



Diversity of Butterflies on Rajaram College Campus, Kolhapur, Maharashtra, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present study was carried out to understand the butterfly diversity and abundance in Rajaram College, Campus from November 2022 to March 2023 and November 2023 to March 2024. A total 28 species of butterflies belonging to 24 genera and four families were recorded from the present study. From the observed butterflies, the family Nymphalidae was the most dominant among the four families with 14 species, followed by Lycaenidae (07), Papilionidae (04) and Pieridae (03). The present study added valuable information on the diversity of butterfly fauna and will contribute to developing effective conservation.

Keywords: Butterfly; diversity; habitat; abundance; indicator.

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1. INTRODUCTION

"Butterflies fall under the group of insects and phylum Arthropoda. They exhibit different colours and patterns. Some butterflies act as charismatic species or flagship species" [1]. "Butterflies play an important role in maintaining the food chain and in pollination" [2]. "The presence of these creatures indicates that the ecosystem is in good condition. Butterflies are good biological indicators of habitat and environmental health" [3,4,5]. "Even a small change in their habitat also disturbed their occurrence, and hence, these insects work as ecological indicators" [6]. "It consists of a total of six families, namely Nymphalidae, Papilionidae, Pieridae, Hesperidae, Lycaenidae, and Libytheidae. Butterflies are one of the most conspicuous species of Earth's biodiversity. Butterflies are extremely responsive to any changes in their environment, namely; temperature, humidity, light, and rainfall patterns" [7,8,9,10].

"Adult butterflies have large, often brightly coloured wings, and conspicuous, fluttering flight. Butterflies have the typical four-stage insect life cycle. Winged adults lay eggs on the food plant on which their larvae, known as caterpillars, will feed. The caterpillars grow, sometimes very rapidly, and when fully developed pupate in a chrysalis. When metamorphosis is complete, the pupal skin splits, and the adult insect climbs out and expands their wings and dries for flight. Some butterflies, especially in the tropics, have several generations in a year, while others have a single generation, and a few in cold locations may take several years to pass through their whole life cycle. Butterflies are often polymorphic, and many species make use of camouflage, mimicry and aposematism to evade their predators. Some species are pests because in their larval stages, they can damage domestic crops or trees; other species are agents of pollination of some plants, and caterpillars of a few butterflies (e.g., harvesters) eat harmful insects" [11-15].

In the present study diversity of butterflies on Rajaram College, Kolhapur campus was studied. Rajaram College, Kolhapur is situated in Karveer taluka from Kolhapur district. The college campus has rich diversity with flora, therefore the diversity of butterflies was studied.

2. MATERIALS AND METHODS

Rajaram College is located at Karveer taluka in Kolhapur district, Maharashtra India. This college

campus falls in 60 acres of area, having different pollinating areas here. The study period was 2022-23 to 2023-24. During the present study butterfly photography was done in their natural habitat during morning and evening hours with the help of three different mobile camera:

1. Vivo y73 64-megapixel (f/1.79) primary camera; a 2-megapixel (f/2.4) camera, and a 2-megapixel (f/2.4) camera.
2. OnePlus 11r Sony IMX890 Sensor Size: 1/1.56", Megapixels: 50, Lens Quantity: 6P, Focal Length: 24mm equivalent, Autofocus: PDAF, Pixel Size: 1.0 μm Aperture: f/1.8.
3. Vivo y20, 13-megapixel (f/2.2) primary camera; a 2-megapixel (f/2.2) camera, and a 2-megapixel (f/2.2) camera.

Recorded butterfly species were identified with the help of photographs by using manual books [16], available research papers, articles and with the help of experts Dabhadkar and Prajapati [17], Khyade, and Jagtap, [11].

3. RESULTS AND DISCUSSION

Table 1 indicates the total number of species observed during the study period. Total 28 species belonging to four families were observed in college campus area. The family Nymphalidae shows the highest number of species (14), followed by Lycaenidae (07), Papilionidae (04) and Pieridae (03) (Plate- 1 to 4). In the present study maximum number of butterfly species was observed belonging to Nymphalidae family 50% of the total butterfly species. While the Lycaenidae 14%, Papilionidae 14.28% and Pieridae 10.71%. More or less similar results were observed by Dhakane et al. [18] who recorded a total of 51 species of butterflies belonging to the five families by random observation in the Ghodegaon region, Maharashtra, India. The observations show that the Nymphalidae were the richest family, including 47.05%, followed by the Pieridae and Lycaenidae, with 17.65% in both families and the lowest 3.92% observed in the Hesperidae family. More or less similar results on butterfly diversity by Pardhi and Havale [19] in three selected sites in Ghodegaon, Maharashtra, India. They observed Nymphalidae was the richest family, including 47.05%, followed by the Pieridae and Lycaenidae, with 17.65% in both families and the lowest 3.92% observed in the Hesperidae family.

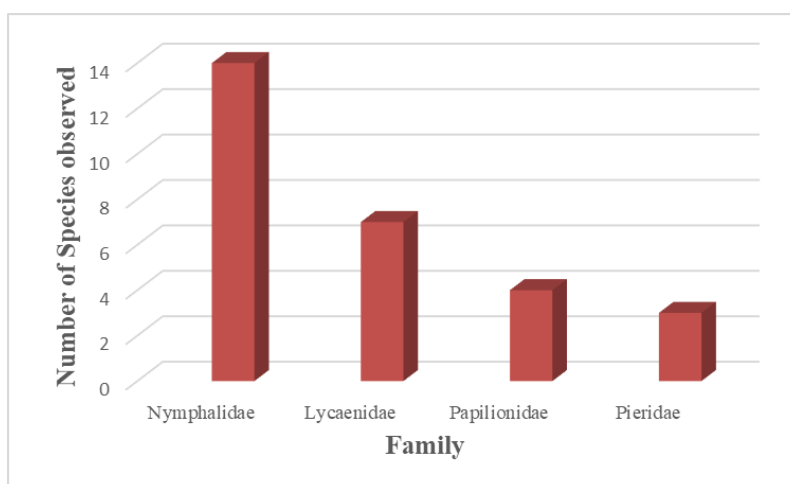
From the above results, it is concluded that the Rajaram College, Campus is rich with nectar-

bearing and host plants. Some regions in college premises show less anthropogenic activity where greater number of butterfly species are observed. Nectar-bearing plants are responsible for the occurrence of many butterfly species [20]. The maximum number of secondary vegetation with less predation shows good butterfly diversity.

This survey is quite helpful for the documentation and conservation of biological diversity. College campus has a huge diversity of plants and a rich diversity of butterfly species. Hence this study was done to create awareness of pollinators in students and locals.

Table 1. Diversity of butterfly species observed on Rajaram College, Campus Kolhapur

Sr. No.	Family	Common Name	Scientific Name
1	Nymphalidae (Brush Footed)	Lemon pancy	<i>Junonia lemonias</i>
2		Common crow	<i>Euploea core</i>
3		Painted lady	<i>Vanessa cardui</i>
4		Blue tiger	<i>Tirumala limniace</i>
5		Glassy tiger	<i>Parantica aglea</i>
6		Stiped tiger	<i>Danaus genutia</i>
7		Common fivering	<i>Ypthima baldus</i>
8		Baby fivering	<i>Ypthima philomela</i>
9		Common sailer	<i>Neptis hylas</i>
10		Common baron	<i>Euthalia aconthea</i>
11		Chocolate pancy	<i>Junonia iphita</i>
12		Daniad eggfly	<i>Hypolimnas misippus</i>
13		Common evening brown	<i>Melanitis leda</i>
14		Great eggfly	<i>Hypolimnas bolina</i>
15	Lycaenidae (Blues)	Zebra blue	<i>Leptotes plinius</i>
16		Common pierrot	<i>Castalius rosimon</i>
17		Common Cerulean	<i>Jamides celeno</i>
18		Red pierrot	<i>Talicauda nyseus</i>
19		Plains cupid	<i>Chilades pandava</i>
20		Gram blue	<i>Eucrysops cnejus</i>
21		Common hedge blue	<i>Acytolepis puspa</i>
22	Papilionidae (Swallowtails)	Common mormon	<i>Papilio polytes polytes</i>
23		Blue mormon	<i>Papilio polymnestor</i>
24		Common jay	<i>Graphium dosom</i>
25		Lime butterfly	<i>Papilio demoleus</i>
26	Pieridae (Whites and Yeallow)	Common grass yellow	<i>Eurema hecabe</i>
27		Common emigrant	<i>Catopsilia pomona pomona</i>
28		Spotless grass yellow	<i>Eurema laeta</i>



Graph 1. Family wise diversity of butterflies in Rajaram College, Campus, Kolhapur



Junonia lemonias



Euploea core



Vanessa cardui



Junonia iphita



Parantica aglea



Danaus genutia



Ypthima baldus



Ypthima philomela



Neptis hylas



Euthalia aconthea



Melanitis leda



Hypolimnas bolina



Hypolimnas misippus



Tirumala limniace

Plate 1. Family: Nymphalidae



Leptotes plinius



Castalius rosimon



Jamides celeno



Talicada nyseus



Chilades pandava



Euchrysops cnejus



Acytolepis puspa

Plate 2. Family: Lycaenidae



Papilio polytes



Graphium dosom



Papilio polymnestor



Papilio demoleus

Plate 3. Family: Papilionidae



Eurema hecabe



Catopsilia pomona



Eurema laeta

Plate 4. Family: Pieridae

4. CONCLUSION

Floral diversity plays an important role in the life cycle of a butterfly. The Rajaram College campus is rich in different flora. Hence, all visited sites are rich in butterfly species. The present study indicates that total of 28 species of butterflies belonging to the four families that were recorded. The highest species were observed in the family Nymphalidae, followed by Lycaenidae, Papilionidae and Pieridae respectively. The occurrence of 28 species of butterflies indicates that the Rajaram College Campus is suitable for butterflies because of the presence of nectar and host plants of butterflies. Hence, there is a scope for documentation and systematic classification of butterfly species for detailed future study.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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