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# Diversity of Butterflies from Ajanta Caves area of Aurangabad District (MS)

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**ABSTRACT**

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. In present study, for 2017 the study is divided in three seasons viz., Pre-Monsoon, Monsoon and Post Monsoon, selected sites were visited twice in each season between 7.30 am to 12.30 pm and butterflies were identified for their systematic diversity studies by using insects net, insects boxes, spreading boards, oven, butter paper envelopes, camera, hygrometer, GPS instrument etc. 42 butterflies belonging to 29 genera from 5 families and 11 subfamilies are recorded from the study area. During present investigation, it was found that 3 (*Papilio helenus, Eurema laeta* and *Caleta caleta*) species are rare, while describing their status and justifies its inclusion in Scheduled List suggesting the need for its strict conservation measures. These findings are important with respect to monitoring butterfly diversity and defining conservation strategies in the Ajanta Caves area in Aurangabad District of Maharashtra State.

**Keywords:** *Butterfly diversity, conservation, Ajanta Caves area*

## INTRODUCTION

The Butterflies belong to order Lepidoptera which is the second largest order among the insects and is made up of about 1,50,000 species so far known. The order Lepidoptera includes Butterflies and Moths of which about 17280 are Butterflies [1]. Butterflies are most familiar insect to mankind due to their large size, brilliant coloration and sunshine loving habits. They amuse us by their brilliant coloration. Due to their attractiveness and omnipresence they have acquired a niche in the prose and poetry of various cultures. The children are more fascinated by them. Butterflies are the next pollinating agents after the bees and in fact success of angiosperms depends on these pollinating agents. The number of Indian Butterflies count to one fifth of the world total of Butterfly species. The Himalayan mountain range harbors major share of the Indian Butterfly diversity [2]. Although, only a quarter of India's Butterfly diversity is represented in the Western Ghats, it has the characteristic of high alpha diversity of Butterflies in certain locations [3, 4].

To accommodate an ever increasing population, man has ruthlessly exploited and destroyed Wildlife habitats. Loss, fragmentation or transformation of habitats have been mainly due to changes in use of land such as urbanization, industrialization, agricultural development, vegetation manipulation, shifting cultivation, introduction of exotics etc. Natural habitats such as forests, grassland, deserts, wetlands, mangroves, coral reefs etc. are under tremendous pressure due to increasing population densities and activities of human beings.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). In the conservation of this rich environment, a Butterfly plays its important role. To be focus on these colourful and elegant creatures which always fascinated the world we chose the focal point to study the species diversity and distribution patterns of butterflies from Ajanta Caves area in Aurangabad District of Maharashtra State.

## METHODOLOGY

**Insect Net:** Insect net was used for collection of Butterflies from the field. It contains aluminium handle, nearly 18 inch in length, having a circular metal ring 9 inch in diameter and collecting bag of 30 inch in depth made up of ordinary nylon mosquito netting cloth, which was attached to the metal ring. The status recording was as follows: VC – very common (60-75 sightings), C - common (45-60 sightings), NR - not rare (30-45 sightings), R – rare (15-30 sightings).

**Camera (**DSLR Camera Nikon D 5300, 24.2 Mega Pixels), **Hygrometer** (Hi-Tech Temperature Clock / Humidity HTC-1) **Global Positioning System (GPS) Instrument** (Garmin Montana 600).

**Study area**

Ajanta caves area situated at the area spread in the Satmala hill ranges of Sahyadri in the proximity of Aurangabad. Southern tropical dry deciduous forest is the main forest type in this track which includes draught resistant trees like Anjan, Khair, Dhawada. Hills tops have sparse vegetation, slopes are covered with Euphorbia spp., river valleys support moist zone species such as Arjun and Chandan valleys have got diversified vegetation.Grass lands at hill tops, plain growth have good growth grasses. Thus the diversified vegetation scattered intermittently support rich faunal diversity. Butterfly species wereidentified directly in the field visually with the helpof field guides followed by photography, in difficultcases, rarely by capture. Collection was restricted tothose specimens that could not be identified directly. All scientific names follow Varshney [5] andcommon English names follow Wynter-Blyth [6]. Classification of butterflies is after Gaonkar [3].

## RESULTS AND DISCUSSION

In the present investigation, 334 butterflies belonging to 29 genera from 5 families and 11 subfamilies are recorded from the study areais given in Table 1. Out of these, 9 belong to Papilionidae, 12 Pieridae, 11 Nymphalidae, 5 Lycaenidae and 5 Hesperiidae. Species belonging to the family Pieridae were the most dominant (28.57%) followed by Nymphalidae (26.19%), Papilionidae (21.42%), Lycaenidae (11.90%) and Hesperiidae (11.90%). Among these species 14 were found very common, 17 species were common, 8 species not rare and 3 species were found rare. None of the species were observed in very rare category from the study area. Butterflies were categorized into four groups such as: very common- 14 species (33.33%), common- 17 species (40.47%), not rare- 8 species (19.04%) andrare-3species (7.14%) which is shown in Table No.2.

**Table 1.** Seasonal sightings and status of butterfly species from Ajanta Caves area.

| Sr.No | Common Name | Scientific Name | | Seasonal Sightings | | | |
|---|---|---|---|---|---|---|---|
| | **Family: - Papilionidae** | | **Pre Monsoon** | **Monsoon** | **Post Monsoon** | **Total** | **Status** |
| **1** | **Subfamily:- Papilioninae** | | | | | | |
| 1 | Common Bluebottle | *Graphium sarpedon* Linnaeus | 10 | 30 | 13 | 53 | C |
| 2 | Tailed Jay | *Graphium Agamemnon* Linnaeus | 8 | 19 | 10 | 37 | NR |
| 3 | Common Jay | *Graphium doson* C & R Felder | 13 | 34 | 21 | 68 | VC |
| 4 | Common Mormon | *Papilio polytes* Linnaeus | 7 | 25 | 16 | 48 | C |
| 5 | Lime Butterfly | *Papilio demoleus* Linnaeus | 12 | 26 | 13 | 51 | C |
| 6 | Red Helen | *Papilio helenus* Linnaeus | 2 | 18 | 8 | 28 | R |
| 7 | Blue Mormon | *Papilio polymnestor* Cramer | 8 | 22 | 11 | 41 | NR |
| 8 | Common Rose | *Pachliopta aristolochiae* Fabricius | 7 | 30 | 21 | 58 | C |
| 9 | Crimson Rose* | *Pachliopta hector* Linnaeus | 5 | 22 | 10 | 37 | NR |
| | | **Total** | **72** | **226** | **123** | **421** | |
| | **Family: - Pieridae** | | | | | | |
| **1** | **Subfamily:- Coliadinae** | | | | | | |
| 10 | Three Spot Grass Yellow | *Eurema blanda* Boisduval | 10 | 35 | 26 | 71 | VC |
| 11 | Small Grass Yellow | *Eurema brigitta* Cramer | 9 | 24 | 13 | 46 | C |
| 12 | Common Grass Yellow | *Eurema hecabe* Linnaeus | 6 | 28 | 18 | 52 | C |
| 13 | Spotless Grass Yellow | *Eurema laeta* Boisduval | 4 | 15 | 9 | 28 | R |
| 14 | Common Emigrant | *Catopsilia pomona* Fabricius | 13 | 35 | 26 | 74 | VC |
| 15 | Mottled Emigrant | *Catopsilia pyranthe* Linnaeus | 11 | 28 | 17 | 56 | C |
| 16 | Lemon Emigrant | *Catopsilia crocale* Cramer | 15 | 33 | 20 | 68 | VC |
| **2** | **Subfamily:- Pierinae** | | | | | | |
| 17 | White Orange Tip | *Ixias marianne* Cramer | 15 | 38 | 22 | 75 | VC |
| 18 | Common Gull | *Cepora nerissa* Fabricius | 7 | 19 | 10 | 36 | NR |
| 19 | Common Jezebel | *Delias eucharis* Drury | 14 | 29 | 17 | 60 | C |
| 20 | Psyche | *Leptosia nina* Fabricius | 8 | 27 | 15 | 50 | C |
| 21 | Pioneer | *Belenois aurota* Fabricicus | 11 | 29 | 14 | 54 | C |
| | | **Total** | **123** | **340** | **207** | **670** | |

**Table 1 . continued…**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Family:-Nymphalidae** | | | | | | |
| **1** | **Subfamily:- Danainae** | | | | | | |
| 22 | Blue Tiger | *Tirumala limniace* Cramer | 18 | 35 | 22 | 75 | VC |
| 23 | Striped Tiger | *Danaus genutia* Cramer | 10 | 29 | 17 | 56 | C |
| 24 | Plain Tiger | *Danaus chrysippus*Linnaeus | 6 | 25 | 12 | 43 | NR |
| 25 | Glassy Tiger | *Parantica aglea* Stoll | 8 | 24 | 15 | 47 | C |
| 26 | Common Indian Crow | *Euploea core* Cramer | 11 | 32 | 21 | 64 | VC |
| **2** | **Subfamily:- Charaxinae** | | | | | | |
| 27 | Common Nawab | *Polyura athamas* Drury | 16 | 34 | 23 | 73 | VC |
| 28 | Black Rajah | *Charaxes Solon* Fabricius | 7 | 30 | 21 | 58 | C |
| **3** | **Subfamily:- Satyrinae** | | | | | | |
| 29 | Common Five Ring | *Ypthima baldus* Fabricius | 10 | 23 | 11 | 44 | NR |
| **4** | **Subfamily:- Heliconiinae** | | | | | | |
| 30 | Common Leopard | *Phalanta phalantha* Drury | 13 | 36 | 26 | 75 | VC |
| **5** | **Subfamily:- Nymphalinae** | | | | | | |
| 31 | Blue Pansy | *Junonia orithiya* Linnaeus | 3 | 36 | 28 | 67 | VC |
| 32 | Lemon Pansy | *Junonia lemonias* Linnaeus | 7 | 24 | 16 | 47 | C |
| | | **Total** | **109** | **328** | **212** | **649** | |
| | **Family:- Lycaenidae** | | | | | | |
| **1** | **Subfamily:- Polyommatinae** | | | | | | |
| 33 | Angled Pierrot | *Caleta caleta* Hewitson | 2 | 16 | 8 | 26 | R |
| 34 | Zebra Blue | *Leptotes plinius* Fabricius | 9 | 31 | 21 | 61 | VC |
| 35 | Forget-me-not | *Catochrysops strabo* Fabricius | 11 | 39 | 25 | 75 | VC |
| 36 | Pale Grass Blue | *Pseudozizeeria maha* Kollar | 4 | 29 | 17 | 50 | C |
| 37 | Lime Blue | *Chilades laius* Stoll | 6 | 24 | 13 | 43 | NR |
| | | **Total** | **32** | **139** | **84** | **255** | |
| | **Family:- Hesperiidae** | | | | | | |
| **1** | **Subfamily:- Hesperiinae** | | | | | | |
| 38 | Rice Swift | *Borbo cinnara* Wallace | 9 | 33 | 24 | 66 | VC |
| 39 | Dark Palm Dart | *Telicota ancilla* Herrich-Schaffer | 5 | 21 | 13 | 39 | NR |
| 40 | Vindhyan Bob | *Arnetta vindhiana* Moore | 8 | 24 | 17 | 49 | C |
| 41 | Conjoined Swift | *Pelopidas conjuncta* Herrich-Schaffer | 13 | 41 | 20 | 74 | VC |
| **2** | **Subfamily:- Heteropterinae** | | | | | | |
| 42 | Grass Demon | *Udaspes folus* Cramer | 6 | 29 | 18 | 53 | C |
| | **Total** | | **41** | **148** | **92** | **281** | |

**Status:** C- Common; VC- Very Common; R- Rare; NR- Not Rare; VR- Very Rare; * - Scheduled species

**Table 2: -** Family composition of the butterflies recorded from study area.

| Sr. No. | Family | Sub family | No. of genera | No. of Species | % of Species | Status | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | VC | C | NR | R |
| I | Papilionidae | 1 | 3 | 9 | 21.42 | 1 | 4 | 3 | 1 |
| II | Pieridae | 2 | 7 | 12 | 28.57 | 4 | 6 | 1 | 1 |
| III | Nymphalidae | 5 | 9 | 11 | 26.19 | 5 | 4 | 2 | 0 |
| IV | Lycaenidae | 1 | 5 | 5 | 11.9 | 2 | 1 | 1 | 1 |
| V | Hesperiidae | 2 | 5 | 5 | 11.9 | 2 | 2 | 1 | 0 |
| **Total** | | **11** | **29** | **42** | **100** | **14** | **17** | **8** | **3** |

The species abundance rose from the beginning of the monsoon, from the months June to July and reached a peak in the months from August to November. A decline in species abundance was observed from the months December to January and continued up to the end of May. Study report [7] had identified two seasons as peaks, March- April and October for butterfly abundance in India. However, our studies show that peak period in the months from August to November. Nimbalkar et al. [8] reported butterfly diversity in relation to nectar food plants from Bhor Tahsil in that 64 butterfly species feeding on 19 nectar food plants belonging to ten plant families. Chandekar et al. [9] studied the seasonal patterns in the abundance of butterflies, their biotopes and nectar food plants from Maval Tahsil, Pune District and recorded 85 species feeding on 32 nectar food plants belonging to 15 plant families. Khed Tahsil is not showing rich diversity as compared to findings of Nimbalkar et al [8] and Chandekar et al [9] from Bhor and Maval Tahsils respectively.

Mukherjee et al. [10] revealed the presence of 96 butterfly species from rural, suburban and urban sites in and around Kolkata. Patil et al. [11] recorded 84 butterfly species belonging to 5 families and 54 genera from Rawanwadi reservoir of Bhandara District.Raut and Pendharkar [12] have documented 53 butterflies from Maharashtra Nature Park, Mumbai. Gaikwad et al. [13] had done the survey in Phaltan region of Satara District and recorded 37 species of butterflies belonging to 26 genera and 6 families in their study area. Gajbe [14] revealed 53 species of butterflies in 34 genera of 5 families from Umred- Karhandla wildlife sanctuary. Padhye et al. [15] documented butterfly diversity and distribution of 69 butterfly species belonging to 52 genera and 5 families from Tamhini, Northern Western Ghats. Danta and Jha [16] collected and identified 28 butterfly species belonging to 19 genera and 4 families from Amgaon.

A few butterfly species were observed feeding on either animal droppings or on ripened fruits or while mud pudding. Most of the time mud pudding is observed in males, but in our findings females of *Danaus genutia* and *Danaus chrysippus* species were observed doing mud pudding. Grazing of animals on plant populations, influx of tourists, construction of roads and change in land use pattern are mostly responsible for loss of diversity of butterflies and plants.

Our reviews counselled that monitoring of butterfly species to improve the ecological application of butterflies as indicator taxa and defining conservation techniques within the observe region.

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