

Project Update: May 2019

Update for the period: July 2017 to December 2018.

Fieldwork: Fieldwork was carried out on the Indian Peninsula from September 2017 to December 2018. Landscapes such as the Deccan Volcanic Province, the Satpudas, the Western and the Eastern Ghats, and the Central Dry Peninsular were surveyed in the process.

Methodology: Grids of 200 x 200 km were laid on the map of the Indian Peninsula, which resulted in the formation of more than 30 grids. Each grid was surveyed for agamids, and up to five samples (tail/toe clips) were collected from each grid. It was ensured that samples collected from each grid were either separated by distance or by geography. The grant led to multiple field trips in various regions of the Indian Peninsula, resulting in the collection of nearly 100 samples of Indian agamids for morphology and molecular phylogenetics. Morphometric data for more than 35 mensural and meristic characters has been collected. 16S rRNA sequences have been generated for all the samples collected.

Preliminary results: Molecular phylogenetic reconstructions based on 16S rRNA gene fragment, roughly 600 bp long, coupled with morphological data have satisfactorily shown that Indian agamids are composed of multiple cryptic species. Species such as *Calotes versicolor*, which have been considered extremely widespread, are, in fact, restricted to the Peninsula, and the remaining populations represent hitherto undescribed lineages. Almost all the species included in the study represent species complexes and demand urgent systematic attention. Similarly, many species which currently lie in the synonymy will be resurrected and elevated to species ranks, owing to molecular and morphological divergences.

Plans for future: Sequence data for other nuclear and mitochondrial markers is being generated, which will be useful in the construction of robust phylogenies. Integration of molecular morphological data will lead to the description of lineages, divergent from the nominate form and the distribution of all the studied lineages will be commented upon. Research manuscripts are in preparation and will be submitted to suitable journals for publications, after the molecular data for the remaining regions of the genome are generated, and incorporated into the study.

Education: The distribution models and maps can be prepared only after the northeast Indian landscape has been surveyed and the specific status of the populations of Indian agamids is made certain. Illustrated posters will be then printed. I have engaged in education related activities, and have conducted sessions on Indian agamids in various schools and colleges across India, and have delivered talks on numerous aspects of agamid biology.

Table 1: Brief account of the objectives stated in the project and the current status of the activities

Objectives	Activities	Current status	Remarks
Sampling surveys	Field surveys for the collection of tail/toe clips for molecular data	Nearly completed	Field surveys in northeast Indian regions remain
Sequence data generation	Generation of mitochondrial and nuclear sequences for use in phylogenetics	Nearly complete	I have successfully generated mitochondrial sequences for the collected samples. Nuclear regions will be sequenced shortly. The protocols are being standardized
Molecular analysis	Phylogenetic reconstructions, distance analysis, haplotype analysis based on generated sequences	Partially complete	Will be completed only after the data for nuclear regions is generated
Education	Interaction with students, imparting knowledge on Indian agamid diversity	Ongoing	I have interacted with students from various schools and colleges, and imparted knowledge on Indian agamid diversity through presentations. Posters are yet to be designed



Figure 1: Two contrasting landscapes surveyed: top: Dry-deciduous scrub forests interspersed with grasslands; bottom: Semi-evergreen forests of the Northern Western Ghats

Family Agamidae



Figure 2: A representative slide from one of the presentations made for educational purposes