



Diversity of Butterflies in Different Habitat of Kota City

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ABSTRACT

Diversity represents the basic characteristic of every living system. The heterogeneity of living organisms from terrestrial, marine, and aquatic ecosystems is measured as diversity. Butterflies are generally considered as one of the accurate taxonomically studies groups of insects. The present work was started with a view to examining the dynamics of the butterfly population across seasons and habitats. The present analysis has revealed the seasonal patterns of butterflies, interaction among them, relation with vegetative fauna and climatic conditions. The main purpose of this topic was to set biodiversity into the mainstream decision-making framework to have wider visibility amongst policymakers when formatting development strategies and planning progress. Our main aim for using butterflies is to ascertain the effect of anthropogenic activities on life in the investigated area. The data analysis of this present research on biodiversity was accomplished by concluding some interesting facts. The butterfly fauna was enriched with 4 families, 13 genera, 19 species and 548 individuals with a profound diversity despite the semi-arid climate of the City. Family Pieridae and Nymphalidae are dominated by Lycaenidae and Papilionidae. The maximum population is found in August-September followed by March-April and the minimum in October-November. At the gardens; herbs were dominant over the trees while trees dominate herbs and shrubs in sampling site agriculture land. This represents the high conservation rate is found in garden and park areas. So at these sites steps should be taken to preserve the ecology and proper monitoring should be required of the anthropogenic activities out there. Proper steps should also be taken to establish the ecology of industrial areas in and around. To sum up, this research paves a way for further study on bioindicators' values of butterflies.

INTRODUCTION

Biodiversity is the Fundamental Property of Every Living System. The heterogeneity of living organisms from terrestrial, marine, and aquatic ecosystems is measured as diversity. Uncontrolled human development, overexploitation of natural resources, mining, pollution, deforestation, poaching, chemical pesticides etc.

has resulted in severe pressure on biodiversity. 3 These factors result in the extinction of an estimated 35,000 plant and 5500 animal species. It is assessed that one species becomes extinct every 20 minutes. The principal component of the world's biodiversity is insects. Half of the diversity of mother earth entails insects. Worldwide around 1.4 million species are present on earth of which 53% are insects. (Hassan, 1994). Insects are considered vital determinants of terrestrial ecological processes. Lepidoptera is one of the best-known and large orders of insects. Butterflies are rare and beautiful objects of pleasure to mankind. Sometimes they are used as decorative pieces while some species are worshiped and used as an ornament in tribal cultures. They are sensitive creatures to habitat degradation and climate changes such as temperature, humidity, light and rainfall patterns. They are supposed to be food for birds, spiders, reptiles and predatory insects. Being herbivores, butterflies are a vital component of the food chain so they can be considered as an indicator for the study of population and community ecology (Pollard,1991).

Exorbitantly increasing population and urbanization with industrial development have directly subjected the ecosystems of the world to which many Lepidoptera and other organisms are not able to adopt. Hence, there is a need to develop long-term resource management policies for this ecosystem based on ecological processes. Butterflies are indicators of environmental quality apart from being appreciated for their aesthetic value. Their diversity, ease of sampling and abundance are different environmental parameters. Different anthropogenic activities like habitat changes, use of chemicals such as pesticides and weedicides, illegal collections for trade, fire etc. day by day declining the diversity of butterflies.

OBJECTIVES

Our primary objective was to assess species richness, distribution, evenness and abundance of butterflies in different areas of Kota City such as Chambal garden, Ganesh Udyan, Industrial area and agricultural land.

We Calculated the alpha, beta and gamma diversity of butterflies in different study sites.

Secondarily we have studied insect diversity, reflection of the degree of ecological disturbance due to anthropogenic activities; and focussed to find out the seasonal effects on butterfly diversity.

Statement of Problem

How does the industrialization and urbanization destroy our ecosystem? And how far we can compromise our ecosystem in the name of development? Is it true that artificial green land can be beneficial for prevention of further damage to our ecosystem? These are the main questions we often ask to ourselves. Measure of diversity is population of different species in different areas surrounds us.

HYPOTHESIS

“It is proposed that industrialization and urbanization have negative effect on growth and development of various species of insects especially butterfly.”

We want to demonstrate the effect of industrialization and urbanization on population of various species of butterfly.

RESEARCH METHODOLOGY

The Pollard transect method was used for the collection of butterflies. The collection of insects was done by surveys in Hadoti and they were identified and studied taxonomically with the help of relevant literature of review. Then this collection of insects was compared with the authentic identified collection present at different esteemed scientific institutes. Following institutes were used for comparison and confirmations of the different identified specimens: Zoological Survey of India (ZSI), Jodhpur; Division of Entomology, Indian Agricultural Research Institute, New Delhi.

To assess species richness, distribution, evenness and abundance of butterflies we have divided Kota city in four different zones.

S1-Chambal garden,

S2-Ganesh Udyan,

S3-Industrial area and

S4-agricultural land.

Calculation of the alpha, beta and gamma diversity and seasonal effects on butterfly diversity in the study sites done through scientific manner.

ANALYSIS

During the biodiversity study of butterflies of Order Lepidoptera, 548 individuals were sampled belonging to 4 families, 13 genus and 19 species (Table 1). The highest number of species (18) was sampled from S-1 (Chambal Garden) and the lowest (4) species from S-3 (Industrial Area). Total species from S-2 (Ganesh Udhyan) and S-3 (Agricultural Land) were 17 and 12 respectively. The winter season was not favorable and the number of individual and species sampled were quite less compared to the rainy and summer seasons. The Chambal Garden S-1 and S-2 Ganesh Udhyan are an artificially re-vegetated habitat, making them an applicable ecosystem for the butterflies round the year. The agroecosystem of site S-4 (Agriculture Land)

had a low species richness of Lepidopterans due to anthropogenic activities of growing very few crops at a time i.e. poor plant diversity, manuring, ploughing and pesticide application.

Table 1: Diversity of Butterflies in Different Sites of Kota City

Site	Number of Families	Number of Species	Number of Individuals
S-1	4	18	216
S-2	4	17	202
S-3	2	4	22
S-4	3	12	108
Total			548

S-1 (Chambal Garden), S-2 (Ganesh Udhyan), S-3(Industrial Area), S-4(Agriculture Land)

Shannon Weiner Diversity Index

Shannon-Weiner Index accounts for species richness and proportion of each species within the sampling Site. This index was used for the study of the diversity of species.

Table 2: Shannon-Weiner Index of Special Richness of Butterflies in All Seasons

CONCLUSION

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Sites	Lepidoptera		
	Summer Season	Rainy Season	Winter Season
S-1	2.47	2.65	2.19
S-2	2.41	2.65	2.28
S-3	1.33	1.29	0.67
S-4	2.14	2.37	2.08

S-1 (Chambal Garden), S-2 (Ganesh Udhyan), S-3(Industrial Area), S-4(Agriculture Land)

correlation was observed between the families or species of butterflies with the magnitude of anthropogenic disturbance. The diversity of butterflies is threatened in today’s scenario. Hence, a proper conservation strategy is needed to maintain the biodiversity of butterflies.

RECOMMENDATION

A well-protected boundary with regular vegetation improving activities are being recommended. A set-up of parks for butterflies is a good initial step. This study will further assess to find out the level of disturbance in the ecology of the Kota City to relating it with 104 the population of butterflies of this area. Butterfly parks are the best option which not only maintain interest among the common populace but also help in development of butterfly conservation. It also educates people about identification of different species of butterflies with knowledge of wildlife protection act and endangered species.

The need of limitation of pesticide uses should be made understand and easy approach to agriculture workers should be made to conserve our ecosystem.

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