Project Update: May 2015

The work on this project started even before I received the grant from Rufford. From December 2013 - January 2014, I carried out a study on the mating behaviours of blue sheep in the Kibber area with Anni Hammaleinen and Karpagam Chelliah (who unfortunately had to quit the study a few days into it due to severe altitude sickness).

Anni and I observed two different herds in Gette and Chomuling for over a month spanning the rutting season and collected data on the following herd parameters: location, size and composition. We collected focal animal observations on individuals of different age and sex classes, scans of the activities of all individuals, and ad-libitum observations on occasions with interesting behaviours such as mating aggregations, of which we observed a number of instances. Data were collected as voice and video recordings. The data are yet to be analysed completely. I hope to shed light on the following aspects of blue sheep social systems from these analyses:

1. Presence/absence of dominance hierarchies in blue sheep herds, nature of dominance interactions, age structuring of these interactions
2. Effects of age-structured dominance interactions on access to mates and eventual mating success.
3. Patterns of individuals joining and leaving groups during the mating season
4. Group composition and cohesiveness of groups

From August - September 2014, I collected faecal samples of blue sheep from areas where they co-occur with high (Kibber plateau) and low (Tabo-Lari) densities of domestic livestock. I also collected samples from the Chunkar grazing reserve (in the Kibber plateau), which is out of bounds for the domestic livestock. From each location, I collected samples from about 30 individuals spread across the age-sex classes (Class I, II, III, IV males, adult and sub adult females, kids and yearlings). Faecal samples were also collected from domestic goats and sheep in Kibber. The samples were preserved appropriately and analysed for parasite loads and cortisol levels (indicators of stress levels) at the lab of Dr Umapathy at the Center for Cellular and Molecular Biology, Hyderabad.

Preliminary analyses of the data suggest that blue sheep individuals are more stressed in the Kibber plateau where they co-occur with high densities of livestock as compared to the Tabo-Lari area where people do not keep goats and sheep. Differences between stress levels of individuals in the reserve area and in the grazed pastures near Kibber village are not evident but they are also not expected given the proximity (6 km) between these two areas, and the ease with which individuals move between them. Preliminary analyses also suggest no significant differences between parasite loads of the blue sheep from all three areas. However, further analyses need to be carried out to check if the blue sheep parasite diversity correlates with that of the parasite diversity in domestic livestock in the corresponding area.

This summer, I plan to extend this work to examine if blue sheep in the more remote reserves established beyond Tashigang (where they are expected to have less mixing with the village populations) also show the trends in decreased stress levels. Unlike Kibber and Tabo which differ in altitude by about 1000 m, and the Kibber reserve and graze pastures which are separated by 6 km, the reserve and grazed areas in Tashigang are at similar altitudes and further apart in distance by 9-10 km. Evidence for decreased stress or parasite levels in grazing reserves, along with data collected by NCF for increased population performance, would make a strong case for setting up more such grazing reserves.

A colleague, Soujanyaa Boruah, and I also carried out outreach activities in the form of interactive sessions with schoolchildren in three different villages in Spiti. We discussed their co-existence with wildlife in the Trans-Himalayas, showed camera trap pictures collected by Nature Conservation Foundation and talked about how and why the biodiversity in this area may differ from that in the more moist Himalayan foothills.

In one school, we also debated the subject of my research on ungulate mating systems as to why these animals have large horns that differ between the sexes. We also used these sessions to talk more generally about the scientific method and design thinking.

From December 2014 - January 2015, I carried out observations on ibex social systems in the Parahio catchment area in Pin Valley with Prasanna Muralidharan, a volunteer, and with two local field staff from Sagnam, a village in Pin Valley. We observed ibex herds opportunistically to collect data on group size, composition and behaviour, as with the blue sheep the previous winter. While the behavioural data are yet to be fully analysed, the numbers of ibex in a typical group, and the numbers of groups observed were lower than those expected from anecdotal accounts from previous years. The groups also tended to occupy the higher slopes and move large distances between successive days, an anomalous behaviour.

Furthermore, as contrasted with the blue sheep observations from the previous winter, we did not observe actual mating in the month spent in Pin Valley studying the ibex. While the expected estrous season is in late December - early January, it is possible that we missed the mating that season due to our delayed arrival at the field site on December 24th 2014 and unseasonal early snow in the region. Alternatively, as we had to depart on January 20th 2015 due to heavy snow that eventually cut off access to the valley, it may be possible that most of the mating happened later. It may also be possible that we missed the mating despite their coinciding with the window we were there due to the small number and high mobility of the groups we observed. To understand the situation better,to estimate when the mating actually occurred, and to look for evidence of any shift from the expected timing,I am now back in Spiti to start observing the ibex groups in Pin Valley. I would like to observe when the females

give birth this summer in order to be able to back calculate the timing of mating from an expected gestation period of 170-180 days.

In order to examine the effects of livestock grazing on ibex health, I am carrying out a study this summer in collaboration with NCF. Pin Valley hosts a number of migratory shepherds in the summers, who come into the valley from other districts with big herds of goats and sheep. Grazing by their herds is believed to have a significant impact on the ecosystem, however it has not been quantified yet. NCF is currently starting a project to understand the impacts of migratory herding on wild ungulates. I am collaborating with them to collect faecal samples from ibex herds in these pastures before, during and after their occupation by the migratory herds in the summer. I would like to also collect faecal samples from the Parahio valley that the herders pass through on their routes to and from the high altitude pastures, the area where I observed the ibex last winter. The increased use of this area by the migratory herders and the resulting decreased forage availability is a possible cause of the lower numbers of ibex we observed last winter. Hence I would like to better understand the impact of the migratory herders especially on this area by counting the number of heads of livestock brought in and observing how long they stay in the area. I would also like to interview them informally about their changing patterns of grazing in the Parahio valley and carry out surveys for ibex presence and numbers there before and after the herders pass through.

Based on the observations and discussions this summer, I would like to have a more accurate estimate of the expected timing of the mating season and locations where ibex can be found in enough numbers to observe their mating behaviour. Hence I would like to go back to Pin valley in winter 2015 to collect behavioural data on ibex mating systems. This time I would like to ensure that we are there much before the rutting is expected to begin, and are equipped to stay in the valley as late into the winter as possible so that the entire mating window can be covered.

Hence I request permission from the Rufford Foundation to use my grant to collect data until as late as February 2016, and be able to submit the final report once I'm back from the field site. This extension will enable me to:

1. Complete the study on mating systems and social systems of ibex in late 2015-early 2016, and
2. Collect data to provide a more complete picture of livestock grazing, especially by migratory herders, and their impacts on the health of ibex populations.