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Study of Butterfly Diversity In Mulshi Tahsil, Pune District, Maharashtra, India

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ABSTRACT

The present study was carried out at Mulshi Tahsil of Pune District, Maharashtra, India, during August 2007 to August 2009. A total of 71 species of butterflies belonging to 48 genera under five families were recorded from Mulshi Tahsil. Out of 71 species, 10 species of butterflies are scheduled species. Family Nymphalidae is dominating in study area, followed by Lycaenidae, Hesperiidae, Pieridae, and Papilionidae. The seasonal pattern in the abundance of butterflies, their biotopes and nectar food plants were also studied. Mud- puddling is also observed among some butterflies. Forest biotope is found to be rich for butterfly species. Thirty two Nectar food plants were identified belonging to 15 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. A decline in species abundance was observed from the months of December to January and continued up to the end of May. These findings are important with respect to monitor butterfly and plant diversity and to define conservation strategies in the Mulshi Tahsil.

Keywords: Butterfly diversity, food plants, seasonal abundance, biotopes, Mulshi Tahsil.

I. INTRODUCTION

The increased industrialization and urbanization of Pune has affected the ecology of this important industrial District in the Maharashtra State, to a great extent. It has fourteen Tahsils, out of which, Mulshi Tahsil was selected for the study of Butterfly Diversity with respect to seasonal abundance, biotopes and nectar food plants in Mulshi. 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. Ranganekar and Dharwadkar (2009) documented three additions to the known Butterfly Fauna of Goa, India.Singh (2009) recorded 147 species of Butterflies from Kedarnath Musk Deer Reserve, in Chamoli and Rudraprayag, districts of Uttarakhand State in India, along with their seasonality, altitudinal distribution and relative abundance. Tiple et al., (2006) have analyzed the factors influencing nectar plant resource visits by Butterflies and its implications for conservation at Amravati University campus. Further, Tiple et al., (2009) investigated Butterfly-Flower morphological interrelationships for 108 Butterfly species and 20 plants at Nagpur. Triigunayat and Saxena (2009) documented Butterfly diversity from Dholpur Distt., Rajasthan and their study reflected 48 species from 34 genera spread over five families.

Four tropical habitats in North-Western Ghats. These four sites were close to Pune city within a radius of 20km. Rane and Ranade (2004) studied Butterflies of Tamhini- Dongarwadi area, Mulshi, Maharashtra. Padhye et al., (2006) studied season and landscape wise distribution of Butterflies in Tamhini, Northern Western Ghats of India. Sharma (2009) studied the fauna of Bhimashankar Wildlife Sanctuary, Maharashtra. Chandekar et al., (2014) studied the seasonal patterns in the abundance of butterflies, their biotopes and nectar food plants from Maval Tahsil, Pune District, Maharashtra, India. The diversity studies are important for environmental protection. The present study was undertaken for study of diversity of butterflies from Mulshi Tahsil.

II. METHODS AND MATERIAL

The Study Area:

Tahsil Mulshi with head quarter Paud is located 42 Km from Pune towards west direction. It is situated at 18°.32' North latitude & 73°.37' East longitude, altitude is about 576 meters. This Tahsil area is also irregular in shape, having an area of 1039 sq. km., bordered by Tahsil Haveli in the east, Tahsil Velhe in south, Tahsil Maval towards the north and district Raigd in west.

This area receives heavy rainfall. This place is one of the attractive picnic spots developed in recent time.

The small village Mulshi in Mulshi Tahsil has its natural beauty and attracts a lot of tourists. The village falls in the Sahyadri ranges and has beautiful deep forests, and the place is famous for its mountains and plateaus named Lavmai. Most of the area is covered with forest. Sag, Teak, Oak, Mango, are the trees found in the forest. Rice is grown in this region. Mula River flows through this area. There is a lake Valanewadi named just 5 kms away from Mulshi. Also located close by are two marvelous forts, namely Dhangad and Korigadh. The hills Hattihant and Pagota, reaching a height of almost 1000 meters, are amazing sights to behold. Famous 'Mulshi' dam is located here which also generates power. The study area was fully explored during August 2007 to August 2009 and then probable areas were decided. To study the seasonal patterns/diversity in Butterfly abundance in relation to nectar food plants, the entire year was divided into three seasons. The three seasons of the year are Pre-Monsoon i.e. from February to May, Monsoon i.e. from June to September and Post-Monsoon i.e. from October to January. The study area was visited twice in each season during the two years i.e. 2007-2008 & 2008- 2009. 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.

III. RESULTS AND DISCUSSION

During the study, seventy one species of Butterflies belonging to five families were recorded in Maval Tahsil (Table2). Out of seventy one species, eight belong to Papilionidae, ten to Pieridae, twenty-eight to Nymphalidae, thirteen to Lycaenidae and twelve to Hesperiidae. Species belonging to family Nymphalidae, were the most dominant (40%) followed by Lycaenidae (18%), Hesperiidae (17%), Pieridae (14%), and Papilionidae (11%). The status recording was as follows: VC- very common (75-100 sightings), C- common (50-75 sightings), NR- not rare (25-50 sightings), R- rare (5-25 sightings) and VR- very rare (1-5 sightings). Among the species fifteen were found very common, thirty-one species common, eighteen species not rare, six species were found rare and one species was observed in very rare category from study area. Ten species (Pachliopta hector, Pareronia valeria, Appais indra, Cepora nerissa, Euploea core, Neptis jumbah, Hypolimnas misippus, Lampides boeticus, Jamides alecto and Acytolepis puspa) come under the protection of the Indian Wildlife (Protection) Act 1972. Out of the seventy-one species twenty-seven species were recorded from botanical and nursery garden, sixty-four from forest area, thirty-five from grassland, sixty on plantation and fifty- two from scrub biotope.

Suborder : Grypocera		
V. Family: HESPERIIDAE		
1. Subfamily: Coeliadinae		
23	Common Banded Awl	*Hasora Chromus* Cramer
2. Subfamily: Pyrginae		
24	Malabar Spotted Flat	*Celaenorrhinus ambareesa* Moore
25	Common Spotted Flat	*Celaenorrhinus leucocera* Kollar
26	Common Small Flat	*Sarangesa dasahara* Moore
27	Fulvous Pied Flat	*Pseudocoladenia dan* Fabricius
28	Tricoloured Pied Flat	*Coladenia Indrani* Moore

3. Subfamily: Hesperiinae		
29	Dark Palm Dart	*Telicota ancilla* Herrich-Schaffer
30	Pale Palm Dart	*Telicota colon* Fabricius
31	Rice Swift	*Borbo cinnara* Wallace
32	Small Branded Swift	*Pelopidas mathias* Fabricius
33	Indian Palm Bob	*Suastus gremius* Fabricius
34	Chestnut Bob	*Iambrix salsala* Moore

TABLE - 2(Continued)

List of Butterfly Species Observed from Study Area Mulashi

S.#	Common Name	Scientific Name
Suborder : Rhopalocera		
I. Family: PAPILIONIDAE		
1. Subfamily: Papilioninae		
35	Common Bluebottle	*Graphium sarpedon* Linnaeus
36	Tailed Jay	*Graphium agamemnon* Linnaeus
37	Common Mormon	*Papilio polytes* Linnaeus
38	Red Helen	*Papilio helenus* Linnaeus
39	Blue Mormon	*Papilio polymnestor* Cramer
40	Lime Butterfly	*Papilio demoleus* Linnaeus
41	Common Rose	*Pachliopta aristolochiae* Fabricius
42	Crimson Rose	*Pachliopta hector* Linnaeus
II. Family: PIERIDAE		
1. Subfamily: Coliadinae		
43	Small Grass Yellow	*Eurema brigitta* Cramer
44	Common Grass Yellow	*Eurema hecabe* Linnaeus
45	Spotless Grass Yellow	*Eurema laeta* Boisduval
46	Common Emigrant	*Catopsilia pomona* Fabricius
47	Lemon Emigrant	*Catopsilia crocale* Cramer
48	Mottled Emigrant	*Catopsilia pyranthe* Linnaeus
2. Subfamily: Pierinae		
49	Common Wanderer	*Pareronia valeria* Carmer
50	PlainPuffin	*Appias indra* Moore
51	Common Gull	*Cepora nerissa* Fabricius
52	Pioneer	*Belenois aurota* Fabricius
III. Family: NYMPHALIDAE		
1. Subfamily: Danainae		
53	Blue Tiger	*Tirumala limniace* Cramer
54	Dark Blue Tiger	*Tirumala septentrionis* Butler
55	Striped Tiger	*Danaus genutia* Cramer
56	Plain Tiger	*Danaus chrysippus*Linnaeus
57	Glassy Tiger	*Parantica aglea* Stoll
58	Common Indian Crow	*Euploea core* Cramer
2. Subfamily: Charaxinae		
59	Common Nawab	*Polyura athamas* Drury
60	Black Rajah	*Charaxes Solon* Fabricius
3. Subfamily: Satyrinae		
61	Common Evening Brown	*Melanitis leda* Linnaeus
62	Common Bush Brown	*Mycalesis perseus* Fabricius
63	Common Five Ring	*Ypthima baldus* Fabricius
64	Common Four Ring	*Ypthima huebneri* Kirby
4. Subfamily: Heliconiinae		
65	Tawny Coster	*Acraea violae* Fabricius
66	Common Leopard	*Phalanta phalantha* Drury
5. Subfamily: Limenitinae		
67	Chestnut Streaked Sailer	*Neptis jumbah* Moore
68	Commom Sailer	*Neptis hylas* Linnaeus
6. Subfamily: Cyrestinae		
69	Common Map	*Cyrestis thyodamas* Boisduval
7. Subfamily: Biblidinae		
70	Angled Castor	*Ariadne ariadne* Linnaeus
8. Subfamily: Apaturinae		
71	Black Prince	*Rohana parisatis* Westwood

IV. DISCUSSION & CONCLUSIONS

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 eleganas, 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 findings will prove to have their own importance.

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