

Summary of Results: Ruffords Small Grant 18997-1

To understand the impact of livestock grazing/presence on health of Himalayan Tahr (*Hemitragus jemlahicus*) and Himalayan Serow (*Capricornus thar*), Shokarkh and Rudranath, two sites within the Kedarnath Wildlife Sanctuary, India, were delimited. The former lacked or had minimal presence of livestock, in comparison to the latter. We studied health impact via ecological parameters, like activity budget difference using scan and focal samples, and parasite load and diversity comparison, using the FILL-FLOTAC method. Upon reaching the half-way point of the project, we have collected over 45 focals (~7 hours in Rudranath and 4 hours in Shokarkh) and ~21 hours of scan, across the two sites for Himalayan tahr. In addition, we have analysed 123 fecal samples; 70 in Rudranath (tahr=26, serow= 10 and livestock=34) and 53 in Shokarkh (tahr=34, serow=2 and livestock=17).

Interestingly, upon performing the Kruskal-Wallis test for our scan data, we obtained a statistically significant difference between time spent foraging ($H=228.28110 > p=3.84146$, $df=1$) and resting ($H=19494 > p=3.84146$, $df=1$) by tahr groups in Rudranath and Shokarkh. More time was spent foraging in Shokarkh (65%) than in Rudranath (58%); whilst the trend for resting was reversed (Shokarkh = 11% and Rudranath = 32%). Dwelling deeper into the focal data, also using the Kruskal-Wallis test, we observed subtle patterns in activity. We obtained a significant difference between time allocated for foraging ($H=2812.5555 > p=3.84146$, $df=1$) by adult females; ones in Rudranath foraged lesser (12%) than in Shokarkh (68%). Similar trend was witnessed for females resting ($H=2903.42526 > p=3.84146$, $df=1$), where in values for Rudranath again was lower (8%) than Shokarkh (12%). Interestingly, we obtained a statistically significant difference between time spent foraging ($H=1287.390764 > p=3.84146$, $df=1$) by a group of sub-adult/adult males from Rudranath, between the months of May/June (12%) and August (45%). No significant difference was recorded in the time spent scratching by males and females across the sites. Lastly and interestingly, juveniles on average recorded more time moving (28%) than any other age-sex class, though more data needs to be collected to obtain significant trends.

Moreover, to understand prevalence of parasites across two sites and species, we performed the Chi-squared test. Intriguingly, there was no difference in prevalence of parasite in tahr samples across the two sites ($p=0.05224 > \alpha=0.05$). There, though was a significant difference in prevalence for livestock samples across the sites ($p=2.20023E-05 < \alpha=0.05$), with Shokarkh recording a higher 18 egg/samples than Rudranath's 11 egg/sample. A significant difference was also obtained between tahr samples and livestock samples in both Rudranath ($p=1.11446E-07 < \alpha=0.05$) and Shokarkh ($p=8.48074 < \alpha=0.05$). In Rudranath, tahr averaged 1 egg/sample, while livestock averaged 11 eggs/sample. In Shokarkh, tahr averaged 14 eggs/samples, while livestock averaged 18 eggs/sample. Combining all species, Shokarkh had a statistically higher prevalence of about 14 eggs/sample, than Rudranath's 7 eggs/sample ($p=0.002655 > \alpha=0.05$). With reference to parasite challenge intensity, no difference was seen, upon performing the Mann-Whitney U test, between tahr samples from both sites. The trend was the same for livestock samples. When tahr samples were compared with livestock's from each site, a significant difference was obtained (Rudranath: $U=246$, $Z=3.04075 > p=0.00236$; Shokarkh: $U=133$, $Z=3.1071 > p=0.00188$).

Lastly, upon making maps of livestock, serow and tahr sites as points, it was visually confirmed that Rudranath did have livestock in closer proximity to both tahr and serow than Shokarkh.