

Butterfly diversity of Kakatiya University Campus, Vidhyaranyapuri, Warangal, Andhra Pradesh

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Abstract

The present study was carried out from Kakatiya University campus, Warangal, Andhra Pradesh, India between June 2009 and May 2011. A total of 39 butterfly species belonging to the families Nymphalidae, Pieridae and Papilionidae were recorded. Family Nymphalidae dominated in the study area, followed by Pieridae and Papilionidae. Species abundance reached the peak in February and March (spring) a decline was observed from the months of October and November (Early winter). During the present study species diversity values (H') were found high in summer, spring and early winter

Introduction

Butterflies are highly sensitive to environmental change and are delicate creatures that act as good bio-indicators of the health of an ecosystem. They also are good pollinators (Rosenberg et al., 1986). The areas with undisturbed vegetation and high floral diversity support large butterfly communities. Butterflies and their caterpillars are dependent on specific host plants for foliage, nectar and pollen as their food. Thus butterfly diversity reflects overall plant diversity, especially that of herbs and shrubs in the given area.

Earlier various workers like Pandaripande (1990) in his studies listed 61 butterfly species in Nagpur city and 52 species from Amaravati University campus. Subba Reddi et al., (2002) provided a checklist of butterflies of Andhra University and documented 54 butterfly species. Solomon Raju and Purnachandra Rao (2003) recorded 68 butterfly species in Andhra University campus Vishakhapatnam. Hirensoni et al., (2005) provided a preliminary investigations of Butterfly Diversity of Sardar Patel University Campus, Vallabh Vidyanagar, Gujarat. Tiple et al., (2007), studied factors influencing nectar plant resource visits by butterflies and implications for conservation on Amravati University campus. The distributions of butterflies are exclusively dependent upon the availability of their food plants (Feltwell 1986). The aim of the present study was to evaluate species diversity of butterflies in and around the campus of Kakatiya University Warangal, Andhra Pradesh.

Material and methods

The study area of Kakatiya University Campus lies between at 17°19" and 18° 36" North latitudes and 78° 49" and 80° 43" East Longitudes. In summer temperature varies between 38°C to 47°C while winter temperature get as low as 10°C. The area receives maximum rainfall during the South West monsoon (June-September), which ranges between 750mm to 920mm. Important tree species on the University campus include *Crotalaria retusa*, *Ixora chinensis*, *Crotalaria verucosa*, *Gratophyllum* sp. *Tridax procumbens*, *Pedilanthus tithymaloides*, *Macroptilium atropurpureum*, *Oldenlandia umbellata*, *Clerodendrum inermii*, *Lagerstroemia indica*, *Nerium oleracea*, *Acalypha* sp., *Tagetes patula*, *Jatropha podagrica*, *Ixora* sp. *Tecomaria capensis*, *Hibiscus rosa sinensis*, *Cajanus cajan*, *Hemelia patens*, *Jatropha* sp., *Stachyterphata jamaicensis*, *Sauropus androgynus*, *Conyza bonariensis*, *Ocimum tenuiflorum*, *Wedelia trilobata*, *Rhyncosia* sp., *Phyla*

nodiflora, *Lantana camara*, *Crotalaria medicaginea*, *Catharanthus roseus*, *Senna siamea*, *Ocimum* sp., *Butea monosperma*, *Hyptis suaveolens*, *Evolvulus alsinoides*, *Aristolochia indica*, *Tylophora asthmatica*, *Turnera subulata*, *Ixora coccinea* and *Euphorbia milii*, *Eucalyptus*, *Feronia elephantum*, *Ficul* spp, *Mangifera indica*, *Moringa oleifera*, *Murraya koenigii*, *Oreodoxa regia*, *Peltophorum ferrugineum*, *Phyllanthus emblica*, *Pongamia pinnala*, *Sapindus emarginatus*, *Tamerindus indica*, *Tectona grandis* and *Ziziphus mauritiana*, *Cassia* etc.

The surveys were made from June 2009 to May 2011 on a monthly basis. Various areas like plantation plots, gardens around buildings, premises of library buildings, medicinal gardens, mulberry gardens and social forestry plantation were surveyed.

All butterflies sighted were identified in the field. Some species were collected with the help of sweeping nets and some species were photographed. Identification of butterflies was done using the following literature: Evans (1932), Talbot (1939), Wynter-Blyth (1957), D'Abnera (1982, 1955, 1986) and Kunte (2000), the classification of butterflies followed here is based on Ackey (1984)

Statistical Analysis

Shannon-Wiener Index (H') species diversity was calculated using the Shannon-Wiener Index. Shannon-Wiener Index (H') species diversity was calculated using the Shannon-Wiener Index.

$$H = -\sum_{i=1}^N P_i \log P_i$$

Where H= Species diversity index

P= the proportion of individuals in the species

N= Total number of species

i =Species 1,2, 3.... N.

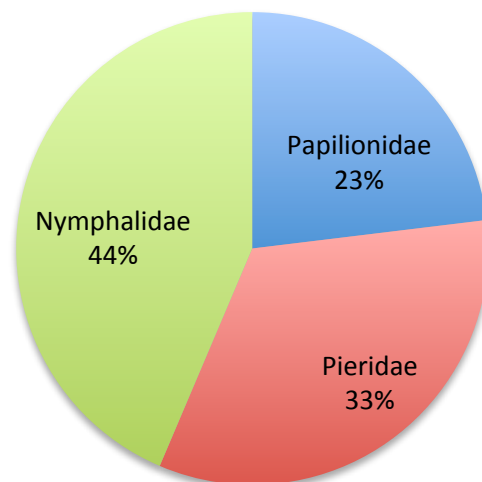


Fig-1 Family wise percentage of butterfly species encountered in Kakatiya University campus

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Table-1. List of butterfly species recorded in Kakatiya University campus.

Family	Species	Common name
Papilionidae (Swallowtail Butterflies)	1. <i>Graphium sarpedon</i> ((Linnaeus))	Common Bluebottle
	2. <i>Pachliopta aristolochiae</i> (Fabricius)	Common Rose
	3. <i>Pachliopta hector</i> (Linnaeus)	Crimson Rose
	4. <i>Papilio demoleus</i> (Linnaeus)	Lime Butterfly
	5. <i>Papilio machaon</i> (Linnaeus)	Common Yellow Swallowtail
	6. <i>Papilio memnon</i> (Linnaeus)	Great Mormon
	7. <i>Papilio polymnestor</i> (Cramer)	Blue Mormon
	8. <i>Papilio polytes</i> (Linnaeus)	Common Mormon
	9. <i>Graphium nomius</i> (Esper)	Spot Swordtail
Pieridae (Yellow white Butterflies)	1. <i>Anaphaeis aurota</i> (Fabricius)	Caper white, Pioneer
	2. <i>Appias albina</i> (Boisduval)	Common Albatross
	3. <i>Catopsilia pomona</i> (Fabricius)	Common Emigrant
	4. <i>Catopsilia pyranthe</i> (Linnaeus)	Mottled Emigrant
	5. <i>Catopsilia crocale</i> (Cramer)	Lemon Emigrant
	6. <i>Colias philodice</i> (Godart)	Clouded Suphur
	7. <i>Colotis danae</i> (Fabricius)	Crimson Tip
	8. <i>Delias eucharis</i> (Drury)	Common Jezebel
	9. <i>Eurema blanda</i> (Boisduval)	Three Spot Grass Yellow
	10. <i>Eurema hecabe</i> (Linnaeus)	Common Grass Yellow
	11. <i>Ixias marianne</i> (Cramer)	White Orange Tip
	12. <i>Pieris rapae</i> (Linnaeus)	Small Cabbage White
	13. <i>Pareronia valeria</i> (Cramer)	Common Wanderer
Nymphalidae (Brush-footed Butterflies)	1. <i>Acraea violae</i> (Fabricius)	Tawny Coster
	2. <i>Euthalia aconthea</i> (Linnaeus)	Baron
	3. <i>Euploea core</i> (Cramer)	Common Indian Crow
	4. <i>Hypolimnas bolina</i> (Linnaeus)	The Great Eggfly
	5. <i>Hypolimnas misippus</i> (Linnaeus)	Danaid Eggfly
	6. <i>Junonia almana</i> (Linnaeus)	Peacock Pansy
	7. <i>Junonia hierta</i> (Fabricius)	Yellow Pansy
	8. <i>Junonia iphita</i> (Cramer)	Chocolate Pansy
	9. <i>Junonia lemonias</i> (Linnaeus)	Lemon Pansy
	10. <i>Junonia orithya</i> (Linnaeus)	Blue Pansy
	11. <i>Melanitis leda</i> (Linnaeus)	Common Evening Brown
	12. <i>Mycalesis mineus</i> (Linnaeus)	Dark-branded Bushbrown
	13. <i>Neptis hylas</i> (Moore)	Common Sailer
	14. <i>Danaus chrysippus</i> (Linnaeus)	Plain Tiger
	15. <i>Danaus genutia</i> (Cramer)	Striped Tiger
	16. <i>Tirumala limniace</i> (Cramer)	Blue Tiger
	17. <i>Tirumala septentrionis</i> (Fruhstorfer)	Dark Blue Tiger

Table-2. Diversity was evaluated using Shannon-Wiener index (H') and Evenness index (J)

Seasons	Shannon-Wiener index (H')	Evenness (J)
Spring	1.32	0.95
Summer	1.36	0.98
Early monsoon	1.27	0.91
Late monsoon	1.31	0.94
Early winter	1.32	0.95
Late winter	1.31	0.94

Evenness Index or J the species evenness is the relative abundance or proportion of individuals among the species. Evenness of species reveals how their relative abundance is distributed in a particular sample or site (Pielou 1969, Magurran 1988).

$$J=H/\ln S$$

Here, S is the number of species present in the site. The value of J ranges from 0 to 1, the less variation in communities between the species, the higher the value of 'J'

Results and discussion:

During the course of the study, 42 species of butterflies belonging to three families were recorded in Kakatiya university campus. Out of the 42 species, 18 belonged to Nymphalidae, 15 to Pieridae, and nine to Papilionidae (Table-1). Species belonging to the family Nymphalidae were the most dominant (43%) followed by Pieridae (36%) and Papilionidae (21%) (Fig - 1).

The greatest number of species (37) was observed in February. Some species namely *Danaus chrysippus*, *Acraea violae*, *Tirumala septentrionis*, *Euploea core* and *Tirumala limniace* were observed regularly and more commonly. Nearly 50% of species were found very common with frequent sightings and about 30% were found to be abundant while 20% of species were found rare with infrequent sighting.

Among the 42 butterflies recorded from Kakatiya University 2 species come under the protected category of the Indian Wild life (Protection) Act 1972. Among them *Pachliopta hector* and *Hypolimnas misippus* come under schedule I of the Act.

During the present study species diversity values (H') were found high in summer, spring and early winter (Table-2). The campus area of the Kakatiya University is supporting for greater diversity of butterflies. Diversity of vegetation may perform a vital role in maintaining local butterfly diversity along with the undisturbed ecological niches in the campus.

A previous study (Wynter-Blythe 1957) had identified the months of March –April and October for butterfly abundance in India. However, our findings show a peak period in January and February in line with findings of Kunte 2000. More number of adult butterflies was abundant during the periods of spring, summer, late winter and monsoon.

Our results shows that the study area is supportive to a number of butterfly species and diversity indices closely resemble to each other.

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