

Chronicling Ajith Kumar's journey as a primatologist – His contribution to primate studies in India

Tryst with Lion-tailed Macaques

Dr. Ajith Kumar started his career in the field of primatology in the late 1970s under the guidance of Dr. G.U. Kurup in the Zoological Survey of India. The research involved surveys on the distribution and relative encounter rates of primates in large parts of southern India. Later, Ajith was one of the first few Indian field biologists to have started independent field research in primatology. Other Indian primatologists who preceded him are discussed in Singh et al. (2020a). He obtained his PhD from Cambridge University under the supervision of Professor David Chivers for his study on the endangered Lion-tailed Macaque (*Macaca silenus*) in the Anamalai Hills in southern Western Ghats. This was the third study on the species. The first two studies (Sugiyama, 1968; Green and Minkowski, 1977) were largely natural history studies. Ajith's was the first long term study



Figure 1: Dr. Ajith Kumar in Varagaliar, his PhD field site.



Figure 2: Lion-tailed macaque (*Macaca silenus*).

of the species spanning over six years. His work on Lion-tailed Macaques (LTMs) was the first study to quantify the species' behaviour and population dynamics, (Kumar, 1987; Kurup and Kumar, 1993). Many aspects of the species' behaviour and ecology, particularly demographic parameters were studied in depth for the first time.

Eight troops were monitored regularly for demographic parameters, of which one troop was selected for an intensive ecological study. Some key findings of the study were delayed sexual maturity in females and long inter-birth intervals, low population turnovers but high infant survival

rates (Kumar, 1987, 1995). His study documented the first eight weeks of infant development (Kumar and Kurup, 1981). His study also systematically estimated daily path length and home ranges of the study troops by establishing measured grids in the forest. Other significant findings of his study include highly diverse frugivorous diet and dependence on seasonal fruiting resources. His PhD study was followed by a population survey of the LTM across different sites in the Western Ghats. What was significant about Ajith's study was that while it laid a solid foundation for future research on the macaque's ecology and population dynamics, it also presented its accurate status in the wild.

Although, previous researchers had highlighted the status of the LTMs in the wild, the population estimate reported was an underestimate (Green and Minkowski, 1977; Kurup, 1978; Ali, 1985). Ajith estimated it to be between 3000 to 5000 individuals in the wild (Kumar, 1987), and interestingly, the current global population is estimated to be ~4000-4200 individuals across 47 sub-populations (Singh et al. 2020b; Kavana et al. 2024).

Guiding with Scientific Rigour

Wildlife Institute of India

After his PhD, Ajith joined the Wildlife Institute of India (WII) in Dehradun as a faculty member. While in WII, he continued his work on primates. He mentored students and collaborated with forest officers to study endangered primates. Dr. Atul Gupta, an Indian Forest Service officer, collaborated with Ajith to study Pharye's Leaf Monkeys (*Trachypithecus phayrei*) in Tripura. They examined its feeding ecology and conservation prospects in secondary forest patches left fallow after *jhum* (slash and burn) cultivation

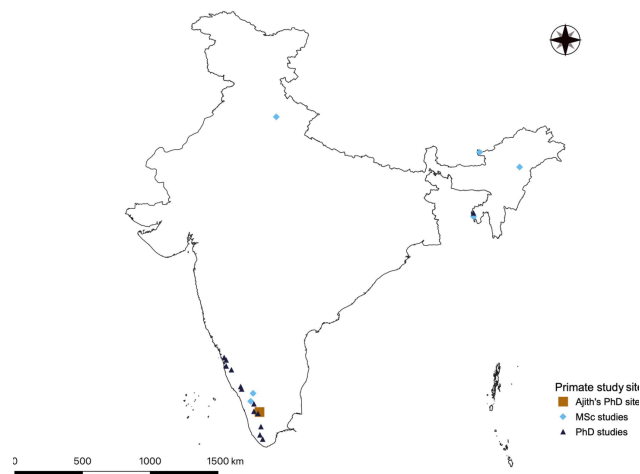


Figure 4: Primate study sites of Dr. Ajith Kumar (brown square) and of students supervised by Dr. Ajith Kumar (blue diamond – MSc students and black triangles – PhD students).

(Gupta and Kumar, 1994). Young leaves comprised a large portion of its diet. They suggested that the species could persist in secondary forest patches despite the practice of *jhum*, provided these forest patches were left undisturbed for at least nine years to allow regeneration of woody species. They also noted that the presence of small patches of primary forests close by played an important role in regeneration. Kaberi Kar-Gupta's Masters dissertation study under Ajith's supervision examined diet selection in Hanuman Langurs (*Semnopithecus entellus*) in Rajaji National Park

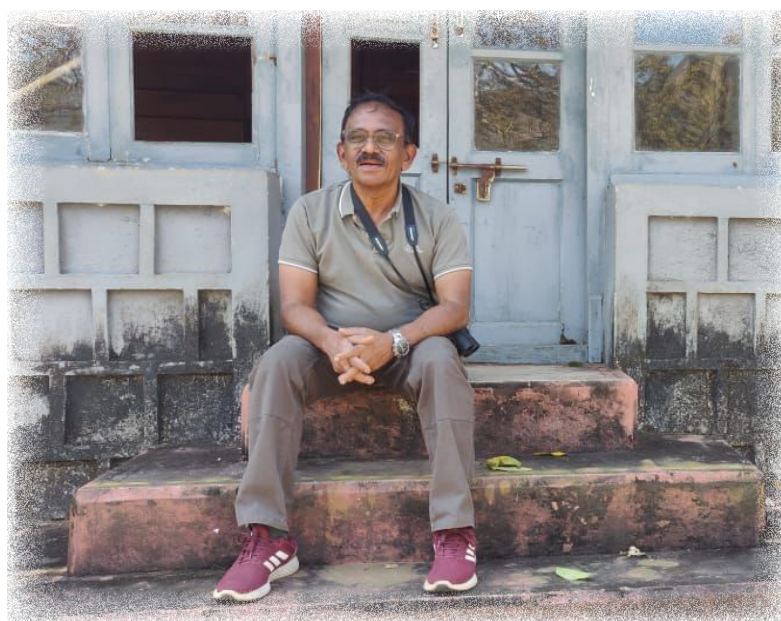


Figure 3: Dr. Ajith Kumar at Varagaliar forest rest house.

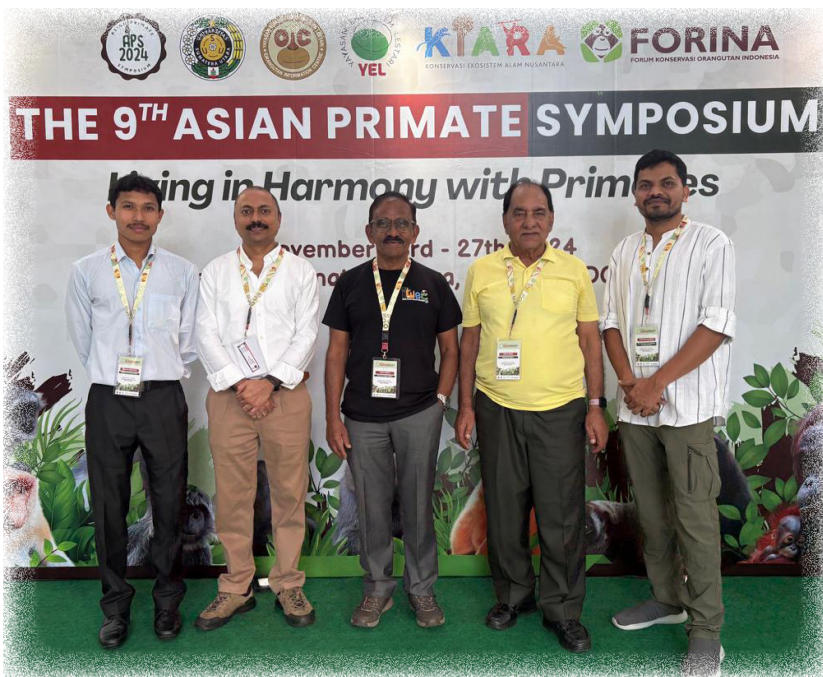


Figure 5: Dr. Ajith Kumar at Asian Primate Symposium, Medan Indonesia, November 2024.

Salim Ali Centre for Ornithology and Natural History

Ajith joined Salim Ali Centre for Ornithology and Natural History (SACON) in 1992. He continued his work on ecology and conservation of primates and other mammals in the Western Ghats. He mentored students and guided their graduate and doctoral research.

He collaborated with two of his colleagues in WII to study the effects of forest fragmentation on herpetofauna, small mammals, and arboreal mammals in the Anamalai hills.

and assessed nutritional correlates of its foraging behaviour in two seasons (Kar-Gupta and Kumar, 1994). They found that the food selection during winter was positively correlated with crude protein and negatively correlated with acid detergent fibre in both winter and spring. This was one of the first studies in India that looked at the role of nutrition in diet selection.

Concurrently, he supervised another Masters dissertation study on Hanuman Langurs that examined the influence of food availability on ranging and space use patterns of the species (Tiwari, 1991).

This was also one of the early studies that attempted to understand space use patterns of a forest primate using rigorous methods before the use of GPS in such studies. Interestingly, the study involved establishing measured grids in the forest and recording the troop's location on a gridded map during daily follows similar to Ajith's study on LTMs.

His first doctoral student Govindaswamy Umapathy studied the impact of rainforest fragmentation on arboreal mammals viz LTMs, Nilgiri Langurs (*Semnopithecus johnii*), and Indian giant squirrels (*Ratufa indica*). One of the aspects studied was the effect of forest fragmentation on



Figure 6: Waterfall field station in the Anamalai Hills. Circa 1996. Dr. Ajith Kumar with John F. Oates, and Mewa Singh, and students Prabhakar, Umapathy, Krishnamani, Lisa, and two others.



Figure 7: Dr. Ajith Kumar (middle in the back row) at the felicitation party in Cambridge for Dr. David Chivers, his PhD guide (2nd from right in the front row).

Masters Program in Wildlife Biology and Conservation

Ajith joined Centre for Wildlife Studies (CWS), Bengaluru in 2004 to establish the Master's degree program in Wildlife Biology and Conservation at the National Centre for Biological Sciences in Bengaluru. He spearheaded the program from 2004 to 2020. Several students from

the MSc program worked under

the demography of LTMs (Umapathy and Kumar, 2000a). They found that the decrease in fragment size correlated with decreased birth rate and the proportion of immature individuals, and an increased number of adult males. The canopy height and tree density were the best predictors of the occurrence of LTMs and Nilgiri Langurs in the forest fragments (Umapathy and Kumar, 2000b). A brief study on the LTMs in a forest fragment reported temporary group fission (Sakthivelou and Kumar, 1998). Another doctoral student of Ajith studied the phyto-ecology of LTMs in the central Western Ghats in Karnataka. They found that the ~ 40 % of woody species were food trees of the species. However, 27 % of the food plant species were also harvested as non-timber forest produce (Krishnamani and Kumar, 2000; Krishnamani and Kumar, 2018).

In the late 1990s, Ajith in collaboration with Dr. Werner Kaumanns of the German Primate Center brought in a substantial research grant from the Volkswagen Foundation to study the effect of forest fragmentation on various aspects of the biology of LTMs. This project further facilitated a long-term collaboration (on-going) between Dr. Kaumanns and Dr. Mewa Singh of University of Mysore that has resulted in several publications on the species, both *in situ* and *ex situ*. Mewa's collegueship and close friendship bond with Ajith spans over almost half a century.

his guidance for their dissertation on various taxa. Some of his students studied primates. Divya Vasudev studied the influence of resource attributes such as abundance and distribution, and predation pressure on group size and composition in a large population of Hanuman Langurs (*Semnopithecus entellus*) in southern India (Vasudev et al. 2008).

This was the first study to examine these effects on group size and composition of Hanuman langurs in southern India. Resource heterogeneity had a positive influence on group size, while resource abundance had a negative influence. Uttara Mendiratta studied the winter ecology of Arunachal Macaque (*Macaca munzala*), a primate species that inhabits the sub-tropical forests in the remote regions of Arunachal Pradesh. This species was discovered only a few years before the study (Sinha et al. 2005).

The study compared its feeding ecology and ranging in winter and spring seasons (Mendiratta et al. 2009). Her study reported significant seasonal differences in activity patterns. During winters when food availability was low, the macaques' overwintering strategy was dependence on low quality foods such as pith, an increase in feeding time and a decrease in ranging time to reduce thermoregulation costs.

An interesting study led by Swapna Nelaballi (Swapna et al. 2010), described seasonal differences in exudativory in Bengal Slow Loris (*Nycticebus bengalensis*). Her study noted that exudates were not fallback foods but formed a large portion of their diet despite being patchily distributed. Ajith's seminal work on the LTM's inspired another graduate student, Meghna Krishnadas to design a study to examine the foraging strategies of the LTM's during the lean season. She estimated macronutrient content in fruits to assess their quality. Her study showed that during the lean period, LTM's fed on high quality fruits that were less abundant and patchily distributed rather than the abundant low quality fruit resources (Krishnadas et al. 2011). Uddipana Kalita's study on Capped Langurs (*Trachypitecus pileatus*) suggested that resource abundance did not have any influence on food selection, but rather presence of acid detergent lignin negatively influenced selection of food resources (Kalita et al. 2018).

IUCN Red List Assessments

Ajith played a pivotal role in some of early efforts towards systematic conservation assessments of primates, particularly LTM's. He, along with



Figure 8: Dr. Ajith Kumar sitting on a liana, in Varagaliar.



Figure 9: Dr. Ajith Kumar at LTM population and habitat viability analysis workshop

Sanjay Molur and Sally Walker of Zoo Outreach Organisation, carried out the first population and habitat viability analysis for the species (Kumar et al. 1995). He was also involved with the first report on conservation and management plan for South Asian primates (Molur et al. 2003). Apart from these, he was involved in the IUCN Redlist assessment of macaques and langurs (Singh et al. 2020b,c,d,e,f; Singh et al. 2024; Kumara et al. 2020; Kumar et al. 2020a,b).

Ajith also collaborated with researchers in other institutes. He contributed to two major studies on LTM's that had significant conservation implications. Hussain et al. (2013) examined the prevalence of gastrointestinal parasites in troops inhabiting forest fragments. Their study indicated that high prevalence and species richness of gastrointestinal parasites in LTM groups were directly related to habitat fragmentation, high anthropogenic activities and high host density. The parasite load partially explains the reason for the decline in immature survival and birth rate in small and isolated rainforest fragments. Ram et al (2015) analyzed genetic structure of LTM troops inhabiting forest fragments, contiguous forests, and the populations across the Palghat gap. They found that the troops in forest fragments had a depleted mitochondrial diversity as compared to those in large forest

complexes. Further, it was reported that the populations north and south of the Palghat gap were substantially genetically different and these findings had a significant implication for management of captive breeding of this endangered species. Ajith also contributed to a systematic review of population status of Indian primates (Hameed et al. 2023).

This review of 41 studies reported that among the Indian primates, 20 were evaluated for their population status and a majority of these studies reported declining population trends even within protected areas.

'Ajith sir', as he was fondly called by his students, was not just a fellow primatologist but to many of us, he was a 'sounding board', someone with whom we could discuss our observations in the field and get his keen insights into primate ecology and behaviour. Umapathy recollects that planning a field visit with Ajith involved far more than just an itinerary. His meticulous preparation extended to every conceivable detail, which included several papers to read, essential gadgets (especially the calculator), notebooks, the precise type of torch lights and their batteries, leech-proof socks, candles, dry fish, snacks, and even books for downtime... the list was invariably exhaustive! Ajith's commitment to his students extended beyond logistics.

Umapathy recalls that after each day's fieldwork, they would sit together to discuss the findings and analyse data—often using that indispensable calculator! Much to his consternation, Ajith once asked him to perform correlation and regression analysis using it.

His passion for teaching was profound, not just focused on data analyses and research design; he was equally dedicated to teaching how to identify plant species in the rainforest, particularly the food trees crucial for primates. He would try and identify every fruiting plant, taste their fruits and make us taste them too!

Apart from the usual banter and quintessential qualities of Ajith, he would quiz us about the research questions, critique the study and its sampling design. At the end of a field session with Ajith, we would always come back wiser! This hands-on mentorship continued consistently, right until his very last field visit. He truly was one of the greatest teachers, mentors, and friends!

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