**“DIVERSITY OF BUTTERFLIES (LEPIDOPTERA) FROM TALA, RAIGAD- A PRELIMINARY STUDY”**

**Abstract*:***

The aim of this study was to evaluate butterfly diversity in the Tala region of Raigad district, Maharashtra. Insects play a vital role in sustaining life-support systems in natural ecosystems, and butterflies are particularly important due to their role in nectar consumption and pollination of flowering plants. Additionally, their larvae feed on leaves, acting as primary herbivores and helping transfer solar energy from plants to other organisms in the food chain.

The study recorded 41 butterfly species from 29 genera across 5 families. The *Nymphalidae* family was the most abundant, with 14 genera and 21 species, followed by *Pieridae* with 7 genera and 9 species, *Satyridae* with 5 genera and 7 species, *Papilionidae* with 2 genera and 3 species, and *Hesperiidae* with 1 genus and 1 species. The results provide important information about the butterfly biodiversity in the area and serve as foundational data for future studies on butterfly populations.

**Keywords:** Diversity, Butterfly, Lepidoptera, Tala, *Nymphalidae*.

**Introduction:**

Tala is a small town and tehsil situated in the Raigad district of Maharashtra’s Konkan region. Biological diversity refers to the variety and variability of living organisms and their ecological interactions (Harper, 1995). Biodiversity forms the foundation of ecological integrity, supports sustainable development, ensures environmental stability, and provides economic and ecological security for future generations. India, the seventh-largest country globally, ranks among the twelve mega biodiversity nations and harbours approximately 80% of its insect species as endemics. The order Lepidoptera constitutes nearly 10% of the total known animal species, a figure comparable to the number of recognized flowering plant species (Srivastava, 2002).

The Western Ghats, designated as a global mega biodiversity hotspot, significantly contribute to India’s entomofaunal diversity, with approximately 800,000 insect species documented. The diversity and distribution of butterfly species are strongly influenced by the availability of host plants within their habitats (Kunte, 2000).

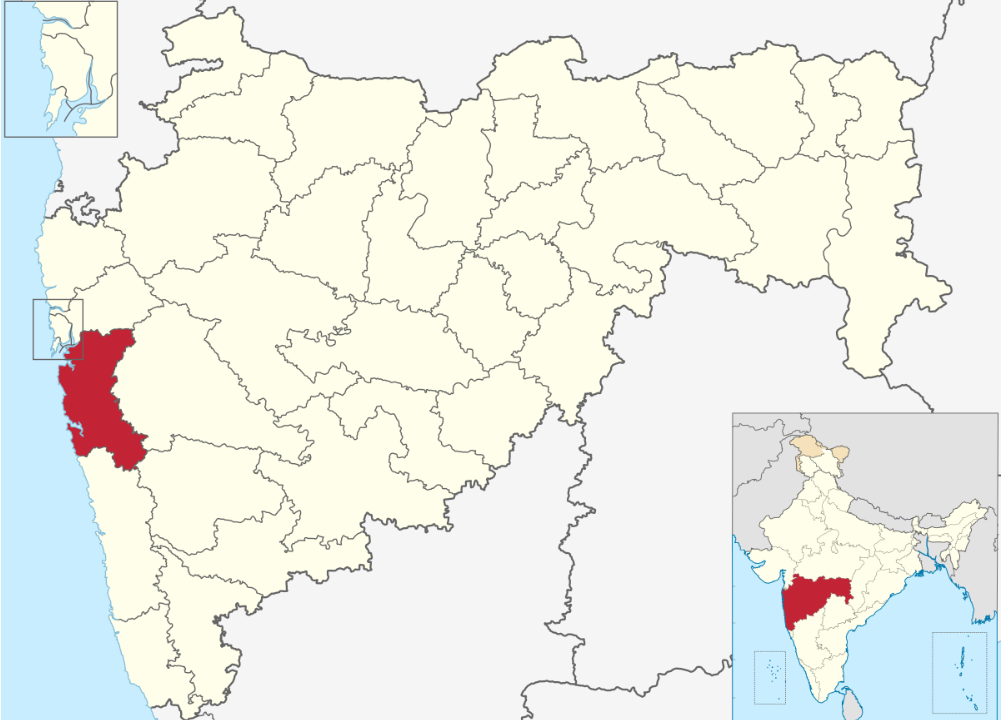
As the second-largest order within the class Insecta, Lepidoptera is of considerable ecological significance. Approximately 1,500 butterfly species have been identified from the Indian subcontinent, accounting for 8.33% of the 18,000 butterfly species documented worldwide (Hampson, 1891; Smetacek, 1992, 2002; Gay T, 2012). A substantial proportion of these species are concentrated within the Himalayan and Western Ghats regions (Larsen TB, 1987). Butterflies play critical roles in ecosystem functioning, serving as both pollinators and herbivores (Kunte, 2000; Tiple, 2006). They have coevolved with angiosperms, relying on nectar as adults and host plant foliage during larval stages (Ehrlich, 1964). Furthermore, butterflies are widely recognized as bio-indicator species due to their sensitivity to habitat alterations, rapid response to environmental perturbations, specific vegetation associations, and ease of sampling (Erhardt A., 1985; Brown, 1991; Kremen, 1992; Thomas, 2005; Bonebrake, 2010; Gowda, 2011; Sethy, 2014).

Anthropogenic disturbances such as habitat fragmentation, urbanization, and pollution have exacerbated environmental changes, leading to biodiversity decline. Habitat loss, primarily due to land-use transformation, directly impacts species survival and ecological balance (Choudhury, 2009; Saikia, 2010; Singh, 2011; Gogoi M.J., 2013; Joshi, 2014; Naro, 2014; Pollard, 1977). Insects contribute substantially to ecosystem processes within both aquatic and terrestrial habitats, providing essential services such as pollination, pest control, nutrient cycling, and overall ecosystem stability. Among insect taxa, butterflies are particularly significant due to their aesthetic appeal and their crucial function as pollinators (Tiple *et al.,* 2006).

In the Tala region, ongoing anthropogenic activities, including road construction toward Agardanda Port, have led to substantial habitat degradation, potentially influencing butterfly populations. Despite the ecological importance of butterflies, no prior systematic studies have been conducted on their diversity within this region. Therefore, the present study was undertaken to document butterfly diversity in and around Tala, Raigad district, Maharashtra. The findings aim to establish a baseline inventory of butterfly species, evaluate the extent of human-induced habitat modifications, and contribute to future conservation initiatives in the region.

**Material & Methods:**

1. **Study Area:**

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**Fig. 1. Map showing study area**

1. **Methodology:**

Butterflies were recorded along designated paths within the study area (Fig.1) and along water streams. The selected sites were surveyed over a one-year period from June 2022 to May 2023 to assess butterfly biodiversity. Field observations were conducted using the Pollard Walk Method (1977). Surveys were carried out weekly between 09:00 and 15:00 hours during sunny periods to document butterfly species through photography along transects. Lycaenid and hesperiid butterflies were captured in nets when necessary, identified, and subsequently released. Photographs of butterflies were taken using a Canon 1300D camera. Species identification was conducted using the identification keys provided by Evans (1932), Kehimkar (2008), Kunte (2000), and Wynter-Blyth (1957), with classification following the system outlined by Kehimkar (2008).

**Table No. 01 List of families with number of genera & species of butterflies recorded in study area**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr. No.** | **Family** | **Genera** | **Species** | **Species %** |
| 1 | Papilionidae | 02 | 03 | 7.1 |
| 2 | Hesperiidae | 01 | 01 | 2.38 |
| 3 | Pieridae | 07 | 09 | 21.42 |
| 4 | Nymphalidae | 14 | 21 | 50 |
| 5 | Satyridae | 05 | 07 | 19.04 |
|  | Total | 29 | 41 |  |

**Table No. 02 Checklist of Butterflies (Insecta: Lepidoptera) recorded in study area**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Family** | **Scientific Name** | **Common Name** |
| I | Papilionidae | *Graphium doson* (C. & R. Felder, 1864) | Common Jay |
| *Papilio demoleus* (Linnaeus, 1758) | Lime Butterfly |
| *Papilio polytes* (Linnaeus, 1758) | Common Mormon |
| II | Hesperiidae | *Aeromachus dubius* (Elwes& Edwards, 1897) | Dingy Scrub Hopper |
| III | Pieridae | *Catopsilia pyranthe* (Linnaeus, 1758) | Mottled Emigrant |
| *Colotis amata* (Cramer, 1775) | Small Salmon Arab |
| *Delias eucharis* (Drury, 1773) | Common Jezebel |
| *Eurema brigitta* (Stoll, 1780) | Small Grass Yellow |
| *Eurema hecabe* (Linnaeus, 1758) | Common Grass Yellow |
| *Eurema nilgiriensis* (Yata, 1990) | Nilgiri Grass Yellow |
| *Leptosia nina* (Fabricius, 1793) | Psyche |
| *Pareronia hippie* (Cramer, 1776) | Common Wanderer |
| *Prioneris sita* (C. & R. Felder, 1865) | Painted Sawtooth |
| IV | Nymphalidae | *Acraea violae* (Fabricius, 1793) | Tawny Coster |
| *Ariadne ariadne* (Linnaeus, 1763) | Angled Castor |
| *Cirrochroa thais* (Fabricius, 1787) | Tamil Yeoman |
| Danaus chrysippus (Linnaeus, 1758) | Plain Tiger |
| *Euploea core* (Cramer, 1780) | Common Crow |
| *Euploea klugii* (Moore, 1858) | King Crow |
| *Euploea sylvester* (Fabricius, 1793) | Double-branded Crow |
| *Hypolimnas bolina* (Linnaeus, 1758) | Great Eggfly |
| *Hypolimnas misippus* (Linnaeus, 1764) | Danaid Eggfly |
| *Junonia almana* (Linnaeus, 1758) | Peacock Pansy |
| *Junonia atlites* (Linnaeus, 1763) | Gray Pansy |
| *Kallima horsfieldi* (Kollar, 1844) | Southern Blue Oakleaf |
| *Melanitis leda* (Linnaeus, 1758) | Common Evening Brown |
| *Mycalesis mineus* (Linnaeus, 1758) | Dark-brand Bushbrown |
| *Mycalesis perseus* (Fabricius, 1775) | Common Bushbrown |
| *Mycalesis visala* (Moore, 1858) | Long-brand Bushbrown |
| *Neptis jumbah* (Moore, 1858) | Chestnut-streaked Sailer |
| *Parantica aglea* (Stoll, 1782) | Glassy Tiger |
| *Phalanta alcippe* (Stoll, 1782) | Small Leopard |
| *Tirumala limniace* (Cramer, 1775) | Blue Tiger |
| *Tirumala septentrionis* (Butler, 1874) | Dark Blue Tiger |
| V | Satyridae | *Melanitis phedima* (Cramer, 1780) | dark evening brown |
| *Elymnias hypermnestra undularis* (Linnaeus, 1763) | Common Palmfly |
| *Lethe rohria* (Fabricius, 1787) | common treebrown |
| *Lethe europa europa* (Fabricius, 1775) | bamboo treebrown |
| *Ypthima huebneri* ( Kirby, 1871) | common four-ring |
| *Ypthima baldus* (Fabricius, 1775) | common five-ring |
| *Melanitis leda ismene* (Linnaeus, 1758) | rice butterfly |

*Graphium doson* *Papilio demoleus* *Papilio polytes Aeromachus dubius*



*Catopsilia pyranthe Colotis amata Delias eucharis Eurema brigitta*

*Eurema hecabe Eurema nilgiriensis* *Leptosia nina* *Pareronia hippie*



*Prioneris sita Acraea violae Ariadne Ariadne Cirrochroa thais*

*Danaus chrysippus Euploea core Euploea klugii Euploea Sylvester*

**Fig. 2 Butterflies species recorded in study area**



*Hypolimnas bolina Hypolimnas misippus Junonia almanac Junonia atlites*

***Kallima horsfieldi Mycalesis mineus Mycalesis perseus Mycalesis visala*

*Neptis jumbah Parantica aglea Phalanta alcippe Tirumala limniace*

*Tirumala septentrionis Melanitis leda Melanitis phedima Elymnias hypermnestra undularis*

*Lethe rohria Lethe europa europa Ypthima huebneri Ypthima baldus*

**Fig. 3 Butterflies species recorded in study area**

**Results & Discussion:**

In the current study, a total of 41 lepidopteran species from 29 genera and 5 families were recorded (Tables 1 & 2). Among the 6 families, *Nymphalidae* was the most diverse, with 14 genera and 21 species, followed by *Pieridae* with 7 genera and 9 species, *Satyridae* with 5 genera and 7 species, *Papilionidae* with 2 genera and 3 species, and Hesperiidae with 1 genus and 1 species (Figures 2 & 3). The highest species diversity was observed in *Nymphalidae*, which accounted for 21 species (50%), followed by *Pieridae* with 9 species (21.42%), *Satyridae* with 7 species (19.04%), *Papilionidae* with 3 species (7.1%), and *Hesperiidae*, which had the fewest species, comprising just 2.38% of the total. Butterflies (Lepidoptera: Rhophalocera) are valuable for their role in pollination, serve as ecological indicators, and are admired for their aesthetic appeal (Rosenberg, 1986; Johnson, 1995; Chakravarthy AK, 1997; McGeoch, 1998; Vu Van Lien, 2007). Factors such as the availability of food (host plants and nectar plants) and the microclimate significantly influence butterfly diversity ( Öckinger E, 2006, 2009; Mukherjee M, 2012; Mukherjee K, 2018).

The study area, rich in vegetation that provides food sources for butterflies, has led to the recording of a large number of species. The *Nymphalidae* family is the largest, accounting for nearly one-third of the world’s known butterflies. The high biodiversity of nymphalids and lycaenids in this study aligns with previous research on butterfly diversity (Dronamraju, 1960; Roy, 2010; Harsh S., 2014; Mukherjee, 2015). These families dominate due to the polyphagous nature of many species, their ecological adaptability (Jiggins CD, 1996), speciation, and high dispersal capabilities (Adler GH, 1996). Additionally, many species in these families are strong, active fliers, which helps them search for habitats and food over large areas (Eswaran R, 2005; Padhye AD, 2006; Krishnakumar N, 2008; Raut NB, 2010). Butterflies are effective indicators of anthropogenic disturbances and habitat quality (Kocher SD, 2000).

As this study serves as the first preliminary exploration of butterfly biodiversity in the area, conclusions regarding the loss of butterfly species cannot yet be drawn. The butterfly checklist created in this study will provide a foundation for future research. Further in-depth studies on butterfly diversity are necessary to expand the species list and assess the impact of anthropogenic changes on habitats in the Tala region.

**CONCLUSION:**

Butterflies (Lepidoptera: Rhophalocera) are valuable for their role in pollination, serve as ecological indicators, and are admired for their aesthetic beauty. Key factors influencing butterfly diversity include the availability of food (host and nectar plants), habitat, and microclimate. Human activities contribute to habitat destruction and the loss of food plants.

In this study, a total of 41 butterfly species from 29 genera and 5 families were recorded. As there are no previous records of butterfly species for this area, it is not possible to confirm any changes in butterfly diversity. This preliminary study lays the groundwork for future research on the ecology, biology, and conservation of butterflies in the region. Further, more detailed studies are needed to enhance the butterfly species checklist and evaluate the impact of human-induced changes on butterfly diversity.

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