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Exploring butterfly diversity: A study of tara government college campus in Sangareddy, Telangana, India

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Abstract
This study conducted at Tara Government College (Autonomous) in Sangareddy, Telangana, aimed to establish a baseline for butterfly diversity. The campus, spread over approximately 20 acres, hosts a diverse range of plant species, including *Mangifera indica*, *Ficus bengalensis*, *Azadirachta indica*, and others. Field observations were conducted from December 2022 to August 2023, employing both the point counting and hand netting methods. A total of 21 butterfly species were identified, photographed, and recorded. These species belong to four families, with the Nymphalidae family being the most prevalent, including notable species like the Grey Pansy and Blue Tiger. Comparison with other Indian colleges revealed varying levels of butterfly diversity, likely influenced by factors such as campus size and habitat diversity. This study underscores the potential for enhancing butterfly diversity by augmenting greenery and introducing additional plant species on college campuses. Establishing long-term monitoring programs will be crucial for evaluating conservation status and understanding the impacts of environmental change on butterfly biodiversity.

Keywords: Butterfly diversity, campus biodiversity, environmental sensitivity, long-term monitoring, habitat conservation

Introduction

Butterflies, with their captivating beauty, have long held a special place in human imagination and creativity (Thomas, *et al*., 1998) [17]. However, their significance extends far beyond aesthetics. These delicate creatures play vital roles in ecosystems, acting as essential pollinators for over 50 economically valuable crops, and contributing to the food chain as prey for a variety of predators (Borges, *et al*., 2003) [2]. Their ability to swiftly respond to changes in microclimate, temperature, sun radiation, and the presence of host plants for egg-laying and larval development underscores their sensitivity to environmental shifts.

Butterflies are found in a wide range of environments, including agricultural systems, and are globally distributed, highlighting their widespread ecological significance. In fact, butterfly diversity serves as a critical measure of biological variety and serving as valuable indicators of ecosystem health, reflecting their remarkable adaptability to small, defined habitats. Establishing long-term, standardized butterfly diversity monitoring programs becomes imperative for evaluating the conservation status of species and ecosystems, and for assessing the impacts of environmental change on biodiversity (Narayana, *et al*., 2017; MacDonald, *et al*., 2017) [12, 14]. As vital bio-indicators of global ecosystems, butterfly populations provide valuable insights into the health of the world's ecological systems (Chakravarthy, *et al*., 1997; Jana, *et al*., 2009) [9].

Climate, host-plant diversity, and habitat complexity are all influential factors in determining butterfly species richness. Among these, climate emerges as the most influential determinant. However, the relative importance of these factors varies between habitat generalists and specialists, with climate variables exerting a stronger influence on generalists, and host-plant richness and habitat complexity holding greater sway for specialists (Menéndez, *et al*., 2007) [13]. Butterflies, with their seasonal occurrence, grace the environment for only a few months each year. In India, peaks in butterfly abundance are typically observed in March-April and October. Institutional campuses, characterized by their undisturbed environments, serve as crucial habitats for butterfly conservation (Dasgupta, *et al*., 2014) [6].

Urbanization poses significant challenges to wildlife, resulting in habitat loss and pollution, which in turn lead to declines in populations and loss of species. Butterfly diversity tends to decrease as urbanization and human population density increase (Di Mauro, *et al*., 2007) [7]. On college campuses, the diverse array of ecosystems, including natural flora and constructed structures, contribute to a rich faunal diversity. Urban green spaces, despite being modified from their original state, offer numerous ecosystem services, and sometimes support higher species richness compared to the ecosystems they replaced. Additionally, they play a crucial role in conserving endangered, rare, and locally indigenous species. Research focused on urban ecosystems not only informs a wider audience about ecological issues but also has the potential to influence conservation strategies (Nerlekar, *et al*., 2016) [15]. These campuses offer sanctuary for these delicate creatures, supporting their critical role as pollinators and ecological indicators.

Understanding and conserving butterfly diversity is paramount for the overall preservation of biodiversity. Many butterfly species serve as invaluable markers for specific habitats, making them instrumental in identifying ecologically significant landscapes for conservation efforts. Through the study of butterfly species richness, ecologically important landscapes can be pinpointed for targeted conservation endeavors (Gaonkar, 1996) [8].

In this study, efforts were made to document the butterfly diversity of Tara Government College (Autonomous) of Sangareddy town, Telangana state, India.

Materials and methods

Study Area

Sangareddy City, which is situated in Telangana, India, has a total area of 13.70 square kilometers (5.29 square miles) and is 496 meters (1,627 feet) above sea level. This city is the administrative center for the district and is located at coordinates 17.6294°N latitude and 78.0917°E longitude. It has a vital role in both history and modernity. Tara Government College (A), located in Sangareddy City on around 20 acres of land with 9 specialized flower zones. Temperature fluctuations in the city range from a low of 15.5°C to 26.8°C to a maximum of 28.0°C to 38.0°C, with an annual rainfall of 91 mm. The relative humidity ranges from 35.29 to 79.40%.

Data collection

From December 2022 to August 2023, field observations were made on the Tara Government College campus in Sangareddy. The butterflies were counted using the "point counting method" and the "hand netting method" at regular intervals from 8:00 a.m. to 10:00 a.m. The butterflies were seen, collected, named, and promptly released at the location of capture. For this, a butterfly net was employed. Photographic evidence was also used for identifying reasons. For reliable species identification, standard identification keys were used (Antram, 2002; Kunte, 2000; Kehimkar, 2008; Singh, 2011) [1, 10, 11, 16].

Table 1: Butterflies recorded on the campus of Tara Government College, Sangareddy from December 2022 to August 2023.

S. No.	Family Name	Scientific Name	Common Name
1	Nymphalidae	*Junonia atlites*	Grey Pansy
2		*Junonia lemonias*	Lemon Pansy
3		*Junonia almanac*	Peacock Pansy
4		*Junonia orithya*	Blue Pansy
5		*Danaus chrysippus*	Plain Tiger
6		*Tirumala limniace*	Blue Tiger
7		*Ariadne merione*	Common Castor Butterfly
8		*Euploe core*	Common Crow
9		*Acraea terpsicore*	Tawny Coster
10	Pieriidae	*Ascia minutes*	Great Southern White
11		*Colotis danae*	Arabs
12		*Eurema hecabe*	Common Grass Yellow
13		*Leptosia nina*	Wandering Psyche
14		*Catopsilia pyranthe*	Mottled Emigrant
15	Papilionidae	*Graphium agamemnon*	Tailed Jay
16		*Pachliopta hector*	Crimson Rose
17		*Papilio polytes*	Common Mormon
18		*Papilio demoleus*	Lemon Butterfly
19	Lycaenidae	*Lampides boeticus*	Pea Blue
20		*Euchrysops cnejus*	Gram Blue
21		*Tarucus nara*	Striped Pierrot

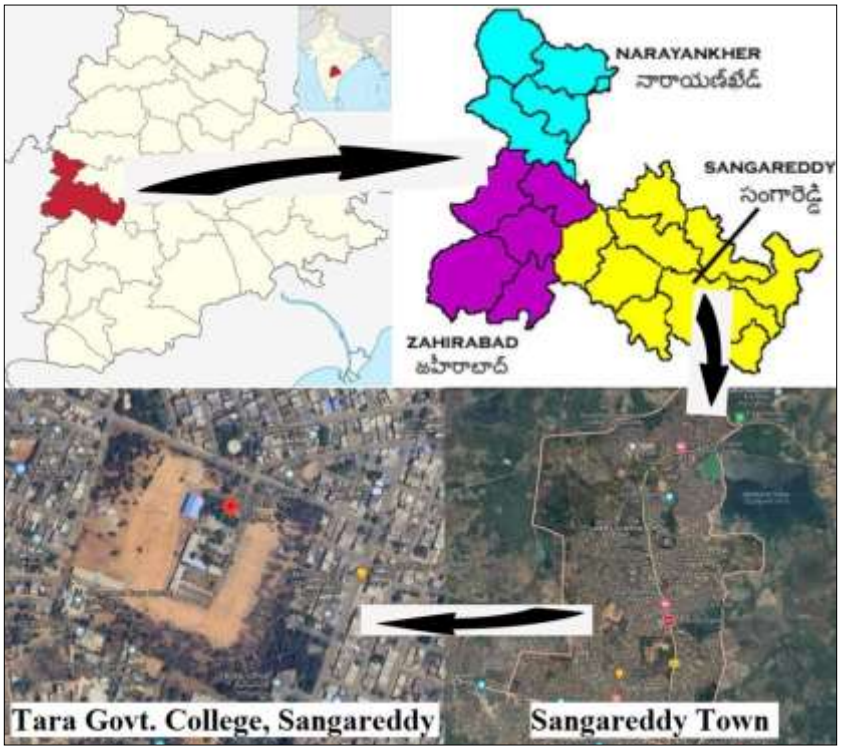

Fig 1: Tara Government College Location. Courtesy: Wikimedia, Wikipedia, Google maps

Fig 2: Photographs of the butterflies identified on the Tara Government College campus. 1) Grey Pansy, 2) Lemon pansy, 3) Peacock pansy, 4) Blue pansy, 5) Plain Tiger, 6) Common castor butterfly, 7) Blue tiger, 8) Common crow, 9) Tawny Coster, 10) Great southern white, 11) Arabs, 12) Common grass yellow, 13) Wandering Psyche, 14) Mottled emigrant, 15) Tailed jay, 16) Crimson Rose, 17) Common Mormon, 18) Pea blue, 19) Gram Blue, and 20) Striped Pierrot

Results and discussion

The purpose of this study was to create a baseline for knowledge of butterfly variety in Tara Government College (A), Sangareddy. The inquiry resulted in the observation of 21 butterfly species from 4 families, which were then photographed and recorded for the report. This area is rich in plant diversity with trees like *Mangifera indica*, *Ficus bengalensis*, *Azadirachta indica*, *Zizyphus jujoba*, *Tectona grandis*, *Annona squamosa*, *Pongamia pinnata*, *Acacia arabica*, *Terminalia arjuna*, *Psidium guajavae*, *Ceiba pentandra*, and *Bauhinia purpurea*, etc.

The survey identified 21 different species of butterflies. Out of these 21 species, 9 species namely the Grey Pansy (*Junonia atlites*), Lemon Pansy (*Junonia lemonias*), Peacock Pansy (*Junonia almanack*), Blue Pansy (*Junonia orithya*), Plant Tiger (*Danaus chrysippus*), Blue Tiger (*Tirumala limniace*), Common Castor Butterfly (*Ariadne merione*), Common Crow (*Euploe core*), Tawny Coster (*Acraea terpsicore*) belong to Nymphalidae family. The Great Southern White (*Ascia minutes*), Arabs (*Colotis danae*), Common Grass Yellow (*Eurema hecabe*), Wandering Psyche (*Leptosia nina*), and Mottled Emigrant (*Catopsilia pyranthe*) are the five species that make up the Pieriidae, the second-most prevalent family. With four species, Papilionidae was the third most prevalent family. Tailed Jay (*Graphium agamemnon*), Crimson Rose (*Pachliopta hector*), Common Mormon (*Papilio polytes*), and Lemon Butterfly (*Papilio demoleus*) are the papilionids that have been identified. Only three species were identified that be;ong to Lycaenidae family. They are Pea Blue (*Lampides boeticus*), Gramme Blue (*Euchrysops cnejus*), and Striped Pierrot (*Tarucus nara*).

Similar investigations were carried out in other Indian colleges. Dabhadkar and Prajapati (2020) [5] identified 40 butterfly species in the M. N. College campus in Visnagar, Gujarat, India. Of them, the Pieridae family has the most species with 14, followed by Nymphalidae (9) and Lycaenidae (9), Papilionidae (5), and Hesperidae (3). Similarly, Chitra (2020) [4] recorded 26 butterfly species from three families—Nymphalidae, Pieridae, and Papilionida—on the Koti Women's College campus in Hyderabad, India, from June 2014 to December 2019. In terms of species composition and total numbers, the Nymphalidae family was the most prominent, followed by Pieridae and Papilionidae.

Tara Government College has a limited variety of butterflies, in comparison. This might be due to the college's limited campus space in comparison to other institutions. Butterfly diversity may be increased by increasing green cover on campus and introducing additional plant species on college campuses.

Conclusion

In conclusion, Tara Government College (A), Sangareddy, hosts 21 butterfly species across four families. The limited campus space may account for the comparatively lower diversity observed. To enhance diversity, increasing greenery and introducing more plant species is advised. This study highlights the importance of maintaining green spaces in educational institutions, offering the potential for thriving butterfly habitats with targeted conservation efforts.

References

1. Antram CB. Butterflies of India. Mittal Publication, New Delhi, 2002.
2. Borges RM, Gowda V, Zacharias M. Butterfly pollination and high contrast visual signals in a low-density distylous plant. Oecologica,2003:136:571-573.

3. Chakaravarthy AK, Rajagopal D, Jagannatha R. Insects as bioindicators of conservation in the tropics, Zoo's Print Journal,1997:12:21-25.
4. Chitra KY. "In-situ Conservation of Some Butterfly Species Population of Koti Women's College Campus, Hyderabad (Telangana) India." Bulletin of Pure and Applied Sciences,2020:39A(2):299-306. DOI 10.5958/2320-3188.2020.00033.9.
5. Dabhadkar S, Prajapati R. A Study of Butterfly Species Diversity in M. N. College Campus, Visnagar, Mehsana District, Gujarat, India. International Journal of Research in Engineering, Science and Management,2020:3(12):98-104.
6. Dasgupta Niladri, Rao RJ. "Diversity and seasonal occurrence of butterflies at Jiwaji University campus, Gwalior, Madhya Pradesh." Bugs R All 21, 2014, 16-20.
7. Di Mauro D, Dietz T, Rockwood L. Determining the effect of urbanization on generalist butterfly species diversity in butterfly gardens. *Urban Ecosyst*,2007:10:427-439. https://doi.org/10.1007/s11252-007-0039-2
8. Gaonkar H. Butterflies of the Western Ghats, India (including Sri Lanka): A Biodiversity Assessment of a Threatened Mountain System. London: British Museum (Natural History), 1996.
9. Jana S, Pahari PR, Dutta TK, Bhattacharya T. Diversity and community structure of aquatic insects in a pond in Midnapore Town, West Bengal, India. Journal of Environmental Biology,2009:30:283-287.
10. Kehimkar I. The Book of Indian Butterflies. Bombay Natural History Society, Oxford University Press, New Delhi, 2008.
11. Kunte K. Butterflies of Peninsular India. Indian Academy of Sciences, Universities Press (India) Limited, Hyderabad, India, 2000.
12. MacDonald ZG, Nielsen SE, Acorn JH. Negative relationships between species richness and evenness render common diversity indices inadequate for assessing long-term trends in butterfly diversity. *Biodivers Conserv*,2017:26:617-629. https://doi.org/10.1007/s10531-016-1261-0
13. Menéndez, Rosa, Adela González-Megías, Yvonne Collingham, Richard Fox, David B Roy, *et al*. Thomas. "Direct and Indirect Effects of Climate and Habitat Factors on Butterfly Diversity." Ecology,2007:88(3):605-611. https://doi.org/10.1890/06-0539.
14. Narayana E, Ramesh R, Lakshmi M. Studies on butterfly diversity in forest habitats of Warangal district, Telangana, India. Biolife,2017:5(1):44-47.
15. Nerlekar AN, Warudkar AM, Gowande GG, Salve SS, Raut A, Patankar SR, *et al.* "A review of the faunal diversity of the Fergusson College campus, Pune, India." ZOO's PRINT,2016:31(10):4-25.
16. Singh AP. Butterflies of India. Om Books International, India, 2011.
17. Thomas JA, Simox DJ, Wardlaw JC, Elms WG, Hochberg ME, Clark RT. Effects of latitude, altitude and climate on the habitat and conservation of the endangered butterfly Maculinea arion and its Myrmica and host. J. Sect. Conserv,1998:2:39-46.