

Dr. Ajith Kumar and the Sikkim-DBT Project: Building Science, Capacity, and Conservation in the Eastern Himalaya

The previous special issue of *Zoo's Print* highlighted Dr. Ajith Kumar's enduring association with the Sikkim Himalayas and his deep commitment to nurturing young researchers (Acharya et al. 2026). Building on that article, this piece reflects on his mentorship and his pivotal role in shaping the Sikkim-DBT Project: one of the most significant ecological research programs in the Eastern Himalayas.

In 2010, Dr. Ajith Kumar, together with an eminent team of scientists from the National Centre for Biological Sciences (NCBS) and the Ashoka Trust for Research in Ecology and the Environment (ATREE) initiated the Department of Biotechnology (DBT)-funded project titled *Technological Innovations and Ecological Research for the Sustainable Use of Bioresources in the Sikkim Himalaya*. The team included Dr. Mahesh Sankaran, Dr. Uma Ramakrishnan, and Dr. Suhel Quader from NCBS, and Dr. Jagdish Krishnaswamy, Dr. Robert John Chandran, Dr. Soubadra Devy, and Dr. Suman K. Rai from ATREE. The project sought to establish a state-of-the-art research program that would advance knowledge of biodiversity in the Eastern Himalayas, identify relationships between biodiversity and ecosystem functioning, assess the potential impacts of climate change on biodiversity and ecosystem services, and strengthen local capacity for the sustainable management of bioresources.

As part of this initiative, nine young researchers from Sikkim -- recent graduates with Master's degrees in Wildlife Science, Biotechnology, Zoology, Environmental Science, and related disciplines -- were recruited through in person interviews conducted there. Two additional researchers, one from Bihar and another (this

author) from Uttar Pradesh were selected through telephonic interviews. Together, we formed a group of eleven researchers on the project that later became known as the "Sikkim-DBT Group."

After a series of field trips and orientation sessions, each researcher undertook independent studies on different aspects of wildlife and plant ecology, guided by the project's principal investigators. Among them, Sunita Khatiwara from Sikkim and I, shared a common interest in mammal ecology and began our work with Dr. Ajith Kumar.

We worked in the Kyongnosla Alpine Sanctuary of eastern Sikkim, a landscape that had fascinated Dr. Ajith since his visit with students from NCBS in 2009. I focused my research on mountain ungulates while Sunita worked on the ecology of small carnivores.

My First Meeting with Dr. Ajith

After my telephonic interview, I was asked to meet Dr. Ajith Kumar in Siliguri before receiving my formal appointment letter. At the time, I was working with WWF-India on red panda conservation in Arunachal Pradesh. Dr. Ajith was accompanying the 2008–2010 M.Sc. Wildlife Biology students from NCBS on their field trip to Sikkim.

I was to meet him at New Jalpaiguri Railway Station. Having never met him before, I wondered how I would recognise him. Soon, I noticed a group of cheerful students enthusiastically waving at me, with Dr. Ajith standing among them. He warmly introduced himself and his students, asked about my work, and engaged me in a brief but encouraging conversation. That first interaction

immediately put me at ease and left a lasting impression of his humility, his warmth, and his genuine interest in young researchers.

Dr. Ajith as My PhD Supervisor

Soon after joining the project, I expressed my desire to pursue a doctoral degree under his supervision. Rather than rushing into research, Dr. Ajith advised me to spend time reading extensively, refining research questions, and thoroughly understanding the study system. For nearly two years, I immersed myself in literature while conducting reconnaissance surveys in the Kyongnosla Alpine Sanctuary. This period of intellectual preparation proved invaluable and laid the foundation for my doctoral research.

Dr. Ajith also introduced me to Dr. G. Umapathy, his first PhD student, from the Laboratory for the Conservation of Endangered Species (LaCONES) at Hyderabad, who specialised in the reproductive physiology of endangered mammals. He encouraged me to attend training programs and workshops on reproductive and stress physiology, broadening both my technical skills and scientific perspectives.

By December 2012, I had developed a clear research framework. I registered for my PhD, titled “Ecology of Feeding and Reproduction in Mid-altitude Wild Ungulates in the Sikkim Himalaya”, under the supervision of Dr. Ajith Kumar, and co-supervision of Dr. Uma Ramakrishnan. Dr. G. Umapathy and Dr. Yash Veer Bhatnagar served on my doctoral advisory committee, bringing complementary expertise in wildlife physiology and mountain ungulate ecology.

Throughout my doctoral journey, Dr. Ajith remained a constant source of guidance and encouragement. He regularly visited me in the field, met with forest department officials to ensure logistical support, motivated me to present my work at national and international conferences, and strongly encouraged all members of the

Sikkim-DBT group to participate annually in the Student Conference on Conservation Science (SCCS) in Bangalore. We also attended a variety of courses on advanced tools and techniques on data analysis, scientific writing, and various laboratory techniques at NCBS, ATREE, and IISc. He actively helped us secure travel grants, wrote recommendation letters, and encouraged us to build international scientific networks. On his advice, I even obtained my passport soon after joining the project, anticipating future opportunities for global scientific engagement.

Key Findings from My Doctoral Research

Dr. Ajith had long been fascinated by the distribution of mammals across elevational gradients. Together, we sought to understand not only these patterns but also the ecological processes driving them in the subtropical Himalayas.

Mountain ecosystems experience pronounced seasonal changes in climate and forage availability. These fluctuations interact with complex topography to create diverse microhabitats over short elevational distances, influencing plant phenology and, consequently, the feeding ecology and reproductive strategies of herbivores. Although such relationships have been extensively studied in temperate ecosystems, they remain poorly understood in the subtropical Himalayas.

Our research was conducted in the 31 km² Kyongnosla Alpine Sanctuary, spanning elevations from 3,000 to 4,200 m. Nearly half the year, the sanctuary remains snow-covered, making it an ideal natural laboratory to study seasonal variation in habitat use, forage availability, diet, and reproduction in three sympatric ungulates: Himalayan Musk Deer *Moschus chrysogaster*, Himalayan Serow *Capricornis thar*, and Himalayan Goral *Naemorhedus goral*.



Dr. Ajith Kumar and Dr. Jagdish Krishnaswamy with the Sikkim-DBT group at the Kyongnosla Alpine Sanctuary in East Sikkim (May 2010). © Tanushree Srivastava.

To understand forage dynamics, we repeatedly sampled 52 permanent vegetation plots 752 times over one year, documenting 283 plant species, including grasses, forbs, ferns, and mosses. Contrary to patterns reported from temperate ecosystems, plant biomass increased with elevation while forage quality declined, with season emerging as the dominant driver of vegetation dynamics.

Our studies on habitat use revealed distinct ecological strategies among the three ungulates. Himalayan Serow exhibited seasonal elevational migration, descending to lower elevations during winter. Himalayan Goral remained largely resident at lower elevations throughout the year. In contrast, Himalayan Musk Deer displayed a unique behavioral strategy of maintaining similar elevations while shifting between mountain aspects: moving from cooler north-facing slopes to warmer south-facing slopes in winter (Srivastava & Kumar 2018). This work received international recognition and led to my invitation in 2023 to join the Global Initiative on Ungulate Migration (GIUM), where I now represent India in discussions on movement ecology.

We further investigated reproductive physiology using non-invasive fecal hormone monitoring in collaboration with Dr. Umapathy. Our studies first established baseline reproductive physiology in captive Himalayan Musk Deer (Mithileshwari et al. 2016) before extending these methods to free-ranging musk deer and Himalayan Serow (Srivastava et al. 2021). We also examined physiological stress patterns in these species.

We found contrasting reproductive strategies among sympatric ungulates. Himalayan Goral exhibited highly synchronized seasonal breeding closely linked to the phenology of graminoids, whereas musk deer showed a more prolonged breeding season associated with the relatively stable availability of browse. Stress hormone levels peaked during spring and summer, likely reflecting increased disturbance from grazing by domestic yak and their interactions with feral dogs.

Collectively, our studies demonstrated that seasonal patterns of habitat use, feeding ecology, and reproduction in Himalayan ungulates are shaped by the combined influence of environmental conditions, topography, forage



Dr. Ajith Kumar with Sunita Khatiwara and me during a field trip to the Kyongnosla Alpine Sanctuary in East Sikkim. © Tanushree Srivastava.

availability, and body size. More importantly, they established one of the first ecological baselines for assessing the impacts of climate change on Himalayan herbivore communities. This work subsequently laid the foundation for my postdoctoral research on the critically endangered Kashmir Hangul with Dr. G. Umapathy and Dr. Karthikeyan Vasudevan at LaCONES, CCMB.

Success of the Sikkim-DBT Project

Between 2010 and 2019, the Sikkim-DBT project evolved into one of the most successful capacity-building initiatives in Himalayan ecology. Eight researchers completed doctoral degrees covering diverse topics, namely, rhododendrons, primulas, pikas, small carnivores, hydrology, large cardamom, oak forests, ecosystem services provided by orange orchards, and the impacts of climate change on alpine ecosystems.

The research generated under the program has been published in leading international peer-reviewed journals and has significantly advanced our understanding of Himalayan biodiversity and ecosystem functioning. More importantly,

the project created a generation of scientists who continue to contribute actively to research, conservation, and environmental management across India.

The Sikkim-DBT project is among Dr. Ajith Kumar's most enduring contributions to ecology and conservation in the Indian Himalaya. While the project generated important scientific knowledge on biodiversity, climate change, and ecosystem processes, its greatest achievement was perhaps the community of young scientists it nurtured.

Dr. Ajith believed that good science begins with curiosity, careful observation, and intellectual independence. He invested generously in his students—not only by guiding their research but also by creating opportunities, building collaborations, and instilling confidence in them to pursue ambitious scientific questions.

For me personally, Dr. Ajith was much more than a PhD supervisor. He was a mentor who shaped my approach to science, encouraged me to think critically, supported me through every stage of my academic journey, and inspired me to pursue excellence with humility. The scientific

foundation he helped build continues to guide my research today, from understanding Himalayan ungulates to contributing to global initiatives on wildlife movement ecology. His legacy lives on not only through his publications and scientific achievements but also through the many students and colleagues whose lives and careers he profoundly influenced.

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Tanushree Srivastava

Senior Manager and Head, Jammu and Kashmir Projects
Wildlife Trust of India

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