

Enumerating Insect Biodiversity in the Himalayan Mountains of India in Context to Species Richness, Biogeographic Distribution, and Possible Gap Areas in Taxonomic Research

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Abstract : The Himalayan Mountains of India fall under two biogeographic zones Trans Himalaya (TH) and Himalaya and seven biotic provinces (TH-Ladakh Mountains, TH-Tibetan Plateau, TH-Sikkim, North-West Himalaya, West Himalaya, Central Himalaya, and East Himalaya). Because of the extreme environment and altitudinal variations, unique physiography, varied ecological conditions, and different vegetations, the Himalaya exhibit a rich assemblage of life, both flora, and fauna, further subjected to the impacts of climate change. To the authors' best knowledge, there is no comprehensive account except for sporadic faunal investigations, to assess or interpret the insect diversity and their biogeographic distribution in Indian Himalaya (IH), one of the biodiversity hotspots. Therefore, in this paper, a compelling review of the extensive knowledge of insect diversity of IH is presented for the first time to the best of our knowledge. The inventory of the known insect species of IH was compiled from the exploration cum faunal-study data ready with the zoological survey of India, Kolkata as well as from the information published in the scientific literature till date. The species were listed with their valid names with their distribution in seven biotic provinces of IH. The insect fauna of IH represents about 38% of the identified insect diversity of India. The interpretation of data provided significant information in detecting possible gap areas in the taxonomic representation of different insect orders. Archaeognatha, Zygentoma, Ephemeroptera, Phasmida, Embioptera, Psocoptera, Phthiraptera, Strepsiptera, Megaloptera, Raphidioptera, Siphonaptera, and Mecoptera need revisions, and it is required to collect more samples from remote areas of the region. Scope for finding new taxa even in the most diverse orders, Coleoptera, Lepidoptera, Hymenoptera, Diptera, and Hemiptera cannot be overlooked. Exploration of cold deserts of Trans Himalaya and East Himalaya (Arunachal Pradesh) may result in a good number of new species from these regions. The most notable data was that many of the species recorded from Himalaya are still known from their type localities only, so there is an urgency to revisit and resurvey those collection localities for the evaluation of the status of those species. It is also required to assess and monitor the impact of climate change on the diversity of insects inhabiting in the fragile Himalayan ecosystem. DNA barcoding especially pests and biological control agents to solve the problems of identification in species complexes is also the need of the hour. In a nutshell, it can be concluded that the inventory of insects of this region is extensive but is far from final as every year hundreds of new species are described.

Keywords : catalog, climate change, diversity, DNA barcoding

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