Abstract

Taxonomic assignments are fundamental for successful communication of biological research, enabling comparability between studies. Due to lack of taxonomic experts the ability to classify biodiversity effectively and accurately is significantly hindered. The present study focusses on the usage of molecular techniques more particularly Random Amplified Polymorphic DNA (RAPD) to identify, classify and distinguish morphologically similar geometrid moth species prevalent in the North-Western Himalayas. Total thirty-six species pertaining to different genus were collected and identified. Geometrid moth species belonging to three subfamilies Ennominae (24) followed by Geometrinae (8) and Sterrhinae (4) were collected with the help of light trap. These were further identified along with detailed description of external morphology and wing venation. Wing venation was studied with the method proposed by Common (1970) advocated by Zimmerman (1978).

Primer OPA-09, OPA-10, OPA-11, OPA-13 and OPA-20 were selected for RAPD-PCR analysis. Amplified RAPD bands were analyzed with DNA diversity database software. OPA-20 primer resulted in maximum of 97 bands. In all, 326 bands were amplified using all five primers and all of them are polymorphic in nature. An average of 65.2 bands per primer was observed. Size range of amplified bands ranged from 107 bp to 1278 bp. Band data was processed with the help of NTSYS software and UPGMA phylogenetic tree was prepared. UPGMA based phylogenetic analysis categorized the geometrid family in various clades. Species belonging to same subfamilies were closely placed showing the reproducibility of RAPD-PCR in taxonomic study. It was inferred from dendrogram that Iotaphora admirabilis is more closely related to Biston suppressaria among all other Geometrid moth. However, Timandra responsaria and T. correspondens belonging to Sterrhinae subfamily was clustered into one group confirming their close genetic relationship indicating that they belong to same genus. Jaccard’s similarity coefficient matrix value ranges from 0.29 to 0.67.

Keywords: Geometrid moth, RAPD-PCR, UPGMA dendrogram, Taxonomy, Jaccard’s similarity coefficient.