



Butterfly diversity of Sundarvan, Ahmedabad, Gujarat

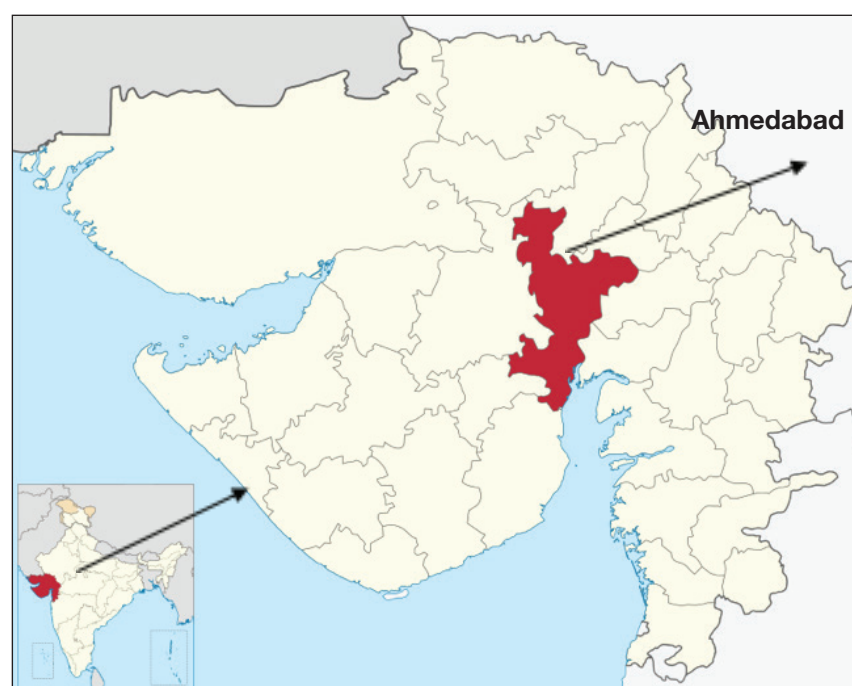
Several studies have been conducted on butterflies found in forests, grasslands as well as urban areas in India. Butterflies are conspicuous insects that often bear brightly coloured wings and exhibit a fluttering flight. Distributed worldwide, there are more than 28,000 species of butterflies, with about 80% found in tropical regions (Tiple 2011). The Indian subcontinent bearing a diverse terrain, climate and vegetation, hosts about 1,504 species of butterflies (Tiple 2011).

Sundarvan – a nature discovery centre is located in the heart of Ahmedabad, Gujarat, India. This four-acre land was originally a mango orchard, converted into a nature discovery centre in 1978. It is a green oasis of the city and has been categorized as a mini zoo

by the Central Zoo Authority (CZA).

Sundarvan plays a very crucial role in sensitizing and creating appreciation for wildlife, especially lesser-known species like snakes and other reptiles (Sivakumar 2020). Availability of nectar sources, plants suitable for egg laying and open sunny

places attract varied species of butterflies in the area. The study area experiences hot, semi-arid climate. Apart from the monsoon season, the climate is extremely dry in Ahmedabad. Humidity stays very high in the summer and the area receives average rainfall of 789 mm per year. The present study aimed to produce a checklist



Geographical location of the study area in Gujarat.

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Enlarged view of sampling sites: Sundarvan - A nature discovery centre.

of butterflies found in Sundarvan, Ahmedabad.

The study was conducted for one year, from January 2019 to January 2020.

Sampling sites were visited twice in a day during the one year covering all the seasons, viz., winter, summer, and monsoon. Random sampling method and direct observation method were used during the study period.

The habitat surveyed has a wide range of shrubs,

herbs, and grass species including a wide variety of ornamental species planted by Sundarvan management (Sivakumar 2020). A total of nine sampling sites were selected, classified as water body, adventure park, butterfly garden, campsite, dense vegetation, wetland, aquarium, office area and miscellaneous (consist of mixed vegetation).

Butterflies were recorded by visual observations, with the help of binoculars

(Bushnell Nature View 8*40) and a DSLR camera (Nikon D5200 – 18–140mm lens). Butterflies were observed and identified using field guides and photographs (Evans 1932; Wynter-Blyth 1957; Lewington 1999; Kunte 2000; Parasharya & Jani 2007; Kehimkar 2016). Species richness was calculated by the total number of species found in a group in an area.

Twenty-four species of butterflies representing five families were recorded. Family Nymphalidae showed the maximum species richness, comprising of 10 species (42%), followed by Pieridae (7 species, 29%), Papilionidae (4 species, 17%), Lycaenidae (2 species, 8%), and Hesperidae (1 species, 4%). The percentage of occurrence shows that Nymphalidae was the most common family and Hesperidae was the family with lowest occurrence.

Based on visual observations, each species was designated

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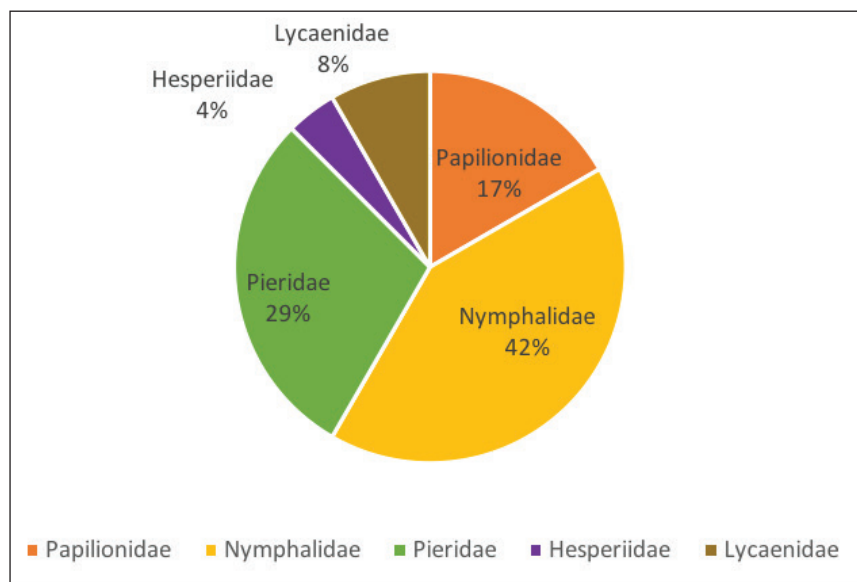
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	Common Name	Scientific Name	Abundance Rating	Conservation status (IUCN)	WPA Status
Nymphalidae (10)					
1.	Lemon Pansy	<i>Junonia lemonias</i>	Abundant	NE	
2.	Peacock Pansy	<i>Junonia almana</i>	Rare	LC	
3.	Plain Tiger	<i>Danaus chrysippus</i>	Common	LC	
4.	Striped Tiger	<i>Danaus genutia</i>	Rare	NE	
5.	Common Evening Brown	<i>Melanitis leda</i>	Common	NE	
6.	Common Crow	<i>Euploea core</i>	Frequent	LC	Schedule IV
7.	Great Eggfly	<i>Hypolimnas bolina</i>	Rare	NE	
8.	Common Sailer	<i>Neptis hylas</i>	Common	NE	
9.	Yellow Pansy	<i>Junonia hierta</i>	Rare	NE	
10.	Danaid Eggfly	<i>Hypolimnas misippus</i>	Rare	NE	Schedule I
Pieridae (7)					
11.	Common Grass Yellow	<i>Eurema hecabe</i>	Abundant	NE	
12.	White Orange Tip	<i>Ixias marianne</i>	Uncommon	NE	
13.	Crimson Tip	<i>Colotis danae</i>	Uncommon	NE	
14.	Common Emigrant	<i>Catopsilia pomona</i>	Common	NE	
15.	Small Salmon Arab	<i>Colotis amata</i>	Common	NE	
16.	Cabbage White	<i>Pieris rapae</i>	Common	NE	
17.	Pioneer	<i>Belenois aurota</i>	Uncommon	NE	
Papilionidae (4)					
18.	Tailed Jay	<i>Graphium agamemnon</i>	Uncommon	NE	
19.	Common Jay	<i>Graphium doson</i>	Common	NE	
20.	Common Mormon	<i>Papilio polytes</i>	Frequent	NE	
21.	Common Lime	<i>Papilio demoleus</i>	Abundant	NE	
Lycaenidae (2)					
22.	Plains Cupid	<i>Luthrodes pandava</i>	Common		
23.	Lime Blue	<i>Chilades lajus</i>	Common	NE	
Hesperiidae (1)					
24.	Common Banded Awl	<i>Hasora chromus</i>	Uncommon	NE	

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Family wise composition of butterflies at Sundarvan, Ahmedabad.

with an abundance category. The following categories were specified, ordered based on increasing abundance of the species.

As shown in the above pie chart, three species (12%), Lemon Pansy, Common Grass Yellow, and Common Lime were designated as abundant. Nine species (38%) were marked as common, including Common Jay, Plain Tiger, Common Emigrant, Common Evening Brown, Common Sailer, Small Salmon Arab, Cabbage White, Plains Cupid, and

Lime Blue based on their occurrence. Two species (8%) were categorized as frequent, including Common Mormon and Common Crow. Five species (21%), Peacock Pansy, Striped Tiger, Great Eggfly, Yellow Pansy, and Danaid Eggfly were identified as rare. Five species were rated as uncommon, which included Tailed Jay, White Orange Tip, Crimson Tip, Pioneer, and Common Banded Awl.

Abundance and richness of butterflies can be affected by the seasonal changes. The

green oasis of the city area showed higher abundance in the spring season, moderate abundance in the post monsoon season and less abundance in the winter. It was also noted that availability of the butterflies varied with the seasonal changes. During unfavorable seasons, that are winter and summer, a low population was maintained. Some species within a family are likely to be more stress tolerant and are likely to survive in these months.

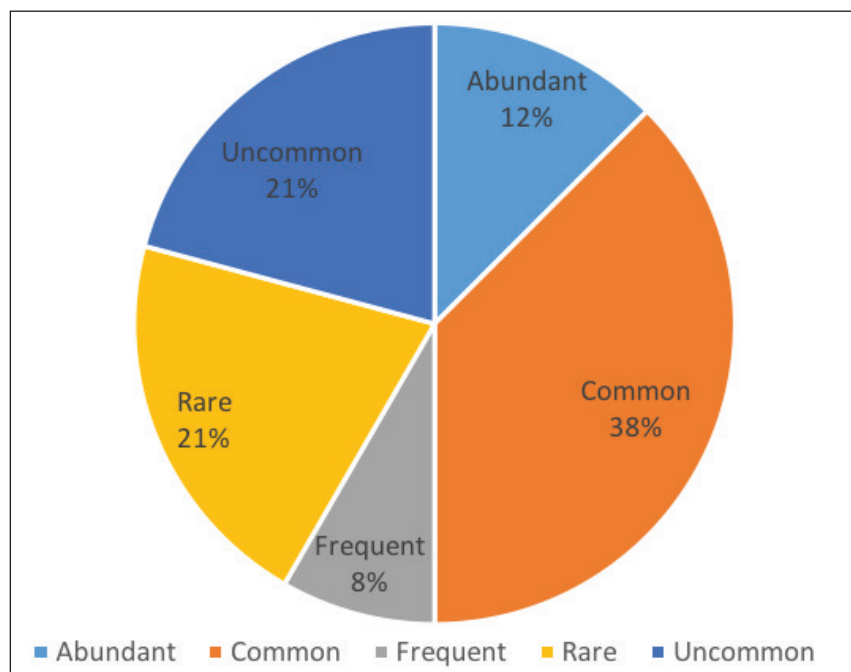
Preference of butterflies in this habitat is associated with availability of plants and some nectar plants. Some of the floral species also attracts the butterflies. The flora in the premises of Sundarvan is of mixed type including plants, trees, shrubs, etc. The study area includes the plant and trees species of the families Annonaceae, Meliaceae, Rutaceae, Nyctaginaceae, Apocynaceae, Amaryllidaceae, Lamiaceae,

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Combretaceae, Fabaceae, Boraginaceae, Verbenaceae, Malvaceae, Fabaceae, Lythraceae, Amaryllidaceae, Rubiaceae etc namely *Polyalthia longifolia*, *Azadirachta indica*, *Murraya koenigii*, *Bougainvillea spectabilis*, *Thevetia peruviana*, *Crinum asiaticum*, *Vitex negundo*, *Terminalia catappa*, *Tamarindus indica*, *Citrus limon*, *Cordia sebestena*, *Lantana camara*, *Hibiscus rosa-sinensis*, *Caesalpinia pulcherrima*, *Catharanthus roseus*, *Ixora coccinea*, *Crinum asiaticum*, *Punica granatum*, and *Annona squamosa* are found. Some butterflies are attracted to the nectar plants, medicinal plants and flowering plants.

Thus, Butterfly abundance can be seen as per the availability of food, plants, breeding sites, and availability of nectar plants. The richness of plant and trees species in the premises of Sundarvan shows 38% abundance of common



Abundance rating (%) of butterflies observed at Sundarvan, Ahmedabad.

species, 21% abundance of uncommon species as well as rarely sited species of butterflies. Apart from being one of the most prominent biodiversity indicators, butterflies also act as our native gardener for their dependence on indigenous plants for completion of the life cycle (Kunte 2000).

Butterfly diversity is largely dependent on a rich flora, because larval host-plant relationships are often very specific (Murphy &

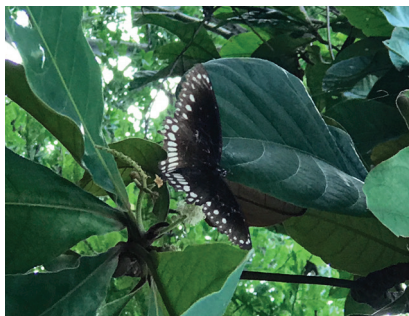
Wilcox 1986). Conservation of butterfly diversity is achievable by enhancement of vegetation in habitats specifically preferred by butterflies (Lawton et al. 1998). Some butterflies are ecological indicator species and play a vital role by cross-pollination of plants (Bonebrake et al. 2010). The rich diversity of Nymphalidae and Pieridae in Sundarvan indicates a varied assemblage of floral species. The flora in Sundarvan is of a mixed type, with herbs,

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Common Banded Awl. © Deep Shah.



Common Crow. © Deep Shah.



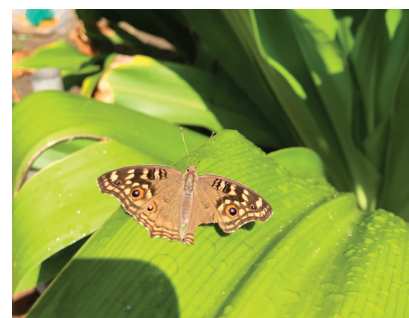
Common Evening Brown. © Deep Shah.



Common Jay. © Deep Shah.



Common Lime. © Deep Shah.



Lemon Pansy. © Deep Shah.



Pioneer. © Deep Shah.



Plains Cupid. © Deep Shah.

palm and other unidentified species dominating the vegetation in the tropical climate (Sivakumar 2020). Our study reports richness

of butterflies which includes some rare and threatened species listed under schedule I under the Wildlife Protection Act, 1972.

Further, standard data we present here can serve as reference for similar future studies. We can try to mitigate the impact of human disturbances by planting native trees and plants, supporting local species as well. This can help prevent threatened species from being driven to the brink of extinction.

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