



VAN VIHAR NATIONAL PARK & ZOO
Butterfly Survey Report
August-September 2023

Organised By
Bhopal Birds Conservation Society
Supported By
Van Vihar National Park & Zoo, Bhopal

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Photo Courtesy :

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We are thankful to all members of Bhopal Birds Conservation Society who managed the whole process smoothly on ground.

We are thankful to all our experts for their kind support in Research and Documentation work in this project.

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FOREWORD



Butterflies are almost worldwide in their distribution and are highly sensitive indicators of the health of the environment and play vital roles in the food chain and food securing as being pollinators. No living form is more beautiful and charismatic than butterflies. Their glowing vibrant colours and delicate flickering movements are a treat to watch. But, the number of these beautiful butterflies is dwindling with the ever-increasing use of pesticides and other chemicals in farming and allied activities. However, there are still islands of conservations in the form of protected areas-national parks and wildlife sanctuaries, where we still see a good wealth of butterfly diversity.

It gives me immense pleasure to inform you that Van Vihar National Park has organized its Second Citizen Science-based Butterfly Survey with the support of Bhopal Birds Conservation Society. The release of the technical report is the scientific documentation of butterflies in Van Vihar National Park & Zoo, Bhopal. I congratulate team Van Vihar for all arrangements and support provided to the organizers. I congratulate Bhopal Birds for organizing a two month vast survey in Van Vihar by covering the potential areas of the park between August to September 2023.

Now they have come up with this technical report which will not only serve as an educational document but will also kindle the interest of the visitor visiting the park.

The entire team of Van Vihar National Park, Bhopal Birds and participants deserves our congratulations and appreciation for this wonderful work.

I wish Good luck to the team in its future ventures.

Padmapriya Balakrishnan (IFS)
Director
Van Vihar National Park & Zoo
Bhopal

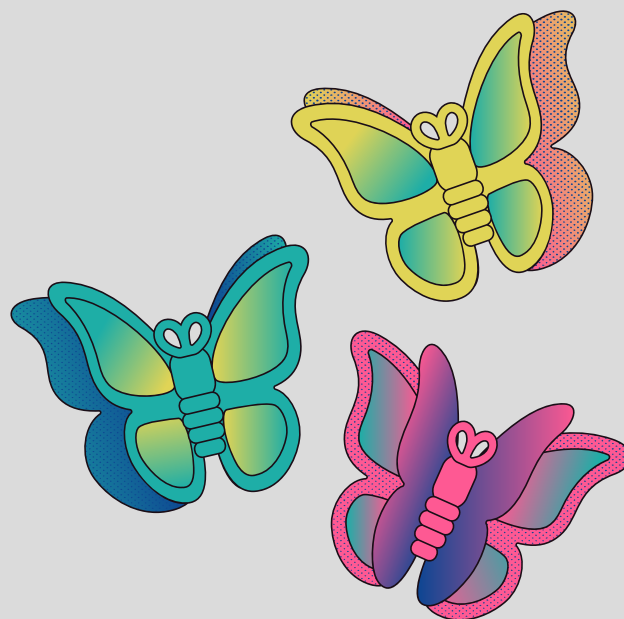
REPORT AT A GLANCE



**6 Families of Butterflies
Observed**

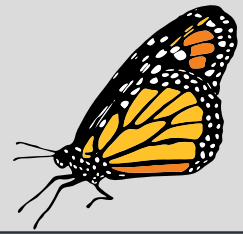


73 Species of Butterflies Recorded



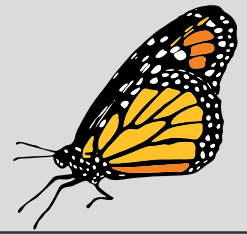
**2051 Total Estimated Population of Butterflies
Recorded**

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1.INTRODUCTION

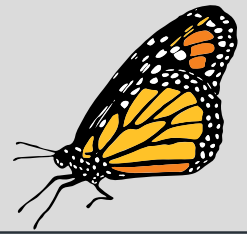


Butterflies are possibly the most colourful and attractive group of insects known to man. The charismatic colour pattern and the bouncy flight from flower to flower make them a well known guest in our gardens. They are distinguished from their insect relatives by presence of two pairs of wings covered by minute scales and clubbed antenna. Actually different coloured scales give the butterfly the characteristic colouration. Butterflies and their close relatives, moths, come under the order Lepidoptera, derived from the Greek terms Lepis meaning scales and pteron meaning wings. Thus, butterflies and moths have their amazing and eye-catching colouration and pattern due to these scales, which are arranged in the same manner as that of roof tiles. The Order Lepidoptera is further divided into two categories Rhopalocera and Heterocera; rhopalo means club and cera means horn. All butterflies come under Rhopalocera as the antenna of the butterfly ends in a club shaped structure. Recently taxonomists have split the order Lepidoptera into two groups called Microlepidoptera and Macrolepidoptera. Microlepidoptera consists of all small moths whereas Macrolepidoptera consists of all large moths and butterflies. The butterflies are further divided in two superfamilies, Hesperioidea and Papilionoidea.

All the skipper butterflies have much similarity with moths so that they come under the superfamily Hesperioidea as one family called Hesperidae. The other superfamily Papilionoidea consists of all true butterflies. There are five families under this superfamily which are Papilionidae (Swallow-tail butterflies), Pieridae (White and yellow butterflies), Lycaenidae (Blue butterflies), Riodinidae (Punches and Judies) and Nymphalidae (Brush-footed butterflies). There are about 18000 butterfly species around the world of which India has 1501 butterfly species comprising 321 species of Skippers, 107 Swallowtails, 109 Whites and Yellows, 521 Brush-footed butterflies and 443 Blues.

From Madhya Pradesh nearly 250 butterflies have been reported by different researchers but there is no specific data on the butterflies of Bhopal district.

1.1 HABITS



The activity of butterflies starts according to the temperature of the day. During the peak of summer from April to June they can be seen active since early morning. The Emigrants are the first one to fly in a summer morning followed by Skippers and Pansies, and later, Blues and Swallowtails. However Evening Browns, Bushbrowns and Awls are active mainly during dawn and dusk, largely throughout the year. During heavy rains in Monsoon, different butterflies rest in different manner. Grass Yellows and Eggflies etc rest below any leaf whereas Psyche, Pioneer, Wanderer, Orange Tips, Jezebel, Browns, Mormons, Lineblues etc rest on the leaf under any thick vegetation or canopy cover. Grassland species such as Grass Blues and Grass Darts go below the grass to save themselves from the impact of wind and rain whereas Tawny Coster, Cupids and Swifts rest on a twig or leaf open in the rain.

Pansies dwell in grasslands but rests in bushes or under the cover of thick long grasses. Milkweed butterflies rest on branches or leaves under thick canopies however Plain Tiger and Striped Tiger rest on open grassland as well.

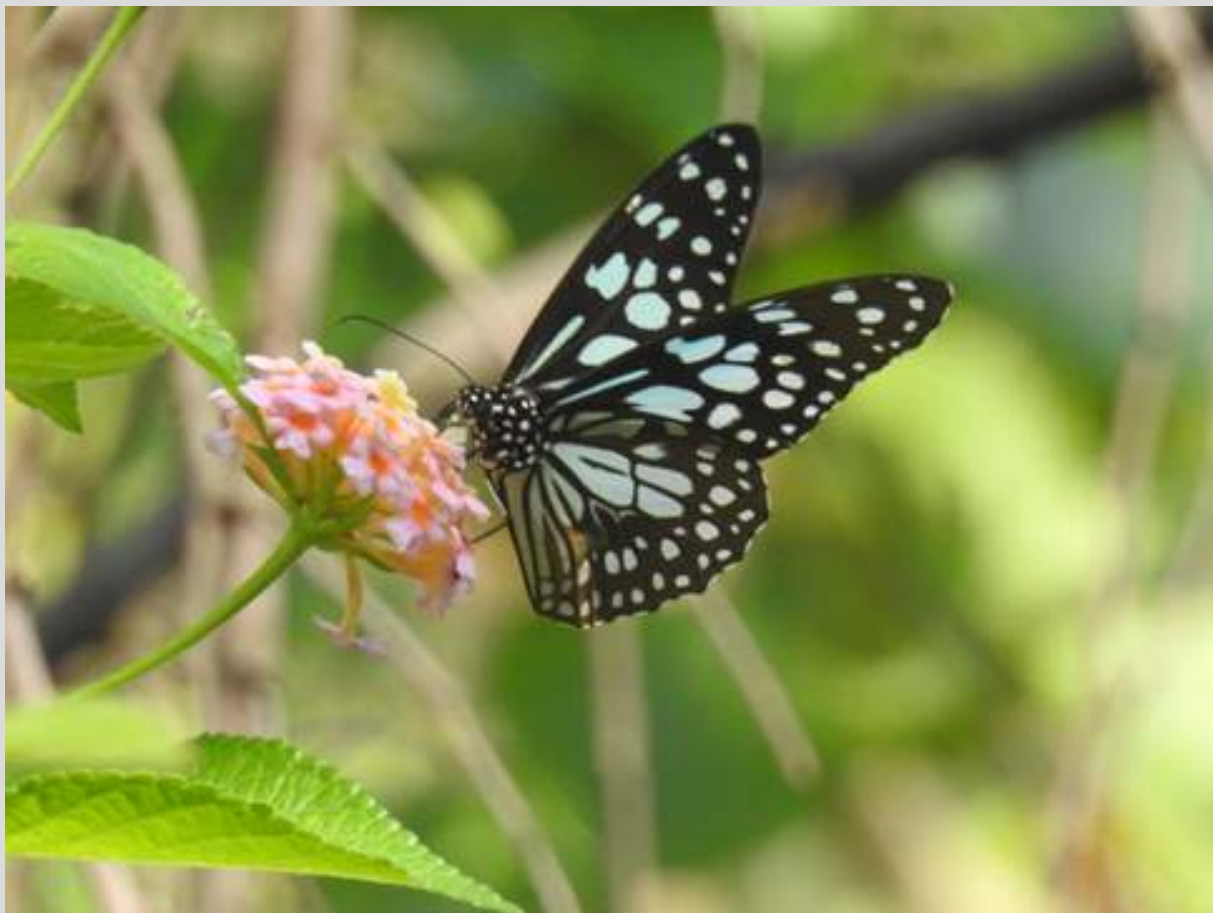


Great Eggfly

1.2 FOOD AND FEEDING

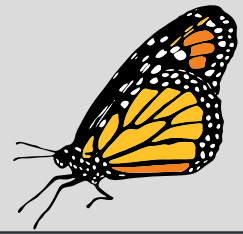


Different species of butterflies have different choices for food. By and large, the larvae feed on plant materials and the adults (winged form) feed on nectar or other debris. Particular species of butterfly lay egg on some specific group of plants which is called as larval host plant for that particular species. The host plant varies from species to species. For example the host plants for Lime butterflies are the members of family Rutaceae and that of Jays have preference for the plants like Bel. Similarly the adults have also choices for the nectar plants.



Blue Tiger on *Lantana Camara*

1.3 MUD PUDDLING

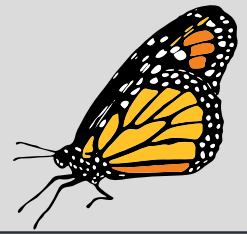


Butterflies congregate in hundreds on damp patches or wet sand close to hill streams. This phenomenon is called Mud Puddling. They also do puddling on animal dropping, urine, sweats, soap, old used wet shoes and socks etc. Basically the male butterflies try to collect the essential salts such as natural salts of potassium, sodium, magnesium, calcium etc. They keep on sucking the inorganic salt present in the wet mud or in urine or sweat or in any animal droppings along with the water and store the salt in the body and pump out the water immediately. Except few exceptions almost all butterflies do puddling. However, puddling is done by both male and female in many species such as Barons, Sergeants etc. Mud puddling is also essential for calcification of eggs after fertilization and the male passes the salt to female during mating.



Common Grass Yellow - Mud Puddling

1.4 COURTSHIP & MATING



The basic tendency of life is to propagate. Butterflies too, have developed different techniques to find their mates. Male of crow butterflies have a yellow brush-shaped structure called hair pencils, through which it spreads pheromones and marks its territory. In case of many skippers they guard their territory aggressively and chase any butterflies that enter in their territory.

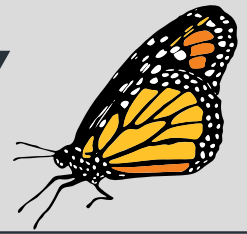
In some butterflies, males fly to the top of a hill in early morning and wait their till afternoon where as female visit the top for a very short period. This phenomenon is called Hill toping.

Some of the male butterflies have also scent scales to mark their territory.



Grey Pansy Mating

1.5 LIFE CYCLE OF BUTTERFLY

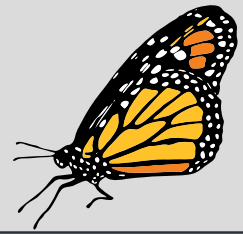


During the progress from caterpillars or larvae to adult the butterflies change their food. Immediately after emerging from the eggs, the caterpillars feed on the egg shell and gradually feed on the host plant. However, there are few carnivore caterpillars, which feed on ants. During the process of growth the caterpillars molt the old skin and progress to the next phase of life called as instars. Like this the caterpillars complete five phases or instars and go for completely new phase of life called as pupal stage. During this stage the caterpillar develops major body organs inside the chrysalis like wings, appendages etc. and emerges by breaking the wall of the chrysalis. The butterfly then moves around in search for food and mate and completes the life cycle.

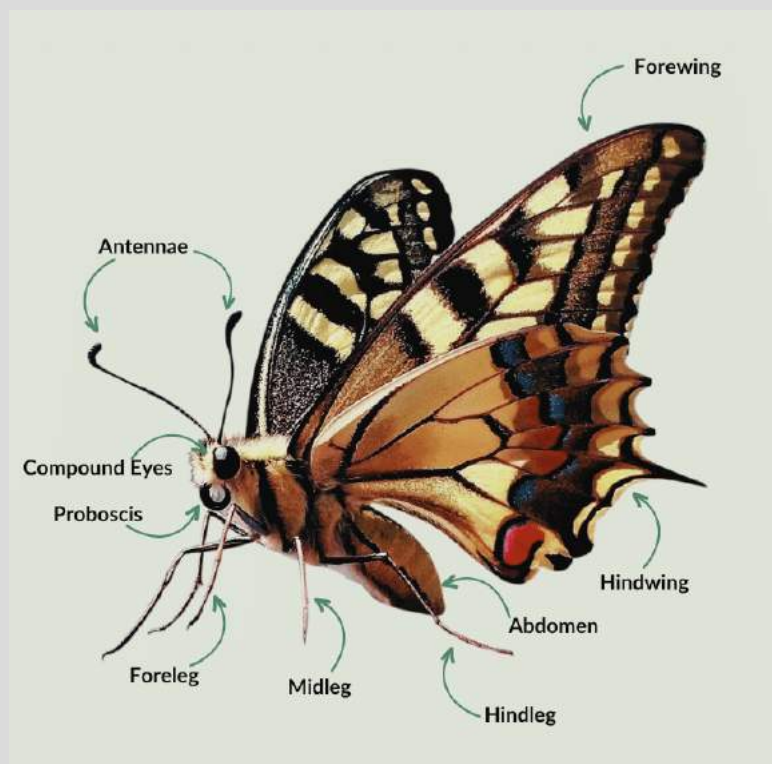


Chrysalis and Caterpillar of Common Crow in Butterfly Park

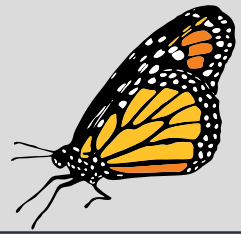
1.6 IDENTIFICATION



Butterfly identification is considered as a science as well as an art. A butterfly is like a painting where evolution has left its own unique signature and impression, like a painter upon his creations. Each species differs from each other by many factors such as size, pattern, colour, shape, flying pattern and difference in different body parts such as genitalia. In field one need to rely mostly on external characters to identify the species. But before that a person should know about its different body parts. The body of a butterfly is clearly divided into three following region Head: Head or the cephalic region of a butterfly consists of major sensory organs such as a pair of antenna and a pair of compound eyes. Antennae have a club-shaped structure towards its distal end. In case of Skippers, a hook-shape structure called apiculus is present beyond the club. Apart from them there is presence of a proboscis, a long hollow structure, through which a butterfly takes nectar and tree or fruit sap etc. The proboscis is coiled like a clock spring and covered by labial palps.



Anatomy of Butterfly Body



Body

This is also called as thoracic region or thorax and comprises two pairs of wings, three pairs of legs and many more internal structures associated with physiology. Basically, butterfly wings are two layers of thin rigid membranes supported by strong veins which provide physical support during the flight. The wings are covered by tiny, multiform multicolored scales which determine different pattern and coloration of butterfly wings. The legs of butterfly are slender and with sensory bristles.

Abdomen

This is the last cylindrical, long and segmented body part containing all major Internal organs. The abdomen has 10 segments but however only seven or eight segments are visible externally.

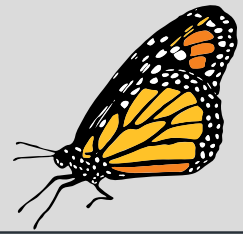
What and where to look?

Butterfly identification is like a riddle and the clue to solve this riddle lies majorly on the wings and different body parts. Taxonomy helps to locate and understand these clues so that the species can be identified. The location of these clues varies from species to species. For certain species it may be size or colour or flight where for others it may be alignment of spots.

For butterfly identification following things are of great importance:

- Colouration and pattern on wings.
- Colouration of the head, eye, body and abdomen.
- Venation of wings.
- Colouration of cilia.
- Length, shape and colour of the antennae.

2. STUDY AREA



Zoos and National Park are the most common conservation paradigms in context of endangered and threatened species. Due to habitat destruction, illegal poaching, hunting, population explosion, the world most of the wild species become threatened and endangered species.

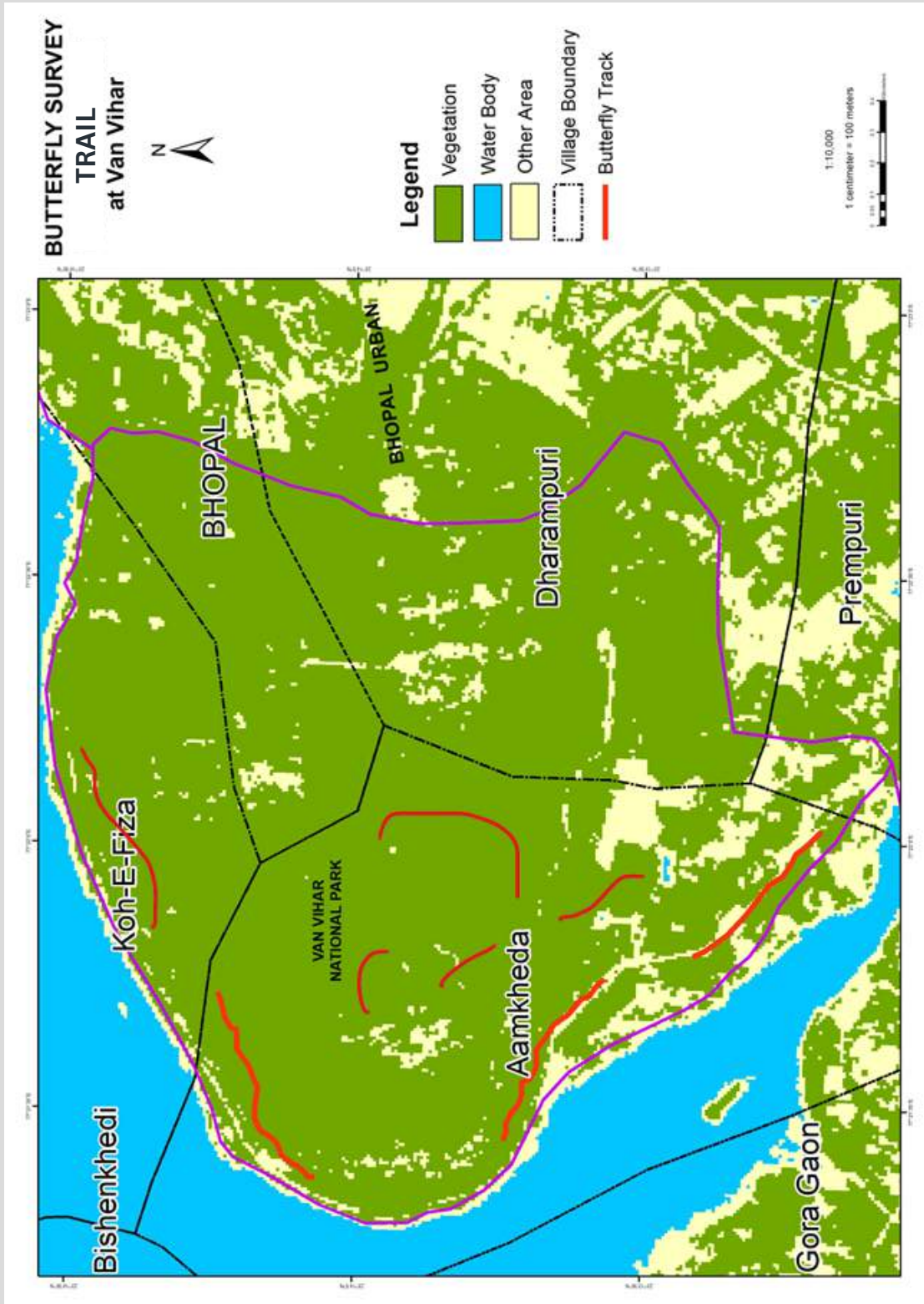
In this context, Van Vihar National Park is one of the appreciable efforts to conservation of wild species: situated in the heart of Bhopal City, 445 degraded hillock along with private village land was initiated in 1980 and finally notified as a National Park in 1983. The area today serves as the green lung for Bhopal City. Van Vihar National Park is developed and managed as a modern zoological park under the guidelines of the Central Zoo Authority (CZA) and having status of a National Park.

It is situated almost midst of the Bhopal City, the capital of Madhya Pradesh State, easily approachable by means of each transportation such as Airways and Roadways.

In 1980, the State Govt. of Madhya Pradesh decided to formulate the VVNP, around 1000 hectare of land was proposed by a committee of experts. But later on only 445.21 hectare of area could be availed to form the park. The proposed land area includes Govt. revenue land or private village, agriculture land of villages viz: Prempura, Darampuri and Amkhera. The park has some places of religious values such as Imlidev, HIRAMANBABA and PAHARI BABA.

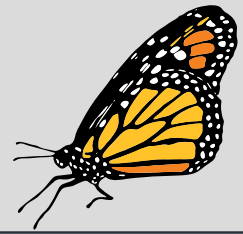


Butterfly Habitat in Van Vihar National Park



Trails in study area

3.METHODOLOGY



To effectively use butterfly as indicators applying appropriate survey method for butterfly monitoring program by citizen scientist/people participatory program is really important. Survey design must include a reliable method of data collection and statistical analysis so that results are scientifically sound and robust (Nowicki et al. 2008).

Major two methods that are frequently used Transects or Pollard walks, are a specific type of line transect done in butterfly research (Pollard 1977), this method uses visual identification while searching along desirable transects of a specific width to count butterflies.

Distance sampling uses randomly placed transects or points to collect unbiased butterfly data (Moranz et al. 2012; Henry et al. 2015).

Usually, checklist survey is employed in public participation program for butterfly surveys. Checklist survey primarily confirm presence of species and sometimes number of individuals for the survey site. However, such “open-ended” survey approaches frequently are inadequate to meet the rigors of statistics (Hellowell 1991). Relative abundance is difficult to estimate accurately across a series of checklist data sets (Royer et al. 1998). For continuous monitoring or indexing of actual or relative abundance a more carefully designed sampling model is essential. Keeping our objectives in mind.

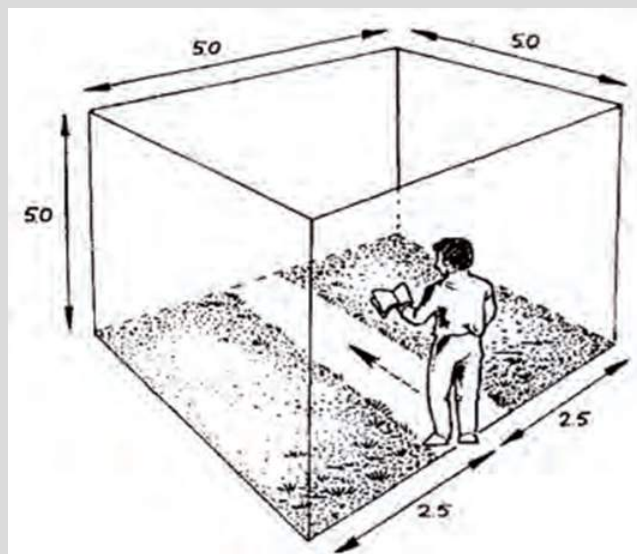
we adopted the transect method developed by Pollard et al. (1975), and later adapted by Pollard (1977, 1982), as it is a quick way to assess relative abundance and species presence while reducing the need for handling individuals (Pollard 1977)

POLLARD’S WALK METHOD

The butterfly sampling was done using the ‘Pollard’s walk’, a type of transect walk primarily used for butterfly surveys, where the observers record butterflies within a 2.5-meter band on both sides of a transect while walking at a slow and steady pace and 5 meters ahead of the walk. The observations were recorded in the datasheet provided which entailed the details of the butterfly species, their count, activity pattern, and remarks on the host plant species.



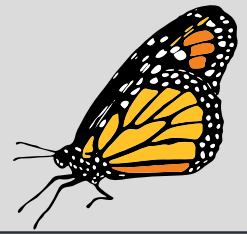
Pollard Walk surveys employ fixed travel routes during counting. More rigorous statistical analysis of Pollard Walk transect data is possible because counts are conducted in a much more uniform manner with respect to area covered and time spent. Moreover, fixity of extent and location of transects allows subsequent or concurrent study of multiple factors (e.g., floral and faunal studies on the same transect). Definite extent and permanent location also make frequent replication possible. This uniform delimitation of parameters, which allows confident longitudinal monitoring, is one of the most important features of transect sampling.



POLLARD's WALK

The survey was carried out in morning hours from 8.00 am to 2.00 pm during August to September 2023, where the activity of insects was observed. To record the daily observations observation sheet, GPS, Camera (Nikon P900) were used. In daily observations, Temperature Weather, Terrain, GPS coordinates were maintained.

4. HOST & NECTAR PLANTS

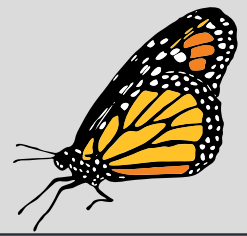


Host plant: Host plants are plants that adult butterflies depend upon to raise their larval young. Female butterflies lay their eggs directly onto their host plant of choice since caterpillars cannot travel far to feed. This include trees, shrubs, herbs, climbers, and grasses. Trees like *Bauhinia racemosa*, *Albizia lebbeck*, *Aegle marmelos*, *Butea monosperma*, and *Peltophorum pterocarpum*; and shrubs like *Caesalpinia pulcherrima*, *Calotropis gigantea*, and *Calotropis procera*, were found frequent during the survey. The important herbs like *Barleria cristata*, *Mimosa pudica*, *Hygrophila auriculata*, and *Senna tora* act as host and nectar plants for butterflies.

Nectar Plants: A constant supply of nectar is vital to reduce the waning of native butterfly populations, and so it's important to try and deliver a range of plants that will have at least some viable nectarproducing flowers throughout the year. Wild plants like *Ocimum americanum*, *Boerhavia diffusa*, *Desmodium triflorum*, *Euphorbia hirta*, *Malvastrum coromandelianum*, *Melochia corchorifolia*, *Ludwigia adscendens*, *Sesamum indicum*, *Sesamum radiatum*, *Sida cordifolia*, *Tridax procumbens*, *Triumfetta rhomboidea*, and *Urena lobata*, are important sources of nectar.



Plain Tiger on *Tridax procumbens*



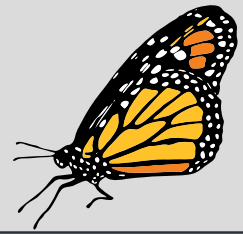
The Van Vihar National Park has been surveyed zone wise for the checklist of host and nectar plant. We recorded some of following important species acting as host and nectar plant of butterflies.

Lantana sp.(Gulsitara), Marigold (Genda), Acacia sp.(Babool), Albizzia sp. (Siris), Aegle marmelos (Bel), Anona squamosa (Sitafal), Argemone Mexicana (Barbhand), Barleria sp.(Mayurpankh),Boerhavia diffusa (Punarnava), Bombax ceiba (Semal), Butea monosperma (Dhak), Calotropis procera (Aak). Capparis sp.(Kair),Cassia fistula (Amaltas), Celosia argentia(Safed Murga), Citrus sp. (Nimbu), Cleome sp.(Bagra), Cynodon dactylon (Dhub), Hibiscus sp. (Gudhal), Ixora sp., Mangifera indica (Mango), Leucas sp.(Bishkhapru), Michelia champaca (Champa), Murraya koenigi (Curry Leaf), Oxalis corniculata (Oxalis), Pongamia pinnata (Karanj), Ricinus communis (Arandi), Sida acuta (Baraira), Syzygium sp.(Jamun), Tephrosia sp.(Surpunkha), Terminalia sp.(Arjun,Baheda), Tinospora cordifolia (Giloy) , Tridax procumbens (Coat Button), Vitex sp.(Nirgundi), Ziziphus sp.(Ber),Barleria cristata (Vajradanti),Abrus Pricatorius (Ghumchi), Madhuca Indica (Mahua).



Striped Tiger on *Stachytarpheta jamaicensis*

5. CHECKLIST OF SPECIES RECORDING DURING SURVEY



S.NO	FAMILY	COMMON NAME	SCIENTIFIC NAME	VEGETATION	ESTIMATED POPULATION
1	HESPERIIDAE	Common Branded Swift	<i>Pelopidas subochracea</i>	MV	5
2		Common Banded Awl	<i>Hasora chromus</i>	MV	15
3		Indian Palm Bob	<i>Suastus gremius</i>	MV	8
4		Rice Swift	<i>Barbo cinnara</i>	GL	8
5	LYCAENIDAE	Angled Pierrot	<i>Caleta decidia</i>	GL,MV	4
6		Common Hedge Blue	<i>Acytolepis puspa</i>	GL	5
7		Common Cerulean	<i>Jamides celeno</i>	GL,MV	20
8		Common Line Blue	<i>Prosotas nora</i>	OP	8
9		Common Pierrot	<i>Castalius rosimon</i>	GL	25
10		Dark Grass Blue	<i>Zieeria karsandra</i>	GL	5
11		Dull Babul Blue	<i>Azanus uranus</i>	MV	6
12		Dark Cerulean	<i>Jamides bochus</i>	MV	4
13		Forget-Me-Not	<i>Catochrysops strabo</i>	GL	21
14		Gram Blue	<i>Euchrysops cnejus</i>	GL	26
15		Grass Jewel	<i>Freyeria trochilus</i>	GL	10
16		Indian Cupid	<i>Chilades parrhasius</i>	MV	18
17		Lesser Grass Blue	<i>Zizina otis</i>	GL	14
18		Lime Blue	<i>Chilades lajus</i>	OP	8
19		Pea Grass Blue	<i>Pseudozizeeria maha</i>	GL,OP	10
20		Pea Blue	<i>Lampides boeticus</i>	GL	12
21		Plains Cupid	<i>Chilodes pandava</i>	GL	8
22		Red Pierrot	<i>Talicauda nyseus</i>	GL,MV	5
23		Rounded Pierrot	<i>Tarucus extricatus</i>	GL	12
24		Spotted Pierrot	<i>Tarucus callinara</i>	GL	14
25		Striped Pierrot	<i>Tarucus nara</i>	GL	28
26		Tailless Line Blue	<i>Prosotas dubiosa</i>	GL,MV	19
27		Tiny Grass Blue	<i>Zizula hylax</i>	GL,OP	17
28		Zebra Blue	<i>Leptotes plinius</i>	OP	27



29	NYMPHALIDAE	Baronet	<i>Euthalia nais</i>	OP	25	
30		Blue Pansy	<i>Junonia orthya</i>	OP	10	
31		Blue Tiger	<i>Triumala limniace</i>	MV	78	
32		Chocolate Pansy	<i>Junonia iphita</i>	MV	21	
33		Commander	<i>Moduza procris</i>	MV	8	
34		Common Baron	<i>Euthalia aconthea</i>	MV	12	
35		Common Bushbrown	<i>Mycalasis perseus</i>	MV,OP	9	
36		Common Castor	<i>Ariadane merione</i>	MV	11	
37		Common Crow	<i>Euploea core</i>	MV	82	
38		Common Evening Brown	<i>Melanitis leda</i>	MV,OP	18	
39		Common Four Ring	<i>Ypthima huebneri</i>	OP	25	
40		Common Leopard	<i>Phalanta phalanta</i>	OP	28	
41		Common Sailor	<i>Neptis hylas</i>	MV	16	
42		Common Three Ring	<i>Ypthima asterope</i>	OP	35	
43		Danaid Eggfly	<i>Hypolimnna misippus</i>	MV	72	
44		Great Eggfly	<i>Hypolimnna bolina</i>	MV	66	
45		Grey Pansy	<i>Junonia atlites</i>	OP,MV	42	
46		Lemon Pansy	<i>Junonia lemonias</i>	OP	56	
47		Peacock Pansy	<i>Junonia almana</i>	OP	16	
48		Plain Tiger	<i>Danaus chrysippus</i>	MV	105	
49		Striped Tiger	<i>Danaus genutia</i>	MV	99	
50		Tawny Coster	<i>Acraea terpsicore</i>	GL	6	
51		Yellow Pansy	<i>Junonia hierta</i>	OP	16	
52		Common Nawab	<i>Charaxes athamas</i>	OP	2	
53		Black Rajah	<i>Charaxes solon</i>	OP	5	
54		PIERIDAE	Common Emigrant	<i>Catopsilia pomona</i>	MV	106
55			Common Grass Yellow	<i>Eurema hecabe</i>	GL,MV	209
56			Common Gull	<i>Cepora nerissa</i>	MV	35
57			Common Jezebel	<i>Delias eucharis</i>	MV	14
58			Common Wanderer	<i>Pareronia valeria</i>	MV	5
59			Mottled Emigrant	<i>Catopsilia pyranthe</i>	MV	86
60			Psyche	<i>Leptosia nina</i>	OP	2
61		Pioneer	<i>Belenois aurota</i>	MV,GL	65	
62	PIERIDAE	Small Grass Yellow	<i>Eurema brigitta</i>	GL	86	
63		Spotless Grass Yellow	<i>Eurema laeta</i>	MV,GL	65	
64		Three Spotted Grass Yellow	<i>Eurema blanda</i>	GL,MV	56	
65		White orange Tip	<i>Ixias marianne</i>	MV	15	
66		Yellow Orange Tip	<i>Ixias pyrene</i>	MV	17	



67	PAPILIONIDAE	Common Bluebottle	<i>Graphium sarpedon</i>	OP	10
68		Common Jay	<i>Graphium doson</i>	MV	9
69		Common Mime	<i>Papilio clytia</i>	MV	2
70		Common Rose	<i>Pachliopta aristolochiae</i>	MV	16
71		Common Mormon	<i>Papilio polytes</i>	MV,OP	14
72		Lime Butterfly	<i>Papilio demoleus</i>	MV	12
73	RIODINIDAE	Plum Judy	<i>Abisara echerius</i>	MV	2

MV- Mixed Vegetation
 OP-Open
 GL-Grassland



Blue Tiger

6. CHECKLIST OF SPECIES RECORDING MONTHWISE



S.NO	FAMILY	COMMON NAME	SCIENTIFIC NAME	AUGUST	SEPTEMBER
1	HESPERIIDAE	Common Branded Swift	<i>Pelopidas subochracea</i>		
2		Common Banded Awl	<i>Hasora chromus</i>		
3		Indian Palm Bob	<i>Suastus gremius</i>		
4		Rice Swift	<i>Barbo cinnara</i>		
5	LYCAENIDAE	Angled Pierrot	<i>Caleta decidia</i>		
6		Common Hedge Blue	<i>Acytolepis puspa</i>		
7		Common Cerulean	<i>Jamides celeno</i>		
8		Common Line Blue	<i>Prosotas nora</i>		
9		Common Pierrot	<i>Castalius rosimon</i>		
10		Dark Grass Blue	<i>Zieeria karsandra</i>		
11		Dull Babul Blue	<i>Azanus uranus</i>		
12		Dark Cerulean	<i>Jamides bochus</i>		
13		Forget-Me-Not	<i>Catochrysops strabo</i>		
14		Gram Blue	<i>Euchrysops cnejus</i>		
15		Grass Jewel	<i>Freyeria trochilus</i>		
16		Indian Cupid	<i>Chilades parrhasius</i>		
17		Lesser Grass Blue	<i>Zizina otis</i>		
18		Lime Blue	<i>Chilades lajus</i>		
19		Pea Grass Blue	<i>Pseudozizeeria maha</i>		
20		Pea Blue	<i>Lampides boeticus</i>		
21		Plains Cupid	<i>Chilodes pandava</i>		
22		Red Pierrot	<i>Talicauda nyseus</i>		
23		Rounded Pierrot	<i>Tarucus extricatus</i>		
24		Spotted Pierrot	<i>Tarucus callinara</i>		
25		Striped Pierrot	<i>Tarucus nara</i>		
26		Tailless Line Blue	<i>Prosotas dubiosa</i>		
27		Tiny Grass Blue	<i>Zizula hylax</i>		
28		Zebra Blue	<i>Leptotes plinius</i>		



29	NYMPHALIDAE	Baronet	<i>Euthalia nais</i>			
30		Blue Pansy	<i>Junonia orthya</i>			
31		Blue Tiger	<i>Triumala limniace</i>			
32		Chocolate Pansy	<i>Junonia iphita</i>			
33		Commander	<i>Moduza procris</i>			
34		Common Baron	<i>Euthalia aconthea</i>			
35		Common Bushbrown	<i>Mycalasis perseus</i>			
36		Common Castor	<i>Ariadane merione</i>			
37		Common Crow	<i>Euploea core</i>			
38		Common Evening Brown	<i>Melanitis leda</i>			
39		Common Four Ring	<i>Ypthima huebneri</i>			
40		Common Leopard	<i>Phalanta phalanta</i>			
41		Common Sailor	<i>Neptis hylas</i>			
42		Common Three Ring	<i>Ypthima asterope</i>			
43		Danaid Eggfly	<i>Hypolimnna misippus</i>			
44		Great Eggfly	<i>Hypolimnna bolina</i>			
45		Grey Pansy	<i>Junonia atlites</i>			
46		Lemon Pansy	<i>Junonia lemonias</i>			
47		Peacock Pansy	<i>Junonia almana</i>			
48		Plain Tiger	<i>Danaus chrysippus</i>			
49		Striped Tiger	<i>Danaus genutia</i>			
50		Tawny Coster	<i>Acraea terpsicore</i>			
51		Yellow Pansy	<i>Junonia hierta</i>			
52		Common Nawab	<i>Charaxes athamas</i>			
53		Black Rajah	<i>Charaxes solon</i>			
54		PIERIDAE	Common Emigrant	<i>Catopsilia pomona</i>		
55			Common Grass Yellow	<i>Eurema hecabe</i>		
56			Common Gull	<i>Cepora nerissa</i>		
57			Common Jezebel	<i>Delias eucharis</i>		
58			Common Wanderer	<i>Pareronia valeria</i>		
59			Mottled Emigrant	<i>Catopsilia pyranthe</i>		
60			Psyche	<i>Leptosia nina</i>		
61			Pioneer	<i>Belenois aurota</i>		
62		PIERIDAE	Small Grass Yellow	<i>Eurema brigitta</i>		
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67	PAPILIONIDAE	Common Bluebottle	<i>Graphium sarpedon</i>		
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70		Common Rose	<i>Pachliopta aristolochiae</i>		
71		Common Mormon	<i>Papilio polytes</i>		
72		Lime Butterfly	<i>Papilio demoleus</i>		
73	RIODINIDAE	Plum Judy	<i>Abisara echerius</i>		



Common Bluebottle

7. DISCUSSION AND CONCLUSION



The results of the present study give us an insight into the status of diversity of butterflies of Van Vihar National Park and Zoo. The study shows increase in the number of diversity from 24 (as per official records) to 73 species recorded during the survey with estimated population of 2,051. However, the results should be considered as an underestimation of true butterfly diversity of VVNP because the data is only from one season survey and the data was collected only from the tourism zone. The upcoming surveys in different seasons will give us a better understanding of spatio-temporal distribution of the butterfly community at VVNP. However, this study still is able to guide us in the right direction in conserving the butterfly population. A baseline butterfly diversity data has been established which can be utilized by researchers as well as forest managers. The population structure and composition gives us information about the distribution, dispersal, dominance, rarity of various butterfly species.

With development and enrichment of Butterfly park a large number of butterflies can be seen in the Butterfly park including large flocks of Plain tiger, Blue tigers, Striped Tigers, Common Emigrants, Lime Butterflies, Lemon Pansy, Grass Yellows, Common crows and mixed flocks of Gram blues, Line blues, Zebra blue, Forget me not etc. This has resulted in large no. of visitors visiting Butterfly park.

This study suggests that VVNP has a great potential to provide habitat to a diverse group of insects including butterflies. A greater diversity of butterfly can attract a number of visitors which includes wildlife enthusiasts, researchers, hobbyists, photographers etc. This scenario provides us with a great opportunity to create awareness among the visitors about the importance of butterflies and their role in our food chain and ecosystem. The butterfly park of the VVNP can be established as a platform for the citizens of the Bhopal city to learn, observe, appreciate and cherish the beauty and importance of the presence of butterflies and nature.

8. BASELINE BUTTERFLY PHOTO-LIST

HESPERIIDAE (SKIPPER)



Rice Swift



Indian Palm Bob



Common Banded Awl

BASELINE BUTTERFLY PHOTO-LIST

BRUSH-FOOTED BUTTERFLIES (NYMPHALIDAE)



Common Crow



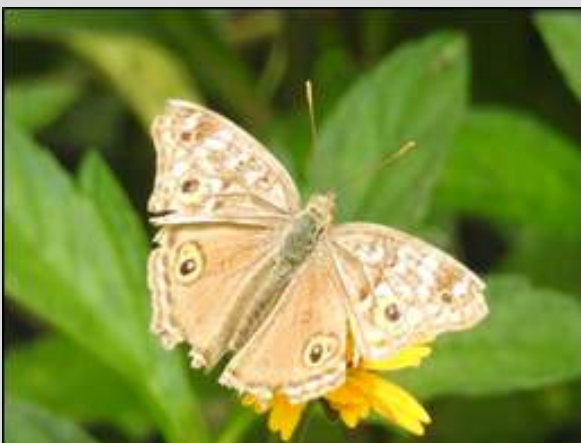
Chocolate Pansy



Striped Tiger



Common Leopard



Grey Pansy



Common Castor

BASELINE BUTTERFLY PHOTO-LIST

BRUSH-FOOTED BUTTERFLIES (NYMPHALIDAE)



Blue Tiger



Yellow Pansy



Blue Pansy



Baronet



Commander



Peacock Pansy

BASELINE BUTTERFLY PHOTO-LIST

BRUSH-FOOTED BUTTERFLIES (NYMPHALIDAE)



Common Three ring



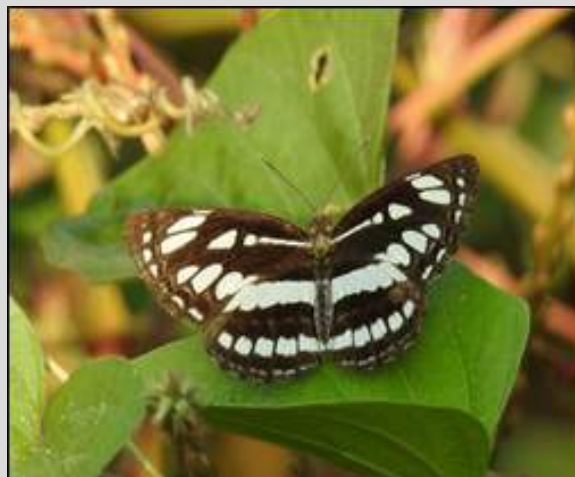
Common Evening Brown



Daniad Eggfly



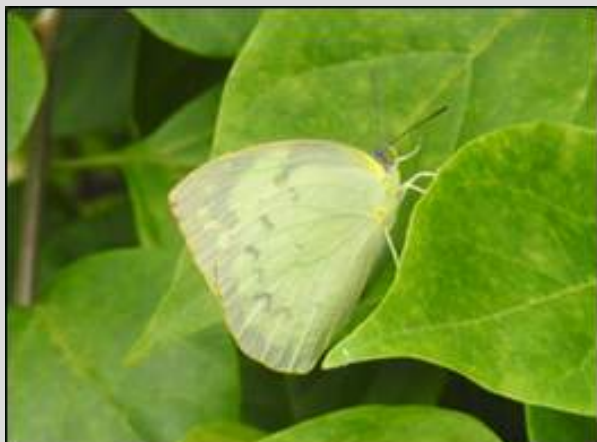
Great Eggfly



Common Sailor

BASELINE BUTTERFLY PHOTO-LIST

WHITES & YELLOWS (PIERIDAE)



Common Emigrant



Common Gull



White-Orange Tip



Common Grass Yellow



Common Wandrer

BASELINE BUTTERFLY PHOTO-LIST

BLUES (LYCAENIDAE)



Plains Cupid



Rounded Pierrot



Common Cerulean

BASELINE BUTTERFLY PHOTO-LIST

SWALLOWTAILS (PAPILIONIDAE)



Common Mormon

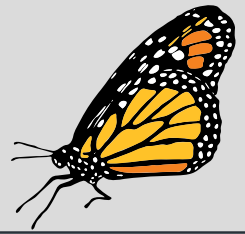


Lime Butterfly



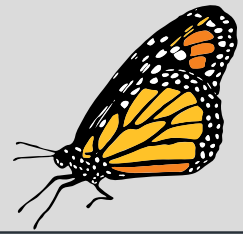
Common Rose

9. RARE SIGHTING



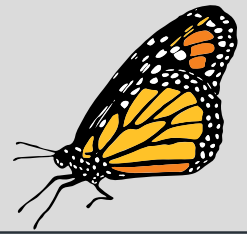
**Common Nawab and Black Rajah Recorded First Time
in Van Vihar National Park**

10. RECOMMENDATION

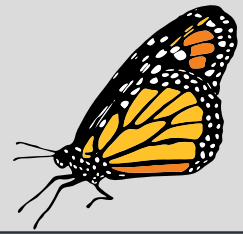


- This study is underestimated in terms that it is restricted to tourism zone only and detailed study in National Park area can enrich the list of butterflies and host plants.
- Second, the study is limited to monsoon season and multi-season surveys can give a better understand of ecology and diversity of butterflies in Van Vihar National Park.
- Citizen Science based butterfly surveys can be planned for each month at least in Tourism zone to promote awareness among local people as well as regular data collection.
- Enrichment of host and nectar plants and development of nursery within Van Vihar National Park.
- Development of Butterfly Interpretation Center and appointment of a regular Nature Educator specialized in Butterflies and Entomology.
- A batch of trained volunteers were introduced to the VVNP Management and these volunteers can be utilized to promote conservation awareness to visitors.

11. GLIMPSES OF BUTTERFLY SURVEY



12. REFERENCES



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“We delight in the beauty of the butterfly, but rarely admit the changes it has gone through to achieve that beauty.”

Maya Angelou





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