society for the Conservation of Species and Populations (ZGAP), Panthera and many others, the "Tajikistan Mountain Ungulates Project" started a facilitation and empowerment process in selected areas aimed at traditional hunters and other community members interested in the sustainable use of wildlife. While these peopleconsidered poaching as less intense than in the early 2000s, continuous pressure still prevented a recovery of ungulate populations, reducing hunting opportunities. Local hunters agreed to establish a legally recognized control over the areas used by them, prevent community members as well as outsiders from poaching, and after recovery of the ungulates populations start a regulated use, based on surveys and agreed quotas.

Game management areas, which are protected by families or associations of local hunters have been established. Revenues generated from guided hiking, game-viewing, wildlife photography and hunting are to support the work of local rangers and nature guides, and any surpluses are invested into local development projects. This approach provides revenues to local families and motivates them to refrain from unsustainable poaching and to protect durably the wildlife populations and the ecosystems they rely on. The Hunting and Conservation Alliance of Tajikistan (H&CAT) has been established by these local NGOs and small family businesses, which manage community-based wildlife conservancies.

Area coverage and population sizes and trends

There are currently four local NGOs and three family businesses.By December 2016 about 300,000 ha (1,158 square miles or 741,316 acres) of wildlife habitat were effectively managed as wildlife conservancies. The largest of these conservancies covers close to 100,000 ha in the Eastern Pamirs with habitat of Asiatic ibex and Marco Polo argali. Three other conservancies of close to 50,000 ha each are located in the Pamirs, and cover Asiatic ibex habitat, with two of them potentially suitable for natural remigration or reintroduction of putative Ladakhurial. The remaining areas are habitat of markhor, locally with Asiatic ibexand Bukhara urial. Coverage of Bukharaurial habitat is still insufficient for the conservation of viable populations and the small range areas of Severtzov's argali are not yet covered by any community based game management areas.

Size, structure and trend of Caprinae populations are monitored by annual surveys with involvement of experts from the Academy of Sciences, government authorities in charge of nature conservation and wildlife as well as national and international NGOs.Recorded observations – under exclusion of all likely repeated observations – are considered as minimum population size present during the time of the survey. These figures are prone to fluctuations due to weather conditions and survey intensity, although the survey effort is kept as constant as possible.

Population numbers have grown in all conservancies after establishment (FIG. 1). Some areas might mow be at or close to carrying capacity, which is also impacted by the presence of livestock (mainly sheep and goats, locally cattle and yaks). According to most recent survey data (2015-2017) the conservancy areas host more than 2,000 Asiatic ibex, at least 1,900 markhor, more than 350-500 Marco Polo sheep and about 50 urials.

Perspectives and challenges

Some parts of the markhor and Marco Polo sheep range areas, most range areas of Bukharaurial, all Severtzov's argali range are neither under community-based management nor assigned as concessions. To improve the conservation status of the Caprinae populations in such areas the Tajikistan Mountain Ungulates Project, now mainly driven by the Hunting and Conservation Alliance of Tajikistan (H&CAT) and by Nature and Biodiversity Conservation Union of Tajikistan with support by Germany's NGO NABU aims at expanding the community-based conservancy approach. More NGOs are already in the state of formation, registration and application for assignment of conservancy areas in sites with high poaching pressure, but remnant populations of all of the country's mountain ungulate species.

The substantial income which can be earned from international trophy hunting, especially on markhor and argali causes a strong competition and some non-local operatorshave attempted atseizing parts of the business, get areas assigned and additional quotas allocated, without investing in conservation and with no adequate support to local community development. Some of these operators have also been usingtheir political connections to

prevent the assignment of conservancy areas to local NGOs and/or the allocation of hunting quotas on highly profitable species to them. Attempts have beenmade to find common ground with these operators. The development of community-based wildlife management should not be seen as a threat to commercial concessions, but as a complementary approach. This approach creates incentives for rehabilitation and conservation of Caprinae populations in human-used landscapes and at the same time improves the reputation of Tajikistan as a hunting destination,with effective conservation programmes. This will be of high importance for both the commercial as well as the community-based part of the wildlife sector,under the conditions of increasing political pressure for bans ofany hunting and against hunting tourism in particular.

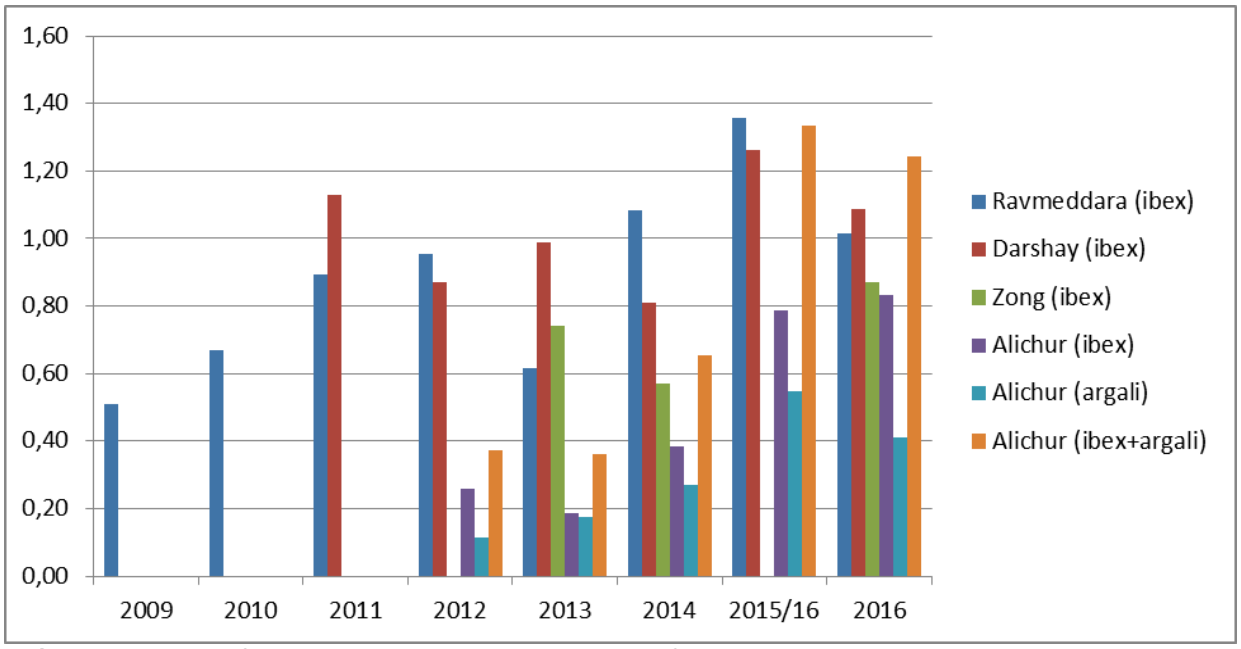

FIG 1 - ***Density of Asiatic ibex and argali per km² conservancy area***

Mountain Ungulates of Bhagirathi Basin, India – Field Research Update

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The Himalaya and associated mountain ranges are home to 12 of 31 species (38.7%) of the subfamily Caprinae found worldwide; the richest in any part of the world (Shackleton and Lovari, 1997). These species are important constituents of the Himalayan mammalian fauna and play a vital functional role in mountain ecosystems as a primary consumer and prey for many endangered wild carnivores such as snow leopard (*Panthera uncia*) and common leopard (*Panthera pardus*). The impact of intensive and unmanaged livestock grazing on native wildlife is an important conservation concern for Caprinae species in the Himalaya (Bhatnagar 1997; Mishra, 2001; Bhattacharya *et al*., 2007; Namgail *et al*., 2007, Kittur et al. 2010). An additional threat is posed by rapidly changing climatic scenarios (Chettri *et al*. 2010; Aryal *et al*., 2016).

To understand the responses of mammals in Himalayan region to climate change, the Government of India has launched a long-term research and monitoring project entitled "Assessment and Monitoring of Climate Change Effects on Wildlife Species and Ecosystems for Developing Adaptation and Mitigation Strategies in the Indian Himalayan Region." The main goal of the project is to identify the drivers of landscape change (climatic and anthropogenic) in the Indian Himalayan Region (IHR) and their effects on the ecological and social systems. It includes focused research on wildlife aspects and human dimensions in IHR for framing evidence-based policy measures. Climate change scenario analyses and visualization methods will be used for predicting potential effects on fauna and ecosystems as a strategy to communicate with stakeholders and to influence policy and decision making. The River Basins of Bhagirathi (Uttarkhand, Western Himalaya), Beas (Himachal Pradesh, Northwest Himalaya) and Teesta (Sikkim, Eastern Himalaya) are the study sites.

Currently, intensive field level data collection is underway in Bhagirathi Basin a. The initial sampling locations have been chosen in seven different sub-basins covering approximately 7,000 km^2 area and different land use and land cover patterns including human habitation, agricultural lands, seasonal settlements, rivers, streams, sub-tropical and temperate forests, alpine rangelands, glacial moraines, and trans-Himalayan cold deserts. The study area encompasses a wide range of elevation zones starting from 500 m at sub-tropical forests to 5,000 m at trans-Himalayan cold deserts and accordingly represents a mosaic of several microclimatic regimes.

Camera trapping was carried out to generate species occurrence data along a gradient of habitats covering all the seasons. Scanning from vantage points (n=15, 30 hrs) and trail sampling (n=28, 228 km) were carried out in Alpine and sub Alpine areas. Camera trap efforts (18,448 trap nights) in 156 locations from October 2015 to December 2016, confirmed the presence of four Caprinae species; goral *Naemorhedus sp.*, Himalayan tahr *Hemitragus jemlahicus*, blue sheep *Pseudois nayaur* and Himalayan serow *Capricornis thar* and one Moschidae species, Musk deer *Moschus chrysogaster*. Goral was found to be partial to steep slopes in both lower and middle altitudes (500 - 3,500m) (Figure 4). Serow captures were from gentle and steep slopes only in middle elevation areas (2,300 to 2,900m). Blue sheep evidence was found in meadows of greater and trans-Himalayan region (3,100 to 4,100m). Tahr was captured in very steep grassy slopes of middle and high elevation areas (2,300 to 3,700m). Musk deer evidences were found only at steep slopes of subalpine areas (2,900 to 3, 600m). During trail sampling and scanning, 399 blue sheep individuals (38 occasions) and 111 Himalayan tahr individuals (7 occasions) were encountered. The encounter rate of blue sheep was 2.01±0.93/km (n=29, individuals=304, mean group size 10.48±1.98 SD?). The largest herd of blue sheep spotted was of 47 individual whereas tahr was of 67 individuals during the winter season.

This survey revealed the presence of four mountain ungulate species in Bhagirathi landscape under varying degree of anthropogenic use. Similar work will be done in northwestern and western Himalayan region. On the basis of these surveys, areas will be selected for intensive study on abundance and distribution pattern of the mountain ungulates, habitat use and vulnerability to changing climatic scenarios.

Acknowledgements

We are thankful to the Department of Science and Technology (DST), Government of India for providing fund under DST Grant Number: DST/SPLICE/CCP/NMSHE/TF-2/WII/2014[G] dated 26.08.2014. Our thanks are due to the Uttarakhand State Forest Department for granting us permission and support for this project.

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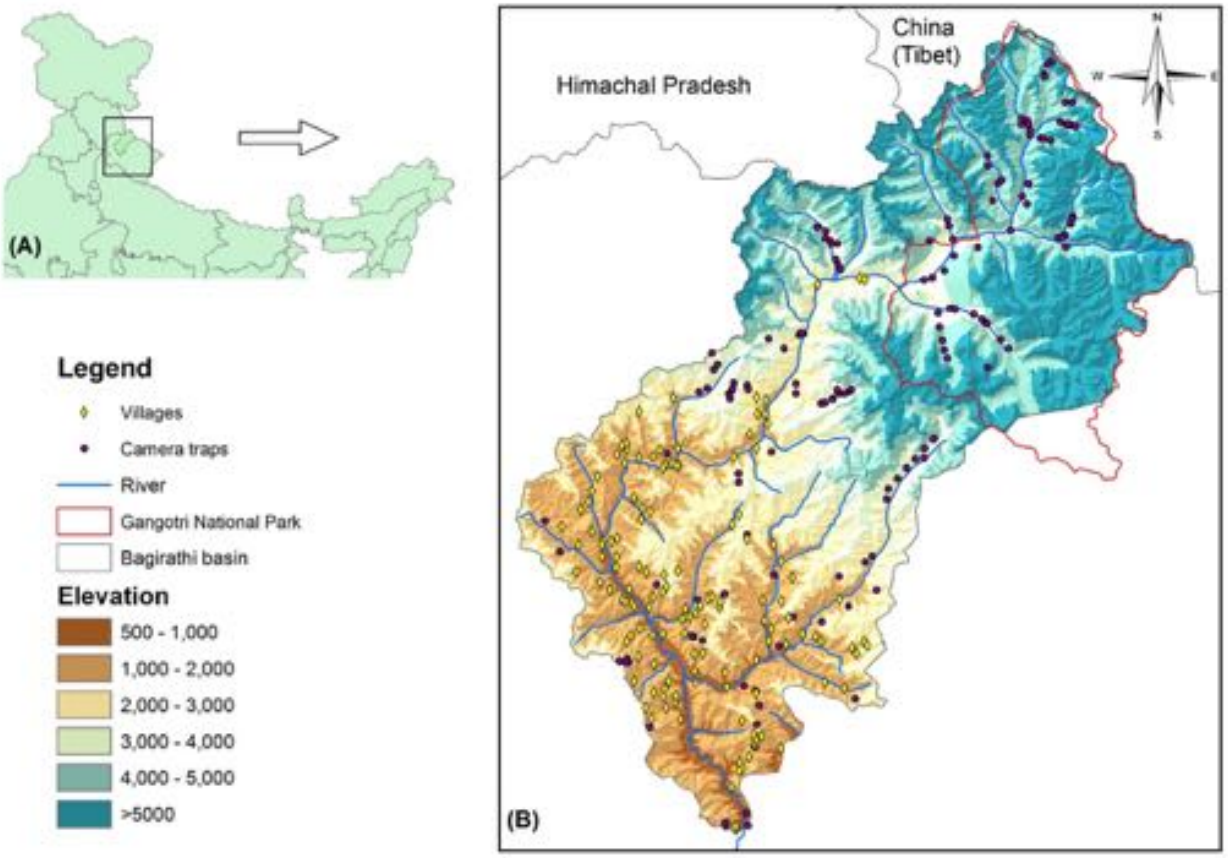

Figure 1: (A) Map showing location of Bhagirathi basin in Western Himalaya, India. (B) Location of camera traps and human settlements in Bhagirathi basin.

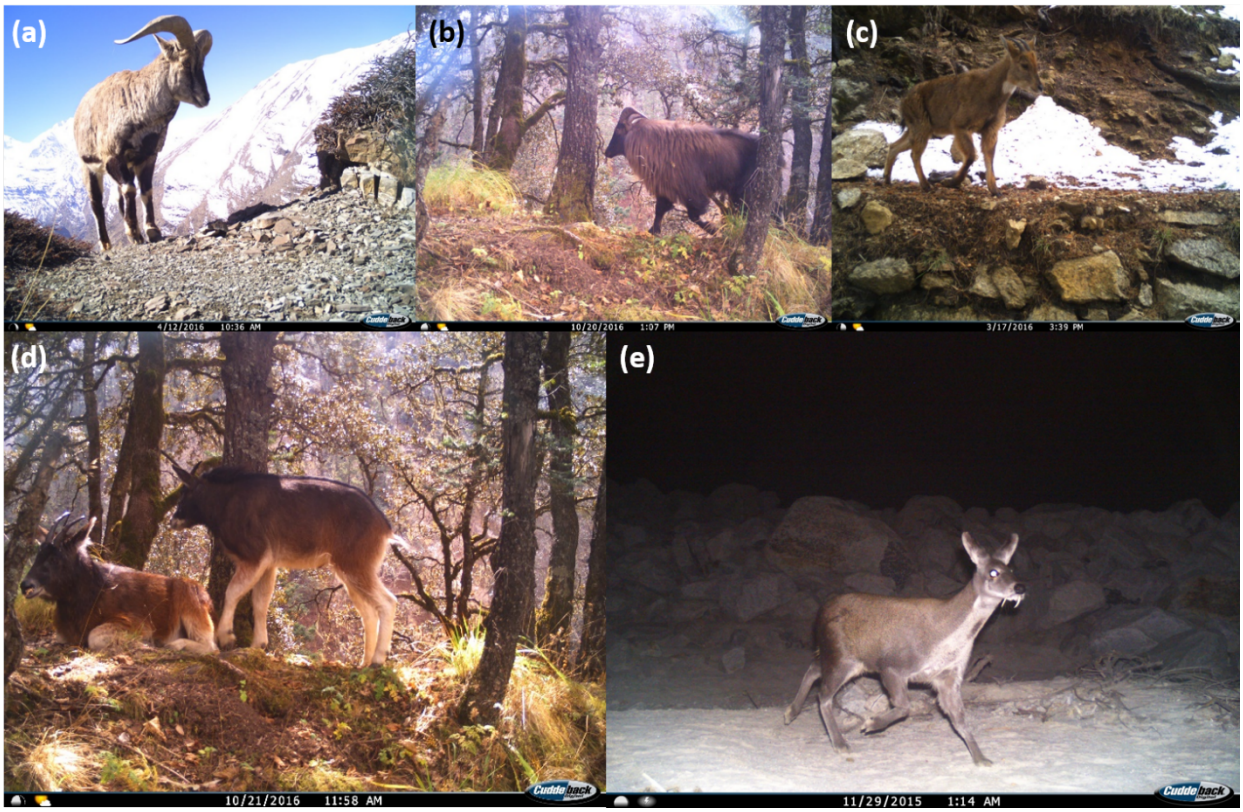

Figure 2: This survey revealed presence of four caprinae species in Bhagirathi basin:(a) Blue sheep *Pseudois nayaur,*(b) Himalayan tahr *Hemitragus jemlahicus,* (c) goral *Naemorhedus sp.,*(d) Himalayan serow *Capricornis thar* and a Moschidae species, Musk deer *Moschus chrysogaster*

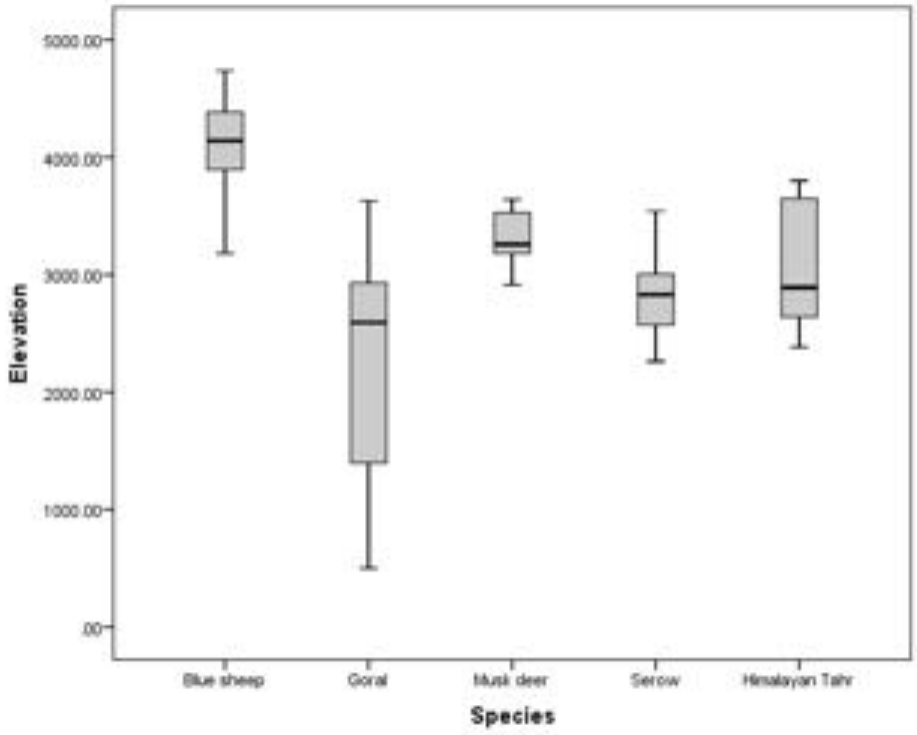

Figure3: Altitudinal distribution of mountain ungulates in Bhagirathi Basin

Observation of multiple sarcoptic mange related deaths in Himalayan serow, in Kedarnath Wildlife Sanctuary, India

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Abstract

The epizootic disease, sarcoptic mange is a wide ranging problem across multiple taxa of the world. Its presence in Himalayan species has seldom been recorded and much less understood. This article is the first account of deaths caused by this disease in the cryptic and understudied Himalayan Serow, *Capricornis thar,* in the Kedarnath Wildlife Sanctuary, Uttarakhand, India. Data of deaths caused by sarcoptic mange in serow was collected by chance encounters with deceased individuals, semi-structured interviews with village communities and retrieving information from the Kedarnath Wildlife Department's wildlife mortality archives. Between the months of March and October 2016, at least 12 adult serows were confirmed to have died due to sarcoptic mange, a number that according to the local community was higher than ever before for a given year. This account sheds light on the importance to understand long-term trends and mechanism of this disease in such mountain ungulate species, along with studying the ecology and habitat use of the serow, so that sustained conservation initiatives can be implemented.

***Key Words*:** Sarcoptes *scabiei*, death, Kedarnath Wildlife Department

Introduction

Sarcoptic mange caused by *Sarcoptes scabiei* is responsible for epizootic disease in populations of various wild canids, cats and ungulates across the world (Pence & Ueckermann, 2002). Short-term mortality can be high, but doesn't generally alter long-term population dynamics. However, this disease can have drastic implications in fragmented populations, where loss of few individuals can be consequential (Bornstein *et al*., 1995).

This disease has been recorded in several Himalayan ungulates and their predators. However, the remote and inaccessible habitat occupied by many of these species makes it hard to detect outbreaks, much less understand those (Hameed *et al.,* 2016). This is a highly contagious mite infection that is generally found in social species due to ease of transmission as a result of proximity. There is a lack of knowledge and detailed records of this disease found in Himalayan Serow (hereafter referred to as serow), *Capricornis thar* a species of mountain ungulate that in itself has very restricted scientific knowledge available. All the observations mentioned in this paper were carried out whilst a team of researchers were conducting a project to assess health impact of livestock on two ungulate species, namely Himalayan Tahr, *Hemitragus jemlahicus* and Himalayan Serow, *Capricornis thar.* This was done by analysing and comparing fecal samples for parasite load and diversity, and activity budgets between two sites (one with presence of livestock and another without)

Background

Sarcoptic mange has been recorded in different Himalayan mammals, especially ungulates (Aziz *et al.* 2003; Hameed *et al.,* 2016). It is a very wide ranging epizootoic disease occurring in 10 orders, 27 families and 104 species of domestic and free-ranging/wild animals (Pence & Ueckermann 2002). Generally cases aren't severe, but examples such as the complete wiping out of Red fox, *Vulpes vulpes* on Borrnhold island in Denmark due to this disease, highlights its potential

Himalayan Serow caught foraging on a camera traps placed in the Kedarnath Wildlife Sanctuary. This area had been previously visited by a large herd (~700) of livestock.

severity in isolated and fragmented populations (Henriksen *et al.*, 1993). This disease has been documented to be one of the major causes of death and population decline in Southern Europe for Northern Chamois, *Rupicapra rupicapra* and Iberian Ibex, *Capra pyrenaica pyrenaica,* species that are ecologically and taxonomically close to the serow (Rossi *et al.*, 1995; Fernandez-Morin *et al,.* 1997).

Though *S. scabiei*, is the primary cause, many vagrants do occur and are yet to be identified. Called Scabies in humans, symptoms and reaction to this disease depend on the immune strength of individual animals and species. The disease-causing-organism is a submacroscopic burrowing mite, of which male and female adults, larvae, prontonymphs, tritonymphs, and eggs occur in the epidermis of the affected individual to the level of the stratum granulosum (Arlian, 1988; Arlian, 1989). Symptoms generally are epidermal hyperkeratosis and alopecia with an underlying chronic dermal inflammation and an abundance of mites in the skin (Arlian, 1988; Arlian *et al.*, 1994) .

The mite consumes living cells and tissue fluid. As yet, there is no taxonomic means to distinguish the various strains that manifest a fairly high degree of host specificity for their respective host species. Interestingly, this disease is believed to have arisen in humans, who spread it to their domestic animals, and subsequently the wild ones picked it from the latter (Pence & Ueckermann 2002).

Methods

All sighting of dead serows were based on chance encounters or passing of information from the local villagers or the Forest Department. No active searches for dead serows were conducted. Although, one of the above mentioned project's aims was to quantify habitats used by serow, hence the team inevitably ended up being in areas that had chances of witnessing serow mortalities. Also, available data was gathered from the Kedarnath Forest Department wild ungulate death records for 2016. Whenever a dead animal, including a serow is sighted by any individual, they are mandated to contact the local Forest Department personnel. Upon this, a case is recorded, veterinarians called upon, an autopsy done and a synopsis of causes and symptoms are filed. Apart from the chance encounters and examination of dead individuals, addition information was gained by searching the above mentioned archives in the Kedarnath Forest Department head office(*Gopeshwar*) for records of dead serows diagnosed to be due to sarcoptic mange. Subsequently, 50 people from two villages on the Southern boundary of the Wildlife Sanctuary, namely *Siroli* and *Mandal*(N30^{o} 27' 26.22'' E79^{o} 16' 28.47') and 50 people from two villages on the eastern side of the Wildlife Sanctuary, namely *Dummak* and *Kalgot*(N 30° 29' 54.98'' E79^{o} 22' 21.68''), were interviewed to gain local knowledge about this disease's spatial and temporal extent and its historic prevalence in serow and livestock. These four villages were the closest villages to the two primary study sites, hence were chosen to be interviewed.

Map showing the extent of Kedarnath Wildlife Sanctuary, located in Uttarakhand, India. Marked in red are the two sites of the primary study

Results and Discussion

Observation of serow deaths in Kedarnath Wildlife Sanctuary due to sarcoptic mange

Two direct observations were recorded across a period of five months(May-September 2016) of serow deaths. One in the *Siroli* village(N30^{o} 27' 26.22'' E79^{o} 16' 28.47') was a confirmed case of mange and another one in the *Shokarkh* valley(N30^{o} 29$^{'}$ 25.93'' E079^{o} 10$^{'}$ 46.34'') was a tentative case for the same.

In *Siroli*, a male serow was seen falling off a rock cliff onto the ground below, where it was found dead. It was unclear if the individual died due to the fall or before. No sign of bleeding, bruising or predation were seen. The individual had marked alopecia and severe lesions, which were confirmed by the veterinarian to be hyperkeratoic and parakeratoic. This is indicative of a lack of a hypersensitive response due to anergia or malnourishment (Arlian, 1989; Arlian *et al.,* 1994), thus an indication of a severe case of sarcoptic mange. The case was confirmed to be sarcoptic mange, upon examining of deep skin scrapings in 10% potassium hydroxide (KOH), identified by idiosomal denticles and club-shaped setae, by a professional veterinarian (Pence *et al.,* 1975). This site is located at an elevation of 1498m, along the village edge. The rock cliffs were a mix of oak, birch and rhododendrons forests with grass patches. The death occurred at 06:58 IST on the 29th of June 2016.

Photos of a freshly deceased Himalayan Serow from the 29th of June 2016 at 0658 hours, found near the Siroli village. Seen clearly on the skin is evidence of sarcoptic mange disease, characterized by hair loss, due to drying and scratching of skin.

Additionally, a skeleton of a serow was found in the *Shokarkh* valley, at an elevation of about 3074m. The skeleton seemed at least a month old, upon its discovery on the 26th of September 2016, as the decaying smell wasn't very pungent, all the meat was entirely either eaten or had decayed, and the bones had lick marks on them. Additionally, there seemed to be no sign of predation around the skeleton such as sprint marks, trampled vegetation (which was primarily soft-stemmed shrubs) or blood stains, though this could be a result of the time gap between the death and the team's presence at the site. This perhaps could have been a tentative case of death due to sarcoptic mange. This was a riverine habitat, comprising mainly of a thick understory, a stream and patches of oak trees.

Photos of a skeleton(skull in picture) of a deceased serow on the 26th of September 2016 , found along the main stream of the Shokarkh valley. Seen on the right is the vegetation adjacent to the skeleton. Notice the lack of trapping or other predation related evidences. .

Additional records of deaths caused by sarcoptic mange in Serow

Upon checking the Forest Department archives and conducting interviews, we confirmed at least 12 deaths of serow due to sarcoptic mange in the southern and eastern Kedarnath Wildlife Sanctuary region in 2016, roughly an area of 100km^2(the entire Wildlife Sanctuary is 975km^2), between the months of March and October. Principally via interviews, it was confirmed that deaths started in March and continued into September. This is particularly interesting as this disease, anecdotally kills individuals in the colder months, as mainly due to hair loss they can't handle the colder temperatures. It was said that during the summer months (May-July), the individuals get infected by the mites and it generally takes about 2-4 months for them to die.

This mechanism of disease was described by majority of the people interviewed, as a pathway that affects domestic sheep, *Ovis aries* in the region as well. Interestingly, domestic

goats, *Capra aegagrus hircus* in the region don't suffer from this disease. Additionally, all recorded deaths were of adult serows, but the sexes of individuals weren't mentioned in the report or identified by the villagers. Most individuals interviewed, suggested that this disease is common in the other ungulates of the area, such as Himalayan Goral, *Naemorhedus goral,* and returns to livestock with intensity every 3-4 years, but doesn't lead to massive casualties. Over 50% of the people who owned livestock said they did have some medicinal treatment for this disease if needed by their livestock. However, they did acknowledge that this year was particularly drastic for the serow, as they had never before seen so many dying with the same symptoms, across such a long temporal spectrum as the ones encountered.

Disease and potential implication in relation to livestock: Steps for the future

During the above mentioned study, direct habitat overlap was noticed via camera trap images between serow and livestock, at a region called *Panchaganga* (N 30° 29' 53.36'' E79^{o} 20' 03.80'', elevation 2849 m). Anecdotally, there are several other places within the Kedarnath Wildlife Sanctuary with such overlap. Therefore, it is of high value to analyse skin samples from sheep and serow infected with sarcoptic mange from the area, to understand if the same mite is infecting both the domestic and the wild ungulates. Cross transmission, if occurring is important to document and study as it has conservation implications.

Additionally, environmental factors such as winter intensity (particularly winter snow depth), rainfall and mean temperatures should be modelled to understand their potential to provide favourable condition for mite propagation, hence increasing infection intensity and probability. Lastly, the presence and persistence of such mites in the environment should be studied and quantified.

Conclusion

The magnitude of this disease impacting the serow or other species across their range is barely understood, much less being acted upon (Walton *et al.* 2004). From the little that we know of this elusive and "Near Threatened" ungulate, anthropogenic impact such as deforestation causing habitat loss is highly fragmenting their populations, resulting in very little genetic exchange across populations (IUCN red list 2016). This situation thus holds a daunting possibility of sarcoptic mange adversely affecting the populations of this elusive mountain ungulate.

Acknowledgements

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