

Summary Report

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Project title : “DNA Barcoding and Systematics of the Pseudoscorpions in the Montane Forests of the Southern Western Ghats of India”

Equipment received : 1. One Samsung Galaxy Tab S6 Lite
2. One Breaecn Galaxy Tab S6 Lite Case
3. Two pack LED Headlamps - rechargeable

Total Grant Amount : \$330

Grantee year : 2023

Summary

The study conducted on the Pseudoscorpion Diversity in the montane habitats of the Western Ghats (WG) of India revealed, a total of over 1500 pseudoscorpions specimens belonging to 40 species, 13 genera and 9 families. Most of the collected pseudoscorpions belonged to the sub-order Icocheirata (pseudoscorpions with a venom apparatus on one/both chelal fingers of their pedipalps), while only those belonging to family Chthoniidae constituted the sub-order Echiocheirata (pseudoscorpions without any venom apparatus on the chelal fingers of their pedipalps). The most abundant pseudoscorpion family collected during the study was Atemnidae with over 10-20 individuals per colony (underneath bark of trees). Atemnidae also represented the only pseudoscorpion family where social- living and cooperation was seen. Followed by Atemnidae, the Chthoniidae constituted the next frequently sampled pseudoscorpions but these were leaf-litter dwellers rather than bark-dwelling forms like the Atemnidae. Due to the high diversity of pseudoscorpions obtained and limited time availability, we chose the subfamily Chthoniinae belonging to the family Chthoniidae for DNA barcoding. Over 70 individuals were used for DNA extraction and the barcoding gene mitochondrial cytochrome oxidase subunit I (hereinafter referred to as *COI*) was amplified to delimit species based on their genetic difference. We used various species delimitation tools such as ABGD, ASAP, GMYC and PTP for delimiting the species. The results revealed more than 25 MOTUs or molecular operational taxonomic units representing 25 putative species among these individuals of which all of them are potentially new species to science. The study further revealed the cryptic diversity within pseudoscorpions as they were morphologically identical yet genetically distinct. This resonates this importance of using molecular data to supplement classical Linnean taxonomy as it helps in identifying such cryptic species.

Prior to this study, only 6 species of Chthoniinae were reported from Western Ghats region of India, and this study thus adds ca. 25 new species, thereby adding to our knowledge of these little critters! Further to identify the phylogenetic relationship of these species and their biogeographic origin, multiple genetic marks need to be used, i.e., *Histone 3A*, *18S*, *28S*, *ITS* etc. and this will form the extension of the project.



Figure 1. Searching for pseudoscorpions in sifted leaf litter using the headlamp IdeaWild provided



Figure 2. Dorsal habitus of *Tyrannochthonius* sp. nov.