"STUDIES ON NECTAR PLANTS OF BUTTERFLIES IN CHINCHOLI WILDLIFE SANCTUARY, KALABURAGI, KARNATAKA, INDIA"

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Abstract:

This study documents the diversity of nectar plants utilized by butterflies in Chincholi Wildlife Sanctuary, Karnataka, India. Through systematic field surveys conducted over two years, we recorded 65 nectar plant species from 27 families, with Fabaceae (14 species), Apocynaceae (7), and Asteraceae (7) being the most dominant. These plants supported 71 butterfly species belonging to five families (Nymphalidae: 24 spp., Lycaenidae: 20 spp., Pieridae: 16 spp., Papilionidae: 6 spp., Hesperiidae: 5 spp.). The Nymphalidae family showed a preference for Asteraceae and Apocynaceae, while Lycaenidae frequently visited Fabaceae and Malvaceae. Pieridae were commonly associated with Asteraceae and Rutaceae, and Papilionidae with Apocynaceae and Lamiaceae. Five plant species remained unidentified at the species level due to insufficient diagnostic features. The findings highlight the critical role of native nectar plants, particularly Fabaceae, in sustaining butterfly diversity. This study provides the first comprehensive checklist of butterfly nectar plants in the sanctuary, serving as a baseline for future conservation efforts. We recommend habitat restoration using key nectar plants, long-term monitoring of plant-butterfly interactions, and community engagement to preserve these vital pollinator networks. The results underscore the importance of floral diversity in maintaining butterfly populations and ecosystem health in dry deciduous forest habitats

Key words: Butterfly-Plant Interactions, Pollination, Butterfly.

1. INTRODUCTION

Butterflies play a important role as pollinators in ecosystem thereby contributing to plant biodiversity (Ghazanfar *et al*., 2016). Due to their dependence on nectar plants as a source of food, the availability of these floral resources also becomes very crucial in any habitat. (Kunte, 2000). The Chincholi Wildlife Sanctuary, located in Kalyana Karnataka region of Karnataka, India, is a significant biodiversity rich area that supports a variety of butterfly species. However, habitat degradation and the loss of native nectar plants due to anthropogenic pressures threaten butterfly populations in this region (Kumar *et al*., 2021).

Planning for conservation at Chincholi Wildlife Sanctuary requires a list of the nectar plants that butterflies make use as their feeding source. According to several studies, Plant-butterfly interactions are vital for preserving the ecosystem health (Tiple *et al*., 2009). Adult butterflies depend on nectar plants for food, but they also have an impact on their habitat choices and breeding habits (Basavarajappa & Santhosh, 2020). Finding important nectar sources can support habitat restoration initiatives and encourage the conservation of butterflies.

Based on field observations and previously published research, this study attempts to create an exhaustive list of nectar plants that support butterfly populations in Chincholi Wildlife Sanctuary. Researchers and conservationists may create focused plans to improve butterfly habitats and guarantee the pollinators' long-term survival by identifying these essential floral resources.

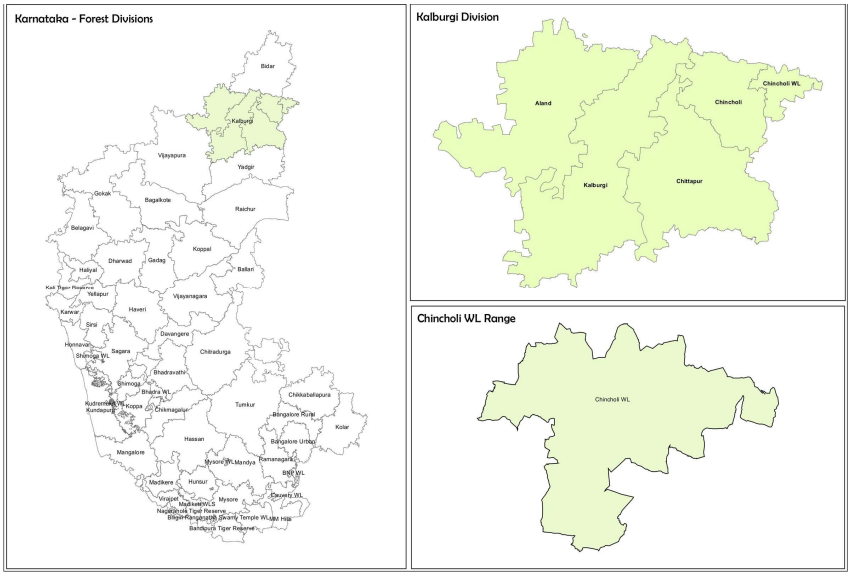
2. Materials and Methods

2.1 Study Area

Chincholi is a historically and environmentally significant area in Karnataka's Kalaburagi district. It is a panchayat town and taluka place. It is located at 17.47°N and 77.43°E. Because of its agricultural landscapes, scrublands, and dry deciduous woods, the area is environmentally significant. The Chincholi Wildlife Sanctuary which is present in this taluq sets a great example for biodiversity conservation. Chincholi Wildlife Sanctuary, which covers an area of 134.88 square kilometers, was designated as a sanctuary in 2011. It is South India's first dry land wildlife sanctuary. This is the only area in the Kalyana Karnataka Region with rich floristic diversity. The forest hosts rich biodiversity. It comes under one of the three ranges of Kalaburagi Forest Division i.e. Chincholi forest range.

2.2 Methodology

The study was conducted for a period of two years (January 2022 to December 2024). The research area was divided into 3 sections- Chandrampalli, Konchavaram, and Shadipur which were further divided into 10 sub sites based on vegetation types and accessibility. Transects of 1000m length were drawn in all 10 sub sites to understand both the butterfly diversity and nectar plant diversity. (Thomas, 1983). Only the plants on which butterflies were seen actively feeding with their proboscis extended were documented to avoid any wrong recordings. Nikon D 7200 and IQOO Z6 Mobile camera were used to photograph different parts of the plants like-stem, flower, flower bud, anthers, leaves etc…The identification of nectar plants was done using the Flora of Gulbarga District, other regional floras (Saldanha, 1996; Sharma *et al*., 2018) and the validation was done by well known taxonomist (Dr. Samarsen Modi, Assistant Professor, Government First Grade College, Bidar) Existing studies on butterfly-plant interaction were used to supplement the findings.



3. Results

A total of 65 species of nectar plants belonging to 27 different families were recorded in Chincholi Wildlife Sanctuary based on photographic evidence collected during the present study. Almost all plant species were identified to the species level with the assistance of a qualified taxonomist. However, five plants could only be identified up to the genus level due to the

absence of clear diagnostic features in the photographs. The checklist was prepared after systematic photographic documentation and field observations carried out over a period of two years.

Among the recorded nectar plants, Fabaceae was the most dominant family, comprising 14 species. This was followed by Apocynaceae and Asteraceae, each represented by 7 species. The Malvaceae family included 6 species, while Acanthaceae accounted for 4 species. Verbenaceae was represented by 3 species. Families such as Rutaceae, Commelinaceae, and Lamiaceae contributed 2 species each. Several families—namely Amaranthaceae, Anacardiaceae, Annonaceae, Arecaceae, Boraginaceae, Cleomaceae, Combretaceae, Euphorbiaceae, Meliaceae, Nyctaginaceae, Oleaceae, Orobanchaceae, Pedaliaceae, Portulacaceae, Rhamnaceae, Rosaceae, and Rubiaceae—were each represented by a single species.

4. Discussion and Conclusion:

The present study documented 65 nectar plant species belonging to 27 families that sustain 71 butterfly species from five families (Hesperiidae, Lycaenidae, Nymphalidae, Pieridae, and Papilionidae) in Chincholi Wildlife Sanctuary. The dominance of Fabaceae (14 species), Apocynaceae (7), and Asteraceae (7) as major nectar sources aligns with findings from similar ecosystems in peninsular India (Tiple *et al*., 2009; Basavarajappa & Santhosh, 2020). These plant families are known for their high nectar accessibility, attracting diverse butterfly species.

Butterfly-Plant Interactions and Family-wise Preferences

Nymphalidae (24 species), the most dominant butterfly family, showed a preference for Asteraceae, Verbenaceae, and Apocynaceae, which offer clustered inflorescences suitable for their feeding behavior (Kunte, 2000).

Lycaenidae (20 species), often associated with small flowers, frequently visited Fabaceae and Malvaceae, likely due to their shallow corolla tubes (Ghazanfar *et al*., 2016).

Pieridae (16 species), known for their affinity for white and yellow flowers, were commonly observed on Asteraceae and Rutaceae (Kumar *et al*., 2021).

Papilionidae (6 species), with their long proboscises, were seen on Apocynaceae and Lamiaceae in this study.

Hesperiidae (5 species), being rapid fliers, predominantly utilized Fabaceae and Poaceae (though grasses were excluded from nectar plant records).

This study provides the first systematic checklist of nectar plants supporting butterfly populations in Chincholi Wildlife Sanctuary. The findings reveal that Fabaceae, Apocynaceae, and Asteraceae are the most significant nectar sources, sustaining a diverse butterfly community dominated by Nymphalidae and Lycaenidae. The correlation between butterfly family abundance and specific plant families underscores the importance of floral diversity in maintaining butterfly biodiversity.

5. Acknowledgement

I must thank Dr. K.Vijaykumar, Research Supervisor, Senior Professor and the Chairman, Department of PG studies and Research in Zoology, Gulbarga University, Kalaburagi, -585106, Karnataka for supporting and inspiring me to take up this research work.

I thank my parents Dr. Rajendraswami and Sheela for providing me the moral support during my work.

I am thankful to my colleagues and friends who helped me during my field surveys while documenting butterflies in the campus.

Lastly I am thankful to Gulbarga University, Kalaburagi, for providing me the equipments required for carrying out my work.

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Table Showing the Checklist of Nectar Plants of butterflies in Chincholi Wildlife Sanctuary

Sl No	Common Name	Scientific Name	Shrub/Herb/Tree
1	Green Chiretta	*Andrographis paniculata*	Herb
2	Porcupine Flower	*Barleria priontis*	Shrub
3	Pseuderanthemum sp.	*Pseuderanthemum sp*	Shrub
4	Thunbergia sp.	*Thunbergia sp*	Shrub
5	Sessile Joy Weed	*Alternanthera sessilis*	Herb
6	Mango Tree	*Mangifera indica*	Tree
7	Seethapal Tree	*Annona squamosa*	Tree
8	Desert Rose	*Adenium obesum*	Shrub
9	Giant Milkweed	*Calotropis procera*	Shrub
10	Periwinkles	*Catharanthus roseus*	Herb
11	Indian Oleander	*Nerium indicum*	Shrub
12	Red Frangipani	*Plumeria rubra*	Tree
13	Pinwheel Flower	*Tabernaemontana divaricata*	Shrub
14	Dyer's Oleander	*Wrightia tinctoria*	Tree
15	Coconut Tree	*Cocos nucifera*	Tree
16	Bullygoat Weed	*Ageratum conyzoides*	Herb
17	Lilac Tasselflower	*Emilia sonchifolia*	Herb
18	Carrot Grass	*Parthenium hysterophorus*	Herb
19	Sontikli	*Pulicaria wightiana*	Shrub
20	Tridax Daisy	*Tridax procumbens*	Herb
21	Little Ironweed	*Vernonia cinerea*	Herb
22	Chinese Wedelia	*Wedelia chinensis*	Herb
23	Indian Borage	*Trichodesma indicum*	Herb
24	Asian Spider Flower	*Cleome viscosa*	Herb
25	Indian Almond	*Terminalia catappa*	Tree
26	Cynotis spp	*Cynotis spp*	Herb
27	Purple Heart	*Tradescantia pallida*	Herb
28	Crown of Thorns	*Euphorbia milli*	Shrub
29	Flame of Forest	*Butea monosperma*	Tree
30	Sickle Pod	*Cassia tora*	Herb
31	Crotalaria sp.	*Crotalaria spp*	Herb
32	Fuzzy Fruited Rattlepod	*Crotalaria hebecarpa*	Herb
33	Asian Pegion Wings	*Clitoria ternatea*	Herb
34	Desmodium sp.	*Desmodium spp*	Herb
35	Gulmohar	*Delonix regia*	Tree
36	Heart leaf Indigo	*Indigofera cardifolia*	Herb
37	Birdsville Indigo	*Indigofera linnaei*	Herb
38	Touch me not plant	*Mimosa pudica*	Herb
39	Karanja or Honge	*Pongemia pinnata*	Tree

	Tree		
40	Matura Tea Tree	*Senna auriculata*	Shrub
41	Tamarind	*Tamarindus indica*	Tree
42	Wild Indigo (Fish Poison)	*Tephrosia purpurea*	Herb
43	Pig nut	*Hyptis suaveolens*	Herb
44	Holy Basil or Tulsi	*Ocimum sanctum*	Herb
45	Fire Flame Bush	*Woodfordia fruticosa*	Shrub
46	Indian Mallow	*Abutilon indicum*	Shrub
47	China Rose	*Hibiscus × rosa-sinensis*	Shrub
48	Common Wireweed	*Sida acuta*	Herb
49	Heart Leaf Sida or Flannel Weed	*Sida cardifolia*	Herb
50	Arrow Leaf Sida or Jelly Leaf	*Sida rhombifolia*	Herb
51	Rhomboid shaped sida	*Sida rhomboidea*	Herb
52	Neem Tree	*Azadirachta indica*	Tree
53	Paper Flower	*Bougainvillea spectabilis*	Shrub
54	Night-Blooming Jasmine (Parijata)	*Nyctanthes arbor-tristis*	Tree
55	Common Sopubia	*Parasopubia delphinifolia*	Herb
56	Sesame	*Sesamum indicum*	Herb
57	Wingpod Purslane	*Portulaca umbraticola*	Herb
58	Red Date, Chinese Date, Jujube	*Zizipus jujuba*	Tree
59	Common Rose	*Rosa indica*	Shrub
60	Common Ixora	*Ixora spp*	Shrub
61	Lemon Tree	*Citrus limon*	Tree
62	Curry Leaf Tree	*Murraya koenigi*	Tree
63	Golden Dew Drop	*Duranta repens*	Shrub
64	Common Lantana	*Lantana camara*	Shrub
65	Blue Snake Weed	*Stachytarpheta jamaicensis*	Herb

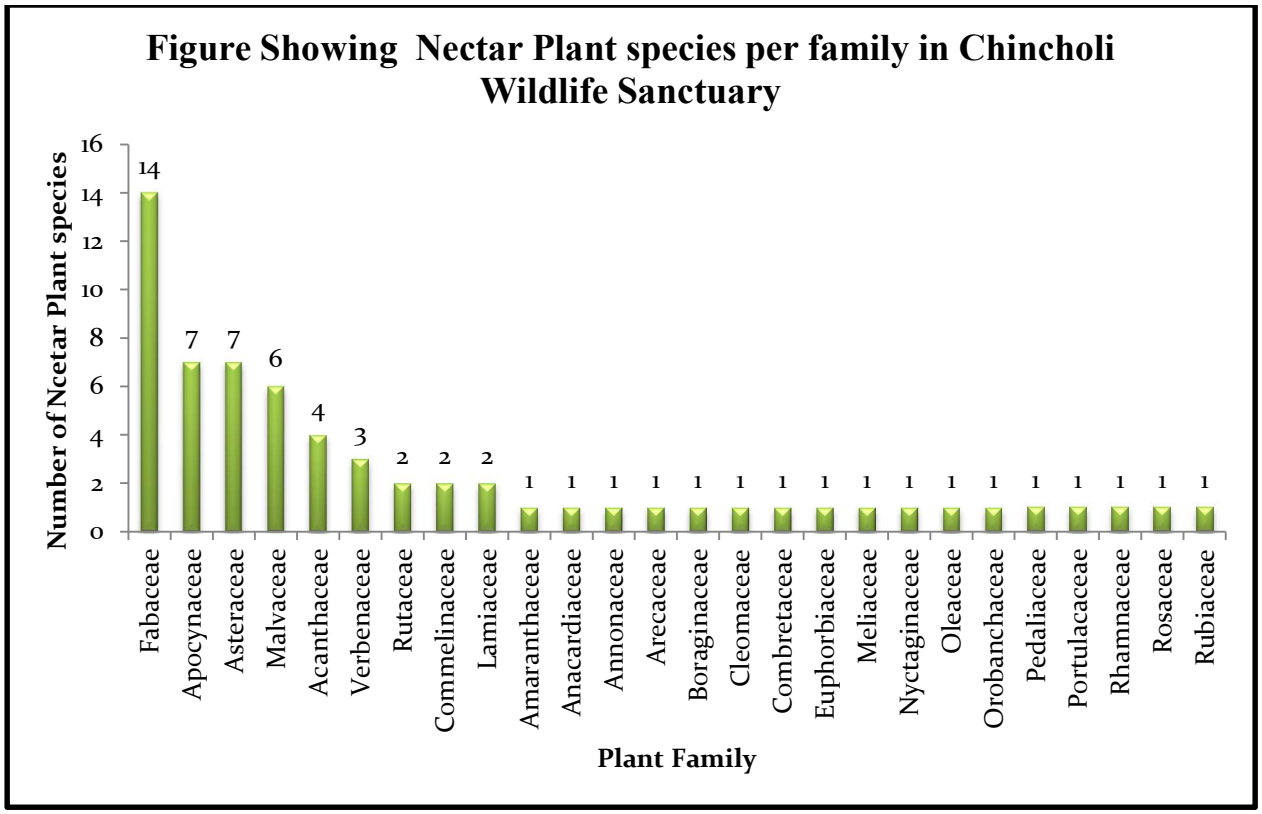
Figure Showing Nectar Plant species per family in Chincholi Wildlife Sanctuary
Number of Ncetar Plant species
0
2
4
6
8
10
12
14
16
14
7
7
6
4
3
2
2
2
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
Fabaceae
Apocynaceae
Asteraceae
Malvaceae
Acanthaceae
Verbenaceae
Rutaceae
Commelinaceae
Lamiaceae
Amaranthaceae
Anacardiaceae
Annonaceae
Arecaceae
Boraginaceae
Cleomaceae
Combretaceae
Euphorbiaceae
Meliaceae
Nyctaginaceae
Oleaceae
Orobanchaceae
Pedaliaceae
Portulacaceae
Rhamnaceae
Rosaceae
Rubiaceae
Plant Family