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DIVERSITY OF BUTTERFLIES IN MIXED AND PURE PLANTATION AREAS

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ABSTRACT: Life cannot run smoothly without biodiversity. Flora and Fauna vary depending on climate, altitude, soils and the presence of other species. All species provide at least one function in an ecosystem. Butterflies are closely associated with plants and are indicators of a healthy environment and healthy ecosystems. They indicate a wide range of other invertebrates, which comprise over two-thirds of all species. Areas rich in butterflies are rich in other invertebrates. These collectively provide a wide range of environmental benefits, including pollination and natural pest control. Butterflies support a range of other predators and parasites, many of which are specific to individual species, or groups of species. Butterflies have been widely used by ecologists as model organisms to study the impact of habitat loss and fragmentation, and climate change. They are the first to be affected by even the slightest disturbance in their habitats.

In the present investigation an intensive survey has been conducted to evaluate the difference in Butterfly species population of Neem Dominated Area and Mixed Vegetation Area at Kanpur. The method used for the present study was visual screening followed by transect method for consecutive two years to identify the species variation in the proposed study areas. A total of 6 families with species diversity were observed.

KEYWORDS: Butterflies, Mixed Vegetation Area, Neem Dominated Area, Transect method

I. INTRODUCTION

The term biodiversity was first used in its long version- biological diversity by **Lovejoy (1980)** and is most commonly used to describe the number of species in our biosphere. Biodiversity is crucial to human survival, because when we lose any particular species, it affects the entire ecosystem. The most straightforward definition of biodiversity is "Variation of life at all levels of biological organization". (**Kevin *et. al.*, 2004**)

Loss of biodiversity has serious economic and social costs for any country. Globally, several hundred species are becoming extinct everyday with habitat destruction, unsustainable ways of living and competition for space between people and wild species. Human is exchanging species from every part of the world, which are of their own interest. It is this ability of humans to exchange flora and fauna which has resulted in rapid and major invasion of exotic plant and animal species in natural habitats (**Drake and Mooney, 1989).**

Life cannot run smoothly without biodiversity. Flora and Fauna vary depending on climate, altitude, soils and the presence of other species. All species provide at least one function in an ecosystem. A National Biodiversity authority has been set up at Chennai India vide Gazette Notification dated 1st October, 2003 under an Act. The Act provides for the establishment of State level and local level Boards and Biodiversity Management Committee to deal with any matter concerning Conservation of Biological Diversity, its sustainable use and fair equitable sharing of benefits arising out of the use of Biological resources and associated knowledge (**Annual Report 2004-2005, Ministry of Environment & Forest, India**).

Many plants and animals are threatened or endangered due to habitat loss and population pressure apart from hunting and extraction. India stands as one of the few countries with high human populations as well as high number of threatened species as studied by **IUCN (2004).** The IUCN has found that 23 percent of vertebrates, 53 percent of invertebrates and 70 percent of plants that have been evaluated are designated as endangered or threatened (**IUCN, 2006).** In recent decades human beings are depleting biodiversity by introducing flora and fauna of his own interest in different habitats **(Srivastava and Mishra, 2004)**.

Butterflies are indicators of a healthy environment and healthy ecosystems. They indicate a wide range of other invertebrates, which comprise over two-thirds of all species. Areas rich in butterflies and moths are rich in other invertebrates. These collectively provide a wide range of environmental benefits, including pollination and natural pest control.

Butterflies support a range of other predators and parasites, many of which are specific to individual species, or groups of species. Butterflies have been widely used by ecologists as model organisms to study the impact of habitat loss and fragmentation, and climate change. According to **Gay *et. al.*, (1992)** butterflies are closely associated with plant life and they are first to be affected by even the slightest disturbance in their habitats. In terms of indicating organisms, for biodiversity studies (**Pearson, 1995**) butterflies are an excellent choice.

II. MATERIAL AND METHOD

The present study focuses on the butterfly population in different environments containing diverse flora. The study has been conducted in two different areas namely Mixed Vegetation Area (**MVA**) and Neem Dominated Area (**NDA**) at Kanpur for two consecutive years. Of the two areas of study, one area was populated with a mixed vegetation of trees including trees, shrubs and herbs (Mixed Vegetation Area, **MVA**) located near the Allen Forest Region, Nawabganj, Kanpur and the other area was populated with Neem trees (Neem Dominated Area, **NDA**) planted near Parag Dairy premises, Nirala Nagar, Kanpur.

For the study the butterflies were censured along 5m long transects, traversed in one hour. Transects were enumerated between 8:00 and 11:00 hours in the morning, when butterfly activity was usually at its daily peak. Sampling was done visually for all the three forest strata (canopy, shrub and ground layers) with the help of basic tools like butterfly nets, camera, stop watch, binoculars, and helpers. Butterflies were identified with reference to **Evans (1932); D' Abrera (1982, 1985, 1986); Gay et. al., (1992) and Blair and Launer (1997)**.

Numbers of individuals were recorded in study area for two years, the observations were recorded for the variation and diversity in species in table form.

III. OBSERVATION

The observed data for butterflies found in MVA and NDA after 2 years of visual screening have been summarized below.

Table –1

Population of Butterflies in MVA

S. No	Family	Common name	Scientific Name	I Year	II Year	Mean
1.	Pieridae	Common Immigrant	Catopsiliacrocale (Cramer)	1	2	1.5
2.		Lemon Immigrant	Catopsiliapomona	1	3	2
3.		Common Grass Yellow	Euremahecabe (Moore)	1	2	1.5
4.		Spotless Grass Yellow	Euremalaeta	0	2	1
5.	Papilionidae	Common Rose	Atrophaneuraaristolochiae	2	4	3
6.		Lime Butterfly	Papiliodemoleus (Linnaeus)	4	3	3.5
7.	Lycaenidae	Common Pieroot	Castaliusrosimon (Fabricus)	1	1	1
8.		Tiny Grass Blue	Zizulagaila	1	2	1.5
9.		Gram Blue	Euchrysopscnegus	1	1	1
10.		Common Cerulean	Jamidesceleno	2	0	1
11.		Indian Red Flash	Rapalaiarbus	2	2	2
12.		Lesser Grass Blue	Zizeeriaotis	0	1	0.5
13.	Nymphalidae	Baron	Euthaliaaconthea	1	2	1.5
14.		Yellow Pansy	Precis hierta (Fabricus)	4	4	4
15.		Blue Pansy	Precis orithya	3	3	3
16.		Common Sailor	Neptishylas	2	4	3
17.		Lemon Pansy	Precis lemonias	3	3	3
18.		Painted Lady	Cinthiacardui	1	2	1.5

19.		Peacock Pansy	Precis almana	0	1	0.5
20.		Choclate Pansy	Precis iphita	0	1	0.5
21.	Satyridae	Common Bush Brown	Mycalesisperseus	1	2	1.5
22.		Common Evening Brown	Melanitisleda	1	1	1
23.		Common Fourring	Ypthimahuebneri	2	2	2
24.		Common Threering	Ypthimaasterope	2	1	1.5
25.	Danaidae	Plain Tiger	Danauschrysippus	2	4	3
26.		Blue Tiger	Danauslimniace	1	2	1.5
27.		Stripped or Common Tiger	Danausgenutia	1	1	1
28.		Common Indian Crow	Euploea core	2	3	2.5

Table –2

Population of Butterflies in NDA

S. No.	**Family**	**Common name**	**Scientific Name**	**I Year**	**II Year**	**Mean**
1.	Pieridae	Common Immigrant	Catopsiliacrocale (Cramer)	1	2	1.5
2.		Lemon Immigrant	Catopsiliapomona	0	3	1.5
3.		Common Grass Yellow	Euremahecabe (Moore)	0	0	0
4.	Papilionidae	Common Rose	Atrophaneuraaristolochiae	1	1	1
5.		Lime Butterfly	Papiliodemoleus (Linnaeus)	1	1	1
6.	Lycaenidae	Common Pieroot	Castaliusrosimon (Fabricus)	1	2	1.5
7.		Indian Red Flash	Rapalaiarbus	0	2	1
8.		Lesser Grass Blue	Zizeeriaotis	0	1	0.5
9.	Nymphalidae	Yellow Pansy	Precis hierta (Fabricus)	0	2	1
10.		Blue Pansy	Precis orithya	0	1	0.5
11.		Common Sailor	Neptishylas	2	1	1.5
12.		Lemon Pansy	Precis lemonias	0	2	1
13.	Satyridae	Common Evening Brown	Melanitisleda	1	0	0.5
14.		Common Fourring	Ypthimahuebneri	1	1	1
15.	Danaidae	Plain Tiger	Danauschrysippus	0	2	1
16.		Blue Tiger	Danauslimniace	1	0	0.5
17.		Common Indian Crow	Euploea core	2	1	1.5

IV. RESULT AND DISCUSSION

The United Nations proclaimed May 22, The International Day for Biological Diversity (IBD) to increase understanding and awareness of biodiversity issues. When first created by the Second Committee of the UN General Assembly in late 1993, 29 December (the date of entry into force of the Convention of Biological Diversity), was designated The International Day for Biological Diversity. In December 2000, the UN General Assembly adopted 22 May as IBD, to commemorate the adoption of the text of the Convention on 22 May 1992 by the Nairobi Final Act of the Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity. This was partly done because it was difficult for many countries to plan and carry out suitable celebrations for the date of 29 December, given the number of holidays that coincide around that time of year (**UP State Biodiversity Board, 2008**).

Butterflies are an extremely important group of 'model' organisms used, for centuries, to investigate many areas of biological research, including such diverse fields as navigation, pest control, embryology, mimicry, evolution, genetics, population dynamics and biodiversity conservation. The long history and popularity of butterfly study have provided a unique data resource on an insect group unmatched in geographical scale and time-scale anywhere in the world. This has proved extremely important for scientific research on climate change.

A native of India, Neem (*Azadirachtaindica*) can grow easily in degraded land without competing with food crops (**Anon, 1980**). It is cultivated in most parts of India except in high and cold regions and dumpsites. It can be easily propagated from seed with the introduction of fast growing exotic tree species like Eucalyptus, Poplar etc. Neem tree improves biodiversity by allowing climbers to grow like *Tinospora* and trees which are slightly tilted allow more climbers to grow. Data of the different butterflies found in MVA and NDA have been summarized. Butterflies were found more in MVA in comparison to NDA as observed in the tables. It was observed that MVA encourages a higher diversity of butterflies because of the availability of different micro-niches which harbor larval food plants (**Koul, 1984**). The lesser number of butterfly species recorded in NDA indicates that the only one type of plantation reduces the species of butterflies. The butterflies play an important role in pollination of flora, if butterflies reduce in number the rate of pollination decreases simultaneously, which will discourage the diversity of flora in that area. Similar results have also been observed by **Jain (1992**). Small insects prefer to live in splitted barks of trees, butterflies derive nectar from various flowers, amphibian flourish on a variety of insects, reptiles in turn feed on amphibians, birds feed on various types of fruits, grains, nectar and insects and mammals derive food in the form of fruits. Thus it can be clearly observed that a mixed vegetation can easily support and satisfy the various faunal groups belonging to different categories whether invertebrates or vertebrates. India being one of the megadiverse countries of this world should try to protect its diversity and should avoid such single species plantations which hamper the proper distribution of fauna which in turn affects the ecosystem on a large scale.

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