

Measurement of Moth Biodiversity as Indication of Environmental Health from Sopore Region of District Baramulla, State Jammu and Kashmir, India

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Abstract—There are a variety of methods for evaluating sites for conservation. Given time and financial constraints, surveying all species at a site is usually impractical, so efforts are limited to surrogate biodiversity indicators, either a subset of taxa, ecological assemblages or environmental variables. Indicator taxa “those taxa which through measurements of their presence or absence, abundance, distribution, species richness or other measure provide an indication of the health or state of a broader group of insects or other community” that represent areas of high species. Insects comprise more than half of the worlds known animal species of which the second largest and more diverse order is Lepidoptera of class Insecta. It includes both butterfly and moths but the number of moth species is much higher than that of butterflies. It is one of the most suitable groups for most quantitative comparisons between insect faunas to be valid, for many reasons explained by Holloway (1980, 1984 and 1985) especially their abundance, species richness, response to vegetation and climate.

Moths are vital to terrestrial ecosystems as major herbivores, pollinators and in nutrient cycling but their natural population are negatively affected by degradation of their habitat due to anthropogenic activities. The moths species are useful for ecological and conservation research since most of them are nocturnal fauna and are allowing relatively efficient estimation of geographic patterns of diversity and abundance. In addition, many researchers reported that moths play a vital role in ecological indicators of plant diversity as well as local lands and forest management due to their host-specificity. This research study contributes to the knowledge of moth biodiversity, which were chosen as a focal group to assess ecosystem quality of Sopore region of District Baramulla region of Kashmir.

Keywords: Diversity, moths, abundance, Sopore.

1. INTRODUCTION

The term diversity encompasses different ecosystems, species, genes and their relative abundance at a given area. For biological diversity, these items are organized at many levels, ranging from complete ecosystems to the chemical structures that are the molecular basis of heredity. The moth species are useful for ecological and conservation research since most of them are nocturnal fauna and are allowing relatively efficient

estimation of geographic patterns of diversity and abundance. In addition, many researchers reported that moths play a vital role in ecological indicators of plant diversity as well as local lands and forest management due to their host-specific (Kitching *et al.*, 2000; Ricketts *et al.*, 2001; Summerville *et al.*, 2004) and they reported that moth indicates the quality of habitat in temperate of agricultural and forests. Moths have demonstrated effectively their role as an indicator of the remnant of woodlands within the agricultural land-use in northern England, UK (Usher and Keller, 1998). According to recent estimates over 1,27,000 species of moths from all over the world (Alfred *et al.*, 1998) are recorded, of which over 12,000 species are recorded from India (Chandra and Nema 2007). There immense diversity and ability to adapt to virtually any climate has made them some of the most successful creature on earth. Objective of the present study is to document the diversity of moths in the study area, Sopore of District Baramulla. Literature review reveals that no documentation of moth diversity has been reported from this region.

2. MATERIAL AND METHODS

Study area

The area is located at 34.30° North and 74.47° East. It is 46.9 kms North West of Srinagar, and 16 km south–west from the district headquarters of Baramulla. The area is also known as an Apple town surrounded by lush horticulture and orchards mainly apple and walnut. River Jhelum divides the town into two parts. Walur lake which is Asia’s one of the largest freshwater lake is also situated between Sopore and Bandipore. The rich floral wealth of area gives a unique identification to the area.

Vegetation profile of study area

Sub-Tropical deciduous forests characterized by a large number of trees, mostly deciduous, which extends from the lowest altitude to about 1500mts. Thick undergrowth of

bushes and scrubs, evergreen shrubs, climbers and tall grasses. Poplar, Chinar, Maple and Willow are the main species of vegetation of this area which are deciduous in character. These forests are being destroyed and depleted at a faster pace. The pressure of human population and ignorance of people are quickly damaging the ecosystems of these forests.

3. IDENTIFICATION

Moths were identified with the available literature of Hampson "Fauna of British India" (1892-96). Bell and Scott 1937 and Zoological Survey of India Jabalpur (Madhya Pradesh).

4. RESULTS

Family	Subfamily	Species
Erebidae	Erebinae	1) Mocis undata (Fabricius, 1775)
		2) Grammodes geometrica (Fabricius, 1775)
		3) Ophiusa tirrhaca (Cramer, 1777)
		4) - Sphingomorpha chlorea (Cramer, 1777)
		5) - Spirama retorta (Clerck, 1759)
		6) - Spirama indenta (Hampson, 1891)
	Arctiinae	7) - Aloa lactinea (Cramer, 1777)
		8) - Olepa ricini (Fabricius, 1775)
		9) - Callimorpha principalis (Kollar, 1844)
		10) - Cretonotus gangis (Linnaeus, 1763)
		11) - Amerila astreus (Drury, 1773)
		12) - Utetheisa lotrix (Cramer, 1779)
		13) - Mangia astrea (Drury, 1773)
Aganainae	14) - Asota producta (Butler, 1875)	
Calpinae	15) - Eudocima maternal (Linnaeus, 1767)	
Lymantriinae	16) - Somena scintillans (Walker, 1856)	
	17) - Arctornis I- nigrum (Muller, 1764)	
Pangraptiinae	18) - Episparis liturata (Fabricius, 1787)	
Noctuidae	Plusiinae	19) - Chrysodeixis acuta (Walker, 1858)
		20) - Chrysodeixis eriosoma (Doubleday, 1843)
		21) - Thysanoplusia orichalcea (Fabricius, 1775)
	Noctuinae	22) - Xestia c-nigrum (Linnaeus, 1775)
	23) - Agrotis epsilon (Hufnagel, 1776)	
	24) - Spodoptera litura (Walker, 1857)	
Crambidae	Spilomelinae	25)-Spoladea recurvalis (Fabricius, 1794)
Arctiidae	Lithosiinae	26) - Chrysorabdia bivitta (Walker, 1856)

Sphingidae	Macroglossinae	27) - Macroglossum insipidia (Butler, 1875)
Geometridae	Ennominae	29) - Hyposidra talaca (Walker, 1860)
		30) - Zamarada excise (Hampson, 1891)
		31) - Biston suppressaria (Guenee, 1857)
		32) - Heterolocha arizana (Wileman, 1910)

Table-1 shows the number of individuals belonging to each family. In this present investigation 32 species of moths were recorded. The highest number of species belonged to Erebidae family followed by Drepanidae family with two species and all other five families with single species. Except Erebidae family all other families were found very rare. The species Hypsopygia mauritialis of Pyralidae family was represented by many individuals.

5. DISCUSSION

During the study period (July – November 2018) a total of 32 species was recorded from 6 families from this region. Similar studies have been reported previously by Dar *et al.*, (2015) who reported 90 species of the family Noctuidae from Kashmir Region and also Smetacek and Kitching (2012) reported three hawkmoth species from Ladakh, Jammu and Kashmir. Chandra and Nema (2007) reported 313 species and subspecies of moths from Madhya Pradesh. This work was an attempt to describe some aspects of biodiversity of moth fauna of Sopore region. A lot of further work is necessary in this regard for getting a detailed faunal diversity of moths in this area. The rich diversity of moths found in this study area was due to absence of industries, which are considered to be a big reason for environmental pollution. Free from all sorts of pollution the area was found to be rich in moth diversity and environmentally stable.

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