

BUTTERFLY DIVERSITY AND ITS HOST SPECIFICITY OF PERMUDE VILLAGE IN DAKSHINA KANNADA DIST.

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Abstract— The biological diversity of butterfly was studied in Permude village (latitude-13.001547 and longitude-74.883583), Dakshina Kannada District of Karnataka. The sites of survey include Paralguthu, Kunta Padavu and areas surrounding the Somanatheshwara temple. A total of 51 species belonging to five families; Nymphalidae (27 spp.), Papilionidae (7 spp.), Lycaenidae (7 spp.), Pieridae (6 spp.) and Hesperidae (4 spp.) was recorded during July, August, September and October 2016. The study of host specificity of butterflies revealed that the members of Papilionidae family was found associated with the plants belonging to Rutaceae, Annonaceae, Lauraceae and Aristolochiaceae. The members of Nymphalidae feed mostly on Apocynaceae, Verbanaceae, Asteraceae and Fabaceae. The Crows prefer plants belonging to Moraceae (*Ficus* spp.). The rest of the species feed on plants belonging to Poaceae and Fabaceae. The members belonging to Lycaenidae depend on the plants of Rubiaceae, Dioscoreaceae, Fabaceae and Rhamnaceae. Skippers mostly feed on grasses (Poaceae) and palms (Aracaceae).

Keywords— Permude, butterfly diversity, host specificity,

INTRODUCTION

Butterflies which are undoubtedly the most attractive among all insects, belong to the order Lepidoptera. Out of the 1800 species and subspecies of butterflies found in India (Kunte 2014) 331 species are found in Western Ghats (Kunte 2001). Butterflies depend on plants and are highly sensitive to environmental changes (Parmesan *et al.*, 1999; Sparks *et al.*, 2005; 2007) and urbanisation (Hardy and Dennis 1999; Jana *et al.*, 2006; Kadlec *et al.*, 2008). Hence, they indicate the overall health of an ecosystem (Padhye *et al.*, 2006).

Butterflies are phytophagous and they show some degree of host selectivity (Bernays and Chapman 1994). They prefer groups of very closely related plants from which the larva can obtain its nutrients for the growth and development (Boppre 1984). Among all the resources required, larval host plant is the key resource which is fundamental in reproduction (Dennis *et al.*, 2003; 2006; Dennis 2010). Prerequisite knowledge of larval host plant is essential for conservation of biodiversity. Various studies were carried out on butterfly species distribution in Sullia Taluk of Dakshina Kannada recording 86 species (Nayaket *et al.*, 2004), 59 species of butterflies in Yekkaru Grama Panchayat,

Mangaluru Taluk (Ramachandra 2007), 172 species of butterflies in Dakshina Kannada (Deepak 2016).

The present study includes three sites in Permude village viz., Paralguthu, Kuntapadavu and the area surrounding the Somanatheshwara Temple. Knowledge concerning larval host plants is still poor in case of butterfly species, especially in the tropics (Kunte 2000). The present study focuses on larval host plants and butterfly species dependant on it in Permude village.

MATERIALS AND METHODS

Permude village is located 13 kms away from Mangalore city at an elevation of 24m covering an area of 72.43 hectares and extends 13°00'15.47" E and 74°88'35.83" N (Fig.1). The field survey was carried out in laterite habitat and shrubby jungle, plantations of areca nut, rubber, cashew plantation and paddy fields during July, August, September and October 2016. Data of butterfly fauna was collected by all search out method during the morning hours. The butterflies and its host plants were identified (Kunte 2000; Gunathilagaraj 2015 and Bhat K.G 2003).

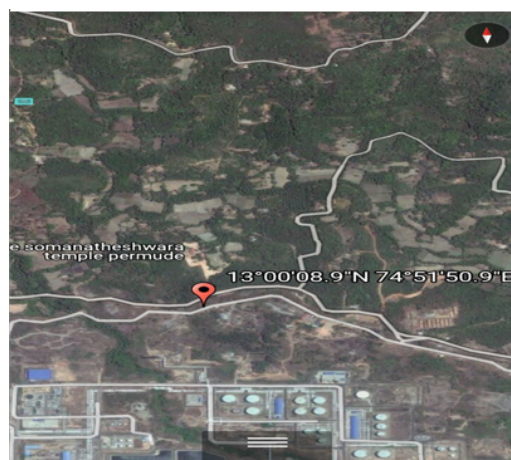


Fig. 1 Satellite map showing the area of study

RESULTS AND DISCUSSION

A total of 51 species belonging to 5 families in 39 genera was identified. Nymphalidae with 27 species (52%) was the dominant family followed by Papilionidae 7 species (13%), Lycaenidae 7 species (13%), Pieridae 6 species (12%) and Hesperidae with

4 species (8%)(Fig.2). The Autumn Oakleaf (*Doleschallia bisaltide*) is listed under Schedule I. Crimson Rose (*Pachliopta hector*) is listed under Schedule I, Part IV of IWL(P) Act, 1972 and Southern Birdwing (*Troides minos*) is listed under Appendix II of CITES. (Gunathilagaraj 2015). *Troides minos* is endemic to Western Ghats, one species (*Cethosia neitneri*) is endemic to Western Ghats and Sri Lanka and two species (*Papilio polymnestor* and *Pachliopta hector*) are endemic to Peninsular India (Table 2). All the 51-species recorded in the present study are reported in Western Ghats (Gaonkar 1996).

A study in Nagpur city showed 124 host plants for 120 butterfly species (Tiple, Khurad & Dennis 2011). The five butterfly families were found to use plants from 39 families in Nagpur. In Permude village the 52-butterfly species recorded were dependant on plants from 22 families, dominant being Poaceae and Fabaceae (Table: 2). The contact receptors

responsible for recognition of host plants and non-host plants are located on the fore tarsi of the female butterfly (Roessinghet *al.*, 1991; Nishida, 1995). Larvae of most butterflies feed on limited number of host species belonging to a single plant family. They are mostly monophagous or oligophagous in nature. Few have a flexible choice of host plants, belonging to different plant families. The choice of host plants is determined both at egg-laying and larval feeding stages (Schoonhoven *et al.*, 1998). The decrease in rainfall and human land use pattern reduces the abundance of host plants, influencing the number of butterflies. Hence, the change in the environment, habitat destruction and degradation due to the various types of industries proposed in the SEZ project of government of India may be a great threat to the diversity of butterflies in this area. The present study is useful in alarming the concerned authority to plan the conservation strategies to protect diversity of the area.

Table 2: Butterfly species and its host plants recorded in the study area.

Family name	Scientific name	Common name	Remarks	Host plant
Nymphalidae	<i>Limenitis procris</i> Cramer	Commander		<i>Cinchona officinalis</i> , <i>Neolamarckia cadamba</i>
	<i>Pantoporia hordonia</i>	Common Lascar		<i>Acacia pennata</i> , <i>Acacia odoratissima</i>
	<i>Neptishylas</i> Moore	Common Sailer		<i>Dalbergia</i> spp. <i>Vigna unguiculata</i>
	<i>Euthalia aconthea</i> Cramer	Common Baron		<i>Mangifera indica</i>
	<i>Tanaecialepidea</i> Butler	Grey Count		<i>Melastoma malabathricum</i>
	<i>Ariadne merione</i> Cramer	Common Castor		<i>Ricinus communis</i>
	<i>Tirumala limniace</i> Cramer	Blue Tiger		<i>Calotropis gigantea</i>
	<i>Tirumala septentrionis</i> Butler	Dark Blue Tiger		<i>Vallisneria spiralis</i>
	<i>Danaus chrysippus</i> Linnaeus	Plain Tiger		<i>Helianthus annuus</i> , <i>Jatropha integrerrima</i>
	<i>Parantica aglea</i> Stoll	Glassy tiger		<i>Crotolaria</i> spp.
	<i>Eupolea core</i> Cramer	Common Crow		<i>Hemidesmus indicus</i>
	<i>Doleschallia bisaltide</i> Cramer	Autumn Oakleaf	Schedule I	<i>Artocarpus heterophyllus</i>
	<i>Melanitis leda</i> Linnaeus	Common Evening Brown		<i>Eleusine indica</i> , <i>Triticum aestivum</i> , <i>Zea mays</i>
	<i>Hypolimnas bolina</i> Linnaeus	Great Eggfly		<i>Ficus microcarpa</i> , <i>Alternanthera sessilis</i>
	<i>Junonia lemonias</i> Linnaeus	Lemon Pansy		<i>Sida cordifolia</i>
	<i>Junonia iphita</i> Cramer	Chocolate Pansy		<i>Hygrophila costata</i>

	<i>Junonia atlites</i> Linnaeus	Grey Pansy		<i>Ludwigia</i> spp. <i>Oryza sativa</i> ,
	<i>Junonia almana</i> Linnaeus	Peacock Pansy		<i>Oryza sativa</i>
	<i>Cupha erymanthis</i> Drury	Rustic		<i>Flacourtia indica</i> , <i>Glochidion eriocarpon</i>
	<i>Acraea violae</i> Fabricius	Tawny Coster		<i>Hibiscus cannabinus</i> , <i>Vitex pinnata</i> , <i>Passiflora foetida</i>
	<i>Ypthima huebneri</i> Kirby	Common Fourring		Grasses (Poaceae)
	<i>Cethosia neitneri</i> C & R Felder	Tamil Lace Wing	Endemic to Western Ghats and Sri Lanka (Kunte2008)	<i>Modecca palmata</i>
	<i>Ypthima baldus</i> Fabricius	Common Fivering		Grasses
	<i>Orsotriaena medus</i> Fabricius	Nigger		<i>Saccharum officinarum</i> , grasses
	<i>Mycalesis perseus</i> Fabricius	Common BushBrown		<i>Oryza sativa</i> , grasses
	<i>Elymnias hypermnestra</i> Linnaeus	Common Palmfly		Palm plants
	<i>Melanitisphedima</i> Cramer	Dark Evening Brown		<i>Microstegium ciliatum</i>
Papilionidae	<i>Graphium sarpedon</i> Linnaeus	Common Blue Bottle		<i>Laurus nobilis</i> , <i>Litsea glutinosa</i>
	<i>Graphium agamemnon</i> Linnaeus	Tailed Jay		<i>Annona squamosa</i> , <i>Artabotrys hexapetalous</i>
	<i>Papiliopolytes</i> Linnaeus	Common Mormon		<i>Citrus aurantifolia</i> , <i>Laurus nobilis</i>
	<i>Papilio polymnestor</i> Cramer	Blue Mormon	Endemic to Peninsular India (Kunte 2008)	<i>Garcinia gummi-gutta</i> , <i>Citrus maxima</i>
	<i>Pachliopta hector</i> Linnaeus	Crimson Rose	Endemic to Peninsular India (Kunte2008) Schedule I	<i>Aristolochia indica</i>
	<i>Papilio demoleus</i> Linnaeus	Lime Butterfly		<i>Citrus aurantifolia</i> , <i>Glycosmis arborea</i>
	<i>Troidesminos</i> Cramer	Southern Birdwing	Endemic to Western Ghats	<i>Aristolochia indica</i> , <i>Thottea siliquaso</i>
Lycaenidae	<i>Castalius rosimon</i> Fabricius	Common Pierrot		<i>Ziziphu smauritiana</i>
	<i>Loxuraatymnus</i> Cramer	Yamfly		<i>Dioscorea pentaphylla</i> and <i>Smilax</i> spp.
	<i>Rathindaamor</i> Fabricius	Monkey Puzzle		<i>Ixoracoccinea</i> , <i>Hopeaspp</i> , <i>Mangifera indica</i>
	<i>Arhopala centaurus</i> Fabricius	Centaur Oakblue		<i>Hopea ponga</i>
	<i>Discolampa ethion</i> Westwood	Banded Blue Pierrot		<i>Ziziphus xylopyrus</i>

	<i>Jamides celeno</i> Cramer	Common Cerulean	<i>Theobroma cacao</i> , <i>Saraca asoca</i>
	<i>Arhopala amantes</i> Hewitson	Large Oakblue	<i>Syzygium spp.</i>
Pieridae	<i>Catopsilia pomona</i> Fabricius	Common Emigrant	<i>Cassia fistula</i> , <i>Senna obtusifolia</i> , <i>Senna tora</i>
	<i>Eurema hecabe</i> Linnaeus	Common Grass Yellow	<i>Acacia spp.</i> , <i>Cassia fistula</i>
	<i>Catopsilia pyranthe</i> Linnaeus	Mottled Emigrant	<i>Cassia fistula</i> , <i>Senna auriculata</i>
	<i>Appias albina</i> Boisduval	Common albatross	<i>Drypetes oblongifolia</i>
	<i>Leptosia nina</i> Fabricius	Psyche	<i>Capparis zeylanica</i>
	<i>Cepora nerissa</i> Fabricius	Common Gull	<i>Capparis frondosa</i>
Hesperiidae	<i>Jambrix salsala</i> Moore	Chestnut Bob	<i>Bambusa arundinacea</i> , grasses.
	<i>Borbo cinnara</i> Wallace	Rice Swift	<i>Oryza sativa</i>
	<i>Tagiades japetus</i> Cramer	Common Snow Flat	<i>Dioscorea oppositifolia</i>
	<i>Tagiades litigiosa</i> Moschler	Water Snow Flat	<i>Dioscorea oppositifolia</i>

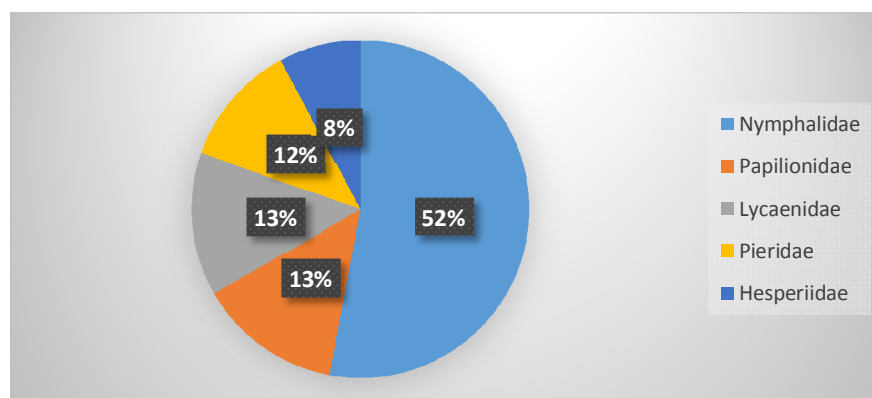


Fig 2: Percentage of species belonging to each family.

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Plate 1: 1-*Loxura atymnus*; 2- *Junonia almana*; 3- *Doleschallia bisaltide*; 4-*Mycalesis perseus*; 5-*Discolampa ethion*; 6- *Cethosia neitneri*; 7- *Eupolea core*; 8- *Elymnias hypermnestra*; 9- *Rathinda amor*



Plate 2: 10-*Parantica aplea*; 11-*Junonia iphita*; 12-*Acraea violae*; 13-*Neptis hylas*; 14-*Tanaecia lepidea*; 15-*Tirumala limniace*



Plate 3: 16-*Pantoporia hordonia*; 17-*Tagiades litigiosa*; 18-*Castalius rosimon*; 19- *Melanitis leda*; 20-*Eurema hecabe*; 21-*Ypthima huebneri*

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