Butterfly species diversity, relative abundance and status in Tropical Forest Research Institute, Jabalpur, Madhya Pradesh, central India

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The Tropical Forest Research Institute (TFRI) Jabalpur is one of nine institutes under the Indian Council of Forestry Research and Education. It lies on the bank of the Gour River on Mandla Road (79^{0}59'23.50"E & 21^{0}08'54.30"N) about 10km southeast of Jabalpur. The campus is spread over an area of 109ha amidst picturesque surroundings (Image 1); semi-arid with mean annual precipitation of 1358mm. The campus is surrounded by agricultural fields with rural habitation. The water reservoir and the vegetation planted around the institute have created a very good habitat and source of attraction for many faunal species like insects, reptiles, birds and mammals (Tiple et al. 2010). The area has trees, shrubs, grasslands and small hills.

Butterflies are generally regarded as one of the best taxonomically studied groups of insects (Robbins & Opler 1997), yet even in genera containing very common and widespread species, our understanding of true species diversity may prove to be startlingly below common expectation (Ackery 1987; Tiple & Khurad 2009; Willmott et al. 2001).

Butterflies are an important aspect of ecosystems for they interact with plants as pollinators and herbivores (Tiple et al. 2006). Butterflies are also good indicators of environmental changes as they are sensitive to habitat degradation and climate changes (Kunte 2000).

The Indian subcontinent hosts about 1,504 species of butterflies (Tiple 2011) of which peninsular India and the Western Ghats host 351 and 334 species respectively. In Madhya Pradesh and Vidarbha of central India 177 species of butterfly species have been documented (D'Abreu 1931).

Subsequent works and fauna volumes include several species from Madhya Pradesh and Chhattisgarh (Evans 1932; Talbot 1939, 1947; Wynter-Blyth 1957). In the recent past, several researchers have studied butterflies from some districts and conservation areas of Madhya Pradesh and Chhattisgarh (Singh 1977; Gupta 1987; Chaudhury 1995; Chandra et al. 2000a,b; 2002; Singh & Chandra 2002; Siddiqui & Singh 2004; Chandra 2006). Chandra et al. (2007) recorded 174 species of butterflies belonging to eight families from Madhya Pradesh and Chhattisgarh.

The present study was started to examine the diversity of butterflies from TFRI Campus, since there was no known published checklist of butterflies in the TFRI campus.

Materials and Methods

The findings presented here are based on a bi-weekly random survey carried out from June 2008 to May 2009 at the TFRI campus. The observations were made from 0800hr to 1100hr, which is a peak time for butterfly activity. Butterflies were Primarily identified directly in the field or, in difficult cases, following capture or photography. In critical conditions, specimens were collected only with handheld aerial sweep nets. Each specimen was placed in a plastic bottle and carried to the laboratory for further identification with the help of a field guide (Wynter-Blyth 1957; Kunte 2000; Haribal 2002). All scientific names followed in the present

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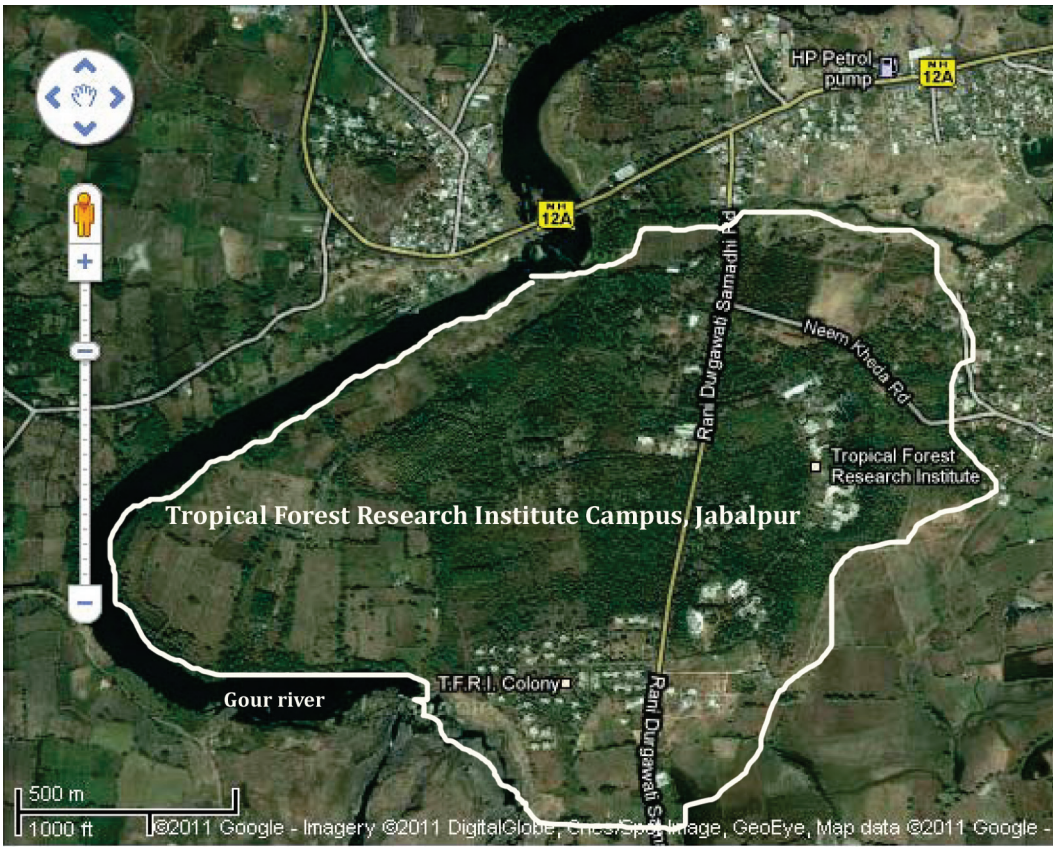

Image 1. Satellite overview map of study locality

study are in accordance to Varshney (1983). The observed butterflies were categorized in five categories on the basis of their abundance in the TFRI campus. VC - very common (> 100 sightings), C - common (50–100 sightings), NR - not rare (15–50 sightings), R - rare (2–15 sightings), VR - very rare (1–2 sightings) (Tiple et al. 2006).

Results and Discussion

A total of 66 species of butterflies belonging to 47 genera and five families viz.,—Papilionidae (5 species), Pieridae (9 species), Nymphalidae (25 species), Lycaenidae (18 species) and Hesperiidae (9 species)—were recorded. Among these 65 species, 24 (37%) were commonly occurring, 16 (24%) were very common, 2 (3%) were not rare, 18 (27%) were rare and 6 (9%) were very rare. The observed species and their status on the TFRI campus is presented in Table 1. Five of the recorded species (Table 1) come under the Indian Wildlife (Protection) Act 1972 (Kunte 2000; Gupta & Mondal 2005).

Among the 66 species of butterflies, *Papilio demoleus*, *Catopsilia pomona*, *Eurema hecabe*, *Danaus chrysippus*, *Euploea core*, *Hypolimnas misippus*, *Junonia lemonias*, *Melanitis leda*, *Tirumala limniace*, *Catochrysops strabo*, *Prosotas nora*, *Borbo cinnara*, *Pelopidas mathias* were present throughout the year (January–December), whereas 53 species were observed only from June-July till the beginning of summer (April–May). Increasing species abundance from the beginning of the monsoons (June–July) till early winter (August–November) and decline in species abundance from late winter (January–February) to the end of summer (Fig. 1) have also been reported by Tiple et al. (2007) and Tiple & Khurad (2009) in similar climatic conditions in this region of central India. They further demonstrated that most of the species were noticeably absent in the disturbed and human impacted sites (gardens, plantation and grassland) and there was no occurrence of unique species in moderately disturbed areas comparable to those of less disturbed wild areas. The present study site is in constant disturbance due to the cutting of grasses, shrubs and trees for landscaping which may be the reason for the overall reduction of the

Table 1. List of butterflies recorded from TFRI Campus together with common name and status

Common name	Scientific name	Occurrence (months)	Status
Papilionidae (5)			
Spot Swordtail	*Graphium nomius* (Esper)	4–7	R
Common Rose	*Pachliopta aristolochiae* (Fabricius)	7–3	NR
Crimson Rose	*Pachliopta hector* (Linnaeus)*	8–1	R
Lime	*Papilio demoleus* Linnaeus	1–12	VC
Common Mormon	*Papilio polytes* Linnaeus	7–2	C
Pieridae (9)			
Pioneer	*Anaphaeis aurota* (Fabricius)	11–2	R
Lemon Emigrant	*Catopsilia pomona* (Fabricius)	1–12	VC
Mottled Emigrant	*Catopsilia pyranthe* (Linnaeus)	7–12	C
Common Gull	*Cepora nerissa* (Fabricius)	7–2	R
Common Jezebel	*Delias eucharis* (Linnaeus)	9–3	C
Three-Spot Grass Yellow	*Eurema blanda* (Boisduval)	7–11	R
Common Grass Yellow	*Eurema hecabe* (Linnaeus)	1–12	VC
Spotless Grass Yellow	*Eurema laeta* (Boisduval)	4–8	C
Psyche	*Leptosia nina* (Fabricius)	11–12	R
Nymphalidae (25)			
Tawny Coster	*Acraea violae* (Fabricius)	6–12	C
Angled Castor	*Ariadne ariadne* (Linnaeus)	6–11	C
Black Rajah	*Charaxes solon* (Fabricius)	8–9	VR
Painted Lady	*Cynthia cardui* (Linnaeus)	9–3	C
Plain Tiger	*Danaus chrysippus* (Linnaeus)	1–12	VC
Striped Tiger	*Danaus genutia* (Cramer)	9–6	VC
Common Indian Crow	*Euploea core* (Cramer)*	1–12	VC
Common Baron	*Euthalia aconthea* (Cramer)	6	VR
Baronet	*Euthalia nais* (Forster)	8–2	VC
Great Eggfly	*Hypolimnas bolina* (Linnaeus)	6–1	C
Danaid Eggfly	*Hypolimnas misippus* (Linnaeus)*	1–12	C
Peacock Pansy	*Junonia almanac* (Linnaeus)	6–1	C
Grey Pansy	*Junonia atlites* (Linnaeus)	8–3	R
Yellow Pansy	*Junonia hierta* (Fabricius)	2	VR
Chocolate Pansy	*Junonia iphita* (Cramer)	6–11	C
Lemon Pansy	*Junonia lemonias* (Linnaeus)	1–12	VC
Blue Pansy	*Junonia orithya* (Linnaeus)	9–3	C
Commander	*Limenitis procris* (Cramer)	9–10	R
Common Evening Brown	*Melanitis leda* (Linnaeus)	1–12	VC
Dark Branded Bushbrown	*Mycalesis mineus* (Linnaeus)	6–11	C
Common Bushbrown	*Mycalesis perseus* (Fabricius)	6–3	VC
Common Sailer	*Neptis hylas* (Linnaeus)	7–12	VC
Common Leopard	*Phalanta phalantha* (Drury)	6–1	VC
Blue Tiger	*Tirumala limniace* (Cramer)	1–12	VC
Common Five Ring	*Ypthima baldus* (Fabricius)	6–10	VR
Lycaenidae (18)			
Plum Judy	*Abisara echerius* (Stoll)	9–10	R
Large Oakblue	*Arhopala amantes* (Hewitson)	10–2	R
Common Pierrot	*Castalius rosimon* (Fabricius)	6–7	R

Common name	Scientific name	Occurrence (months)	Status
Forget-Me-Not	*Catochrysops strabo* (Fabricius)	1–12	C
Plains Cupid	*Chilades pandava* (Horsfield)	6–2	C
Small Cupid	*Chilades parrhasius* (Butler)	10–11	R
Lime Blue	*Chilades laius* (Stoll)	7–9	C
Eastern grass Jewel	*Chilades pulti* Kollar	6–2	C
Gram Blue	*Euchrysops cnejus* (Fabricius)*	7–12	NR
Dark Cerulean	*Jamides bochus* (Stoll)	8–9	VR
Pea Blue	*Lampides boeticus* (Linnaeus)*	9–2	C
Zebra Blue	*Leptotes plinius* Fabricius	7–9	C
Common Line Blue	*Prosotas nora* (C. Felder)	1–12	C
Pale Grass Blue	*Psuedozizeeria maha* (Kollar)	7	R
Common Silverline	*Spindasis vulcanus* (Fabricius)	6–1	VC
Rounded Pierrot	*Tarucus nara* Kollar	6–12	C
Lesser Grass Blue	*Zizina otis* (Fabricius)	6–11	R
Tiny Grass Blue	*Zizula hylax* (Fabricius)	6–8	R
Hesperiidae (9)			
Brown Awl	*Badamia exclamationis* (Fabricius)	6–10	VC
Rice Swift	*Borbo cinnara* (Wallace)	1–12	C
Blank Swift	*Caltoris kumara* (Moore)	8–10	R
Tricolour Pied Flat	*Coladenia indrani* (Moore)	6–9	C
Common Banded Awl	*Hasora chromus* (Cramer)	6–10	VC
Dark Palm Dart	*Telicota ancilla* (Herrich–Schaffer)	8–12	R
Pale Palm Dart	*Telicota colon* (Fabricius)	8–9	VR
Small-Branded Swift	*Pelopidas mathias* (Fabricius)	1–12	C
Indian Skipper	*Spialia galba* (Fabricius)	8–10	R

VC - very common (> 100 sightings); C - common (50–100 sightings); NR - not rare (15–50 sightings); R - rare (2–15 sightings); VR - very rare (1-2 sightings); * - Listed in Indian Wildlife (Protection) Act 1972

number of species.

The findings of the present study underline the importance of institutional estates as a preferred habitat for butterflies. If the landscaping and maintenance of gardens are carefully planned, the diversity of butterflies may increase in the TFRI campus providing a rich ground for butterfly conservation as well as for research.

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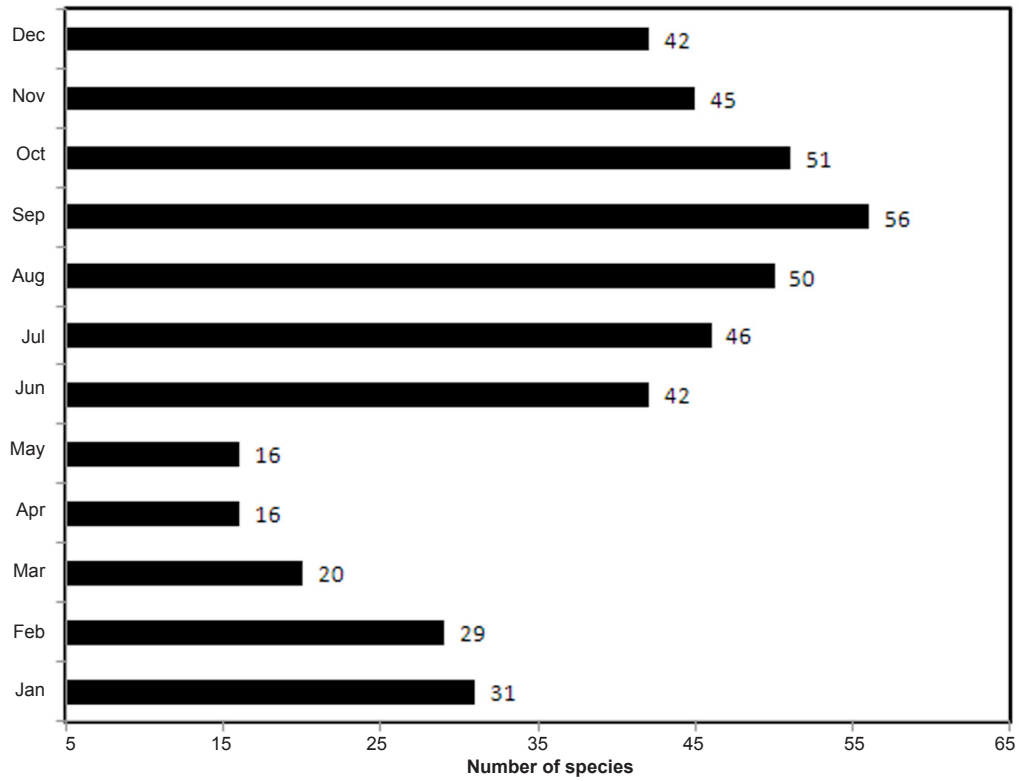

Figure 1. The variations of species composition throughout the year in Tropical Forest Research Institute, Jabalpur

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