

Seasonal abundance of Butterflies in Shekhawati region of Rajasthan, India

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ABSTRACT

A preliminary study was conducted on Seasonal abundance of Lepidopteran insect (Butterfly species in Shekhawati region of Rajasthan. The present study was aimed to determine the seasonality of species richness, dominance, and evenness of lepidopteran fauna from agriculture fields. The study was carried out during the month from June 2019 to September 2019. A total of 244 insects from Lepidoptera orders, four families and 14 species were recorded. Family Nymphalidae is dominating in study area, followed by Lycaenidae, Hesperidae, Pieridae, and Papilionidae. Family Nymphalidae is dominating in study area, followed by Lycaenidae, Hesperidae, Pieridae, and Papilionidae. The seasonal pattern in the abundance of butterflies, their biotopes and nectar food plants were also studied. Forest biotope is found to be rich for butterfly species. Twenty-three nectar food plants were identified belonging to 11 plant families. Plants of Asteraceae family were found to be preferred by Butterflies as nectar food plants. Visits of Butterflies were more frequent to flowers with tubular corollas than to non-tubular ones, to flowers coloured yellow and to flowers with a bloom for longer period in the year. Highest species abundance was observed in the months during August to November. These findings are important with respect to monitor butterfly and plant diversity and to define conservation strategies in the Shekhawati region of Rajasthan.

Keywords: *Lepidopteran Insects, Butterflies, Shekhawati region*

INTRODUCTION

The increased industrialization and urbanization of Shekhawati region of Rajasthan has affected the ecology of this important industrial District in the Rajasthan State, to a great extent. Butterflies are scaled wing insects belonging to order Lepidoptera of class Insecta. Butterflies are an integral part of the forest ecosystem. They show distinct patterns of habitat utilization. Being highly sensitive to changes in the environment, they are easily affected by even relatively minor perturbations in the habitat, so much so that, they have been considered as indicators of environment quality and health of an ecosystem (Rosenberg et al., 1986). Feeding is a significant activity and food may be often the most decisive factor affecting distribution, abundance and movements of animals. In Butterflies, this has a special relevance because food and mode of feeding are

different in the larval and adult stages (Kunte, 2000). Butterflies and their caterpillars are dependent on specific host plants for foliage, nectar and pollen as their food. Thus Butterfly diversity reflects overall plant diversity, especially, that of the herbs and shrubs, in the given area. The herbs and shrubs start their life cycle in the beginning of the Monsoon and complete it by the end of post- monsoon season. While some shrub like *Lantana camara* shows flowering throughout the year. Chandra et al., (2007) gave a checklist of butterflies of Madhya Pradesh and Chhattisgarh States, reporting 174 species / subspecies of 100 genera under the eight families. Chandrakar et al., (2007) studied the butterflies' fauna of Melghat reporting 51 species of butterflies from the seven families. Chowdhury and Das (2007) enumerated 64 species of Butterflies belonging to 49 genera spread over the five families, from Indian Botanic Garden, Howrah, West Bengal. Singh and Kosta (2007) studied the butterfly fauna of Madhya Pradesh, including Chhattisgarh, India. Sharma and Borkar (2008) updated an account of butterflies from the Lonar Wildlife Sanctuary and reported 53 species of 36 genera under the seven families. Sindhu and Mehta (2008) recorded 60 species of Lycaenid butterflies from Himachal Pradesh. Trigunayat et al., (2008) reported and updated list 69 species of butterflies belonging to 48 genera and the five families from Keoladeo National Park, Bharatpur, Rajasthan. Gaikwad et al., (2009) studied Butterfly diversity in Amba Reserved Forest Kolhapur and reported 106 species and subspecies, distributed over 82 genera belonging to eight families of Butterflies.

Materials and Methods:

Study Area: Shekhawati is located in the northern part of Rajasthan, India. It encompasses areas of the districts of Jhunjhunu, Sikar, and Churu. Geographically, Shekhawati is part of the Thar Desert and lies between the Aravalli Range in the southeast and the northern plains of Rajasthan (Figure-1). The region spans an area of approximately 13,000 square kilometers. The terrain of Shekhawati is characterized by vast stretches of semi-arid land, sand dunes, and scattered vegetation. The landscape is predominantly flat, with occasional rocky outcrops and small hills. The climate in Shekhawati is typically arid and hot, with scorching summers and cold winters. The economy of Shekhawati primarily revolves around agriculture, with crops like bajra (pearl millet), mustard, pulses, and vegetables being grown in the arid farmlands. The region also has a significant presence of small-scale industries, including handicrafts, textiles, and pottery.

The study area was fully explored during June 2019 to September 2009 and then probable areas were decided. To study the seasonal patterns/diversity in Butterfly abundance in relation to nectar food plants. In the said investigation the selected sites were surveyed mainly between 7.30 am to 12.30 pm. Butterfly species were identified directly in the field visually with the help of field guides followed by photography, in difficult cases, rarely by capture. Collection was restricted to those specimens that could not be identified directly. All scientific names and common English names were

designated as per Varshney (1983) Wynter Blyth (1957) respectively. Classification of Butterflies is after Gaonkar (1996). Benthum & Hooker (1862-1863) system of classification is followed for plants.

Figure-1. Geographical map of Shekhawati region of Rajasthan, India



Table-1. List of Butterflies observed in the Shekhawati region of Rajasthan during study period.

Family	Subfamily	Species
HESPERIIDAE	Coeliadinae	<i>Hasora Chromus</i> Cramer
	Pyrginae	<i>Celaenorrhinus ambareesa</i> Moore
		<i>Celaenorrhinus leucocera</i> Kollar
		<i>Sarangesa dasahara</i> Moore
		<i>Coladenia Indrani</i> Moore
PAPILIONIDAE	Papilioninae	<i>Graphium sarpedon</i> Linnaeus
		<i>Papilio polytes</i> Linnaeus
		<i>Papilio demoleus</i> Linnaeus
PIERIDAE	Coliadinae	<i>Eurema hecabe</i> Linnaeus

		<i>Catopsilia pomona</i> Fabricius
NYMPHALIDAE	Danainae	<i>Tirumala limniace</i> Cramer
		<i>Danaus genutia</i> Cramer
	Satyrinae	<i>Melanitis leda</i> Linnaeus
		<i>Ypthima huebneri</i>

Results:

During the study, fourteen species of butterflies belonging to four families were recorded in Shekhawati region (Table-1). Out of fourteen species, three belong to Papilionidae, two to Pieridae, four to Nymphalidae, and five to Hesperidae. Species belonging to family Nymphalidae, were the most dominant (40%) followed by Lycaenidae (18%), Hesperidae (17%), Pieridae (14%), and Papilionidae (11%). The status recording was as follows: VC- very common (75-100 sightings), Ccommon (50-75 sightings), NR- not rare (25-50 sightings), R- rare (5-25 sightings) and VR- very rare (1-5 sightings). Among the species 7 were found very common, 4 species common, two species not rare, and one species was observed in very rare category from study area.

Discussion and Conclusion:

The species abundance increased from the beginning of monsoon, from the months June to July and reached a peak in the months from August to November. A decrease in species abundance was observed from the months December to January and continued up to the end of May, indicating the abundances of diverse species was positively affected by approaching warmer days, high relative humidity and more rainfall. These factors help to flourish diverse vegetations, which are vital food sources for many Butterfly species. Gutierrez & Mendez (1995) reported that the abundance of Butterflies is not affected by altitudes but it is more related to the availability of food plants. Plants play vital role in increasing the Butterfly diversity and their abundance in the area. In study area, maximum species of Butterflies were recorded in forest biotope than followed by plantation, scrub, grassland and boticanal garden biotope. However, grassland and botanical garden are not observed as rich biotopes; heavy grazing pressure on grassland and use of pesticides in gardens has adversely affected diversity of Butterflies in these biotopes. Maval Tahsil, forest biotope is rich in butterfly diversity as observed in present study. The nectar flowering plants visited by Butterflies, as observed in our findings, namely *Alstonia scholaris*, *Ageratum conyzoides*, *Nothapodytes nimmoniana*, *Carissa congesta*, *Asclepias*

curassavica, Calotropis gigantea, Senecio bombayensis, Zinnia elegans, Cassia auriculata, Urena lobata, Pentas karmesiana, Gnidia glauca and Vitex negundo. Mulshi Tahsil is rich in floral diversity as compared to earlier reports from Amravati University Campus, Nagpur and Bhor Tahsil. The herbs from study area namely Celosia argentea and Tridax procumbens are more used by the Butterflies, probably due to long flowering period. The shrub Lantana camara is having flowering period throughout the year, so it is more used by Butterflies as their food plant. Number of Butterfly species also feed on other sources of food like tree sap, rotting fruits, rotting animals, animals dropping, minerals from wet soil and varying combinations of all these. Details of habitat used by Indian Butterflies are not known. Fresh information on the habitat and microhabitats of Butterflies will be very useful in all the regions of India (Kunte, 2000). Wildlife habitats are getting destroyed at an alarming rate with disastrous effects on biodiversity. While a large number of species have become extinct in the recent past, the survival of many others is threatened. Thus, habitat loss is considered as major threat to biodiversity of Butterflies (World Resources, 1994- 95). These finding will prove to have their own importance.

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