RESEARCH ARTICLE

Appraisal of Biodiversity of insect fauna of Dumna Nature Reserve, Jabalpur (MP) using Association Index

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ABSTRACT

The present article summarizes an assessment of the biodiversity of different groups of insect population of Dumna Nature Reserve, Jabalpur in correlation with the evaluation of Association index to find out the distribution pattern of the insects in the reserve.

Keywords- Biodiversity, Dumna nature reserve, Insect population , Association index.

INTRODUCTION

The current need of the era is to reduce the biodiversity loss and to keep a check on thealteration in the composition of insect species on earth with local regional climatic changes. For this more vigorous and substantial research has to be undertaken at grass root level. Similar effort was carried out in the Dumna Nature Reserve which is an important ecotourism spot of Jabalpur district of Madhya Pradesh. It includes several attractions in it and at nearby Khandari Dam. Visitors can spot varieties of insects and wild animals like snakes, monkeys, Spotted Deer, Chitals, wild boar, porcupine, jackals, and many species of indigenous as well as migratory birds in the reserve. The current survey was undertaken to upgrade the basic acquaintance of the insect faunal composition of this protected area.

MATERIAL AND METHOD :

Study area **:** The GPS reading shows that the Dumna Nature Reserve is situated on the way to Jabalpur Dumna Airport, some 10km from the center of the main city of Jabalpur district of Madhya Pradesh. It is situated at a latitude of 23°10′01″ N and at a longitude of 79°57′00″ E and its elevation above sea level is 403 m = 1322 ft . Dumna Nature Reserve includes mountains of Vindhya Range, dam, forests with sal, mahua, mango and other trees and wildlife spread in an area of 1058-hectare.

Collection and identification of insects**:** During the present survey benzene killing bottles were used to collect the insects and followed by their preservation by adequate method. Killing bottles were

prepared by placing a layer of cotton at the bottom of a bottle followed by a thin filter paper over the cotton. Then 3-4 drops of benzene was added on top of the filter paper to narcotize the insects after every 15 minutes of collection for effective results. Extensive review of published literature from Jabalpur district for the identification of insects was undertaken. Insects were also identified with the help of technical assistance of experts from ZSI, Jabalpur. Stereoscopic (3D) image of the spiders were obtained using a low power stereo- microscope at the laboratory of Zoological survey of India, Jabalpur. Statistical analysis of the data was done using Association index as per the formula given by Paul (1973); Arora (1995).

Arithmatical analysis of Association Index:
Association index is an approach to decide in a purely subjective way about a representative organism or a species according to a formal set of ground rules. As the name suggest it is a combination of two indices- 1). Cover Abundance index 2). Sociability Index.

Cover Abundance Index: It provides measure of the area occupied by a species as sometime it is more convenient to measure the percentage of area occupied by a species as its importance value. There is a universally accepted rating of Cover Abundance index are shown in table 1.

Sociability Index: This index gives the pattern of distribution or dispersion of a species and is described by the following universally accepted scale. The values of cover abundance index and sociability index are joined together to depict the association index of a species in the form of chart called *"relieve".*

Table 1: Table showing the Cover Abundance index rating

Cover Abundance Rank	Area Covered by a Species
5	More than 3/4th of the sampled area
4	Covering ½-3/4th of the sampled area
3	Covering ½-1/4th of the sampled area
2	Covering ½ of the ½ sampled area
1	Fairly spare but with a greater cover area
+	Rarely covering the sampled area
A	Very rare

Table 2: Table showing the Sociability Index rating

Sociability Rank	Form of Occurrence of Species
5	In large solid strands of very dense population
4	In small colonies or mats or rather dense population
3	In small patches of distinct groups
2	In small groups and clusters
1	Found singly

RESULTS AND DISCUSSION

The current survey is the first formal effort to update the list of insects from Dumna Nature Reserve of Jabalpur district of Madhya Pradesh. During the present study different groups of insects were collected and 11 genus belonging to nine families were identified. The relieve showing the biodiversity of insect fauna of this protected area depicts that short-horned grasshopper and their nymphs were found to cover more than 3/4th of the sampled area.

Table 3: Relieve showing the biodiversity of insect fauna of Dumna Nature reserve, Jabalpur and the Association index values.

Sr. No.	Name of the species	Cover abundance Rank	Sociability Rank	Association index values
1.	Blattella germanica(Cockroach)	1	3	1.3
2.	Short-horned grasshopper	5	5	5.5
3.	Eurema laeta butterfly	4	4	4.4
4.	Aulacophora sps	3	4	3.3
5.	Graptortethus servus	1	2	1.2
6.	Oecophylla smaragdina	5	5	5.5
7.	Camponotus (Carpenter ants)	5	5	5.5
8.	Leptogenys sps	4	3	4.3
9.	Neoscona punctigera	2	2	2.2
10.	Oxyopes sps	+	1	+.1
11.	Rhene flavigera	+	1	+.1
12.	Telamonia dimidiata	2	2	2.2

Blattella germanica

Short-horned grasshopper

Nymphs of Short-horned grasshopper

Eurema laeta

Aulacophora sp.

Graptortethus servus

Oecophylla smaragdina

Camponotus sp.

Leptogenys sps

Neoscona punctigera

Rhene flavigera

Telamonia dimidiata

Fig.1: Check list of insect fauna of Dumna Nature Reserve, Jabalpur (MP)

Three special types of vegetations i.e. the humid grass, semi-arid grass plains and tropical lowland rain forest are support for the occurrence of these grasshoppers (Shishodia, 2000). Koli *et al*., (2009) has also reported the occurrence of acridids from the adjoining areas of Chandoli National Park, Maharashtra. The spider species *Oxyopes* and *Rhene flavigera* were found singly amongrasses and bushes while two other species of spiders *Neoscona punctigera* and *Telamonia dimidiate* were found in small groups and clusters .Both the spiders are oriental in distribution (Sebastian and Peter, 2009). *Blattella germanica* (Cockroach) were found near the restaurant indicating effects of urbanization on this sheltered area. German cockroaches prefer warm and humid environments most likely to be seen crawling around the bathroom or kitchen (Henriksen, 2014). The leaf beetle *Aulacophora sp*. was found to cover ½-1/4th of the sampled area and must have entered the reserve from the nearby farmlands where cucurbit plants are grown. The beetle is known to cause damage to various plants such as *Binincasa hispida, Cucurbita pepo, Citrullus vulgaris* and *Luffa aegyptcia* (Atwal & Dhaliwal, 2009). Kailash Chandra *et al*. (2011) found *Aulacophora* associated with Calotropis Procera. *Oecophylla smaragdina* and *Camponotus sp.* (carpenter

ants) were found to cover more than 3/4th of the sampled area .One more ant genus *Leptogenys* was found in small colonies in the reserve. The relieve showed different association index values of diverse species found at different sites of the sampled area.

CONCLUSION

To conclude, the main objective of this preliminary study was to be familiar with the distribution of the insect fauna and also to help in the inventorisation of faunal diversity of the reserve This may help in further research for the progression of conservation and development of this rich protected area.

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