Study of Butterflies Diversity are correlated to the Role of Butterfly from the Shankarrao Mohite Mahavidyalay Akluj, Malshiras Tahsil.(M.S)India.

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Abstract

Butterflies play a crucial role in ecosystems as pollinators and bio-indicators of environmental health. This study aims to assess the diversity, distribution, and habitat preferences of butterfly species in Shankarrao Mohite Mahavidyalay Akluj. Field surveys were conducted using standard transect and opportunistic sampling methods across different ecological zones. Species identification was carried out using field guides and photographic records. Data analysis included species richness, Shannon-Weiner diversity index, and relative abundance calculations. The findings highlight the impact of habitat type, seasonal variations, and anthropogenic factors on butterfly diversity. Notably, 14 species are identified from college campus from 3 families . Conservation implications emphasize the need for habitat preservation and sustainable land-use practices to protect butterfly populations. This study contributes to understanding butterfly ecology and provides baseline data for future biodiversity conservation efforts.

Keywords: Butterfly diversity, species richness, habitat preferences, conservation, ecological

Introduction

Butterflies are integral components of forest ecosystems, closely associated with plant diversity. Belonging to the order Lepidoptera, butterflies are among the most captivating and easily recognizable insects (Arya and Dayakrishna, 2014; Braby, 2016). They possess a well-defined taxonomy, along with thoroughly studied life cycles and biological characteristics (Bonebrake et al., 2010; Hill, 1999; Kunte, 1997). Butterflies are considered important indicators for insect conservation due to their vital role in ecological monitoring. Globally, their significance lies in their capacity to evaluate environmental quality within terrestrial ecosystems. Notably, they are one of the few insect groups that serve as potent ecological indicators of forest conditions. Indicator species can either reflect the presence or abundance of other species or signify physical environmental changes through fluctuations in their populations. The latter function is often referred to as an ecological marker (Dyck et al., 2000; Kunte, 2000; Tiple et al., 2005; Wettstein and Schmid, 1999).

Butterflies exhibit substantial diversity, appearing in a spectrum of colors and sizes. Globally, more than 28,000 butterfly species exist, with approximately 80% inhabiting tropical regions (Larson et al., 2001). Their primary nourishment derives from liquid sources, such as nectar from flowers and overripe fruits. Butterflies play essential ecological roles, serving as pollinators, food sources, and bioindicators of ecosystem health. As diurnal pollinators, they favor large, vibrant flowers with landing platforms, accumulating pollen on their slender legs while extracting nectar. Butterflies are highly sensitive to environmental changes, such as habitat loss and climate fluctuations, making them responsive indicators of ecosystem vitality. A thriving butterfly population typically signifies a healthy environment (Erhardt, 1985; Gilbert, 1972; Kocher and Williams, 2000; Kunte, 1997).

Many butterfly species undertake extensive migrations, with some traveling up to 3,000 miles. These migrations enable pollination across vast distances, further contributing to human interest in their conservation. Butterflies support restoration efforts in ecosystems by facilitating pollination and provisioning vital food resources (Shi et al., 2009). An increase in butterfly numbers often correlates with greater plant biodiversity and higher abundance of other pollinator groups within restored habitats. In addition to their ecological importance, butterflies serve as aesthetically appealing insects, adding value to gardens and natural landscapes. As bioindicators, butterflies provide critical insights into ecosystem health (Dobson, 2012). Swengel (2003) demonstrated that plants and animals coexist within ecological regions characterized by specific combinations of soil, climate, and geography . Certain vegetation types are essential for butterfly survival, as different species require distinct habitat conditions. Investigating localized butterfly populations reveals the microhabitats necessary for their

persistence. Natural events within ecosystems can either bolster or diminish butterfly populations, depending on the microhabitat characteristics present (Swengel, 2003).

Material And Method

Survey Method

Study area located in Maharashtra state ,Solapur district Malshiras tahsil having grassland habitat agriculture crop also including flowering habitat. Which are suitable for butterflies. In malshiras tahsil there are bhima and nira river. Butterflies having suitable climate in malshiras tahsil.

Physical Method

For this work the first important thing was the Collection of butterflies form different places and study the butterflies are correlated to the Role of Butterfly from Malshiras tahsil area. The butterflies collection was done by the usual procedure. For this collection following materials were used.

1] Insect net.
2] paper cone .
3] Killing jar
4] Spreading board.
5] Oven for dehydration.
6] Collection box.

Role of Butterflies in Ecosystems:

Butterflies, which are classified under the order Lepidoptera (suborder Rhopalocera, characterized by club-shaped antennae), are primarily active during daytime, making them diurnal fliers (Kunte, 1997). The diversity and spatial distribution of a butterfly species are influenced not only by the geographic traits of the habitat and the species' dispersal capabilities within it, but also by the specific ecological requirements of the species. Consequently, butterflies play dual roles in ecosystems: they provide ecological benefits, such as pollination and serving as bioindicators, while their larval stages can inflict significant damage by feeding on valuable forestry and agricultural crops (Beeson, 1941; Joshi et al., 2004).

Role as Pollinator:

Butterflies contribute significantly to ecosystem processes through their dual role as pollinators and as integral components of the food web. By acting as efficient pollinators for nectar-producing plants and indicating the health and vitality of their host plants and habitats, studying butterfly populations becomes crucial for identifying and conserving threatened ecosystems (Kunte, 1997). These insects play key ecological roles by interacting with plants as both pollinators and herbivores. Many butterfly species feed on nectar and frequently visit flowers, aiding pollination by transferring pollen as they move from one bloom to another (Tiple et al., 2005). The larvae, however, are herbivorous and depend on specific host plants for sustenance (Nitin et al., 2018; Tiple, 2011).

Butterflies are among the most recognizable pollinators and bioindicators (Balmer and Erhardt, 2000; Sharma and Joshi, 2009; Sheikh et al., 2021). Their vital role in pollination underpins the reproductive success of numerous plant species. Patterns in their distribution and abundance often reflect environmental changes, and their complex life cycles make them especially sensitive to ecological disturbances, further underscoring their value as bioindicators (Dyck et al., 2000; Hanski, 2001).

Contribution to Biodiversity Conservation:

Lepidoptera play a crucial role in sustaining biodiversity by acting as pollinators, facilitating plant reproduction through pollination, thereby promoting natural propagation . Additionally, they serve as a vital trophic resource for avian species, reptiles, arachnids, and various predatory arthropods (Perveen, 2015). From an ecological conservation perspective, butterflies are widely recognized as bioindicators, effectively reflecting environmental quality and habitat alterations (Arya and Dayakrishna, 2014; Ghosh and Mukherjee, 2016; Patil and Shende, 2014).

Butterflies as Bioindicators of Ecosystem Health:

Butterflies play a crucial role in ecological networks and are widely recognized as reliable indicators of a well-balanced terrestrial ecosystem (Larsen, 1987). Their presence serves as a biological marker of habitat integrity and overall environmental well-being, as numerous species exhibit strict habitat preferences (Kocher and Williams, 2000; Larsen, 1987; Sawchik et al., 2005). Among insect taxa, butterflies are extensively utilized as bioindicators for assessing ecosystem stability and evaluating the effects of climate fluctuations (Bhardwaj et al., 2012; Harsh, 2014; Kumar, 2021). Their sensitivity to habitat deterioration and climatic variations further underscores

their significance in monitoring ecological transformations. Additionally, butterflies are prominent components of open landscapes and serve as indicators of habitat quality (Kunte, 2000).

Results:

Sr. No.	Common name	Scientific name	Family
1.	Common Mormon (male)	*Papilio polytes*	Papillionidae
2.	Common Mormon (female)	*Papilio polytes*	Papillionidae
3.	Common rose	*Pachliopta aristolochiae*	Papillionidae
4.	Common crow	*Euploea core*	Nymphalidae
5.	Three spot grass yellow	*Eurema hecade*	Pieridae
6	Cabage white	*Pieris rapae*	Pieridae
7	White orange tip	*Ixias Marianne (cramer)*	Pieridae
8	Common jay	*Graphium doson*	Papillionidae
9	Brown king crow	*Euploea core*	Nymphalidae
10	Great eggfly	*Hypolimnas bolina jacintha*	Nymphalidae
11	Plain tiger butterfly	*Danaus chrysippus*	Nymphalidae
12	Lime butterfly	*Papilio demoleus*	Papillionidae
13	Denaid eggfly	*Hypolimnas misippus*	Nymphalidae
14	Common gull	*Cepora Nerissa*	Pieridae

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