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Research Paper

Biotic Interrelationship of Plants and Butterflies in Surrounding of Gandhinagar, Gujarat

Science

KEYWORDS : Butterflies, Plant diversity, Gandhinagar, Interrelation.

Dr. Mukesh Mali	Assistant professor, R.R. Mehta College of Science and C.L. Parikh college of Commerce, Palanpur.
B.P. Khokhariya	Research Associates, Gujarat info petroleum limited (GIPL), IT tower II, Info city, Gandhinagar.
Y.B. Dabgar	Principal, R.R. Mehta College of Science and C.L. Parikh college of Commerce, Palanpur.

ABSTRACT

The paper illustrates butterflies and plant diversity and its interaction in Gandhinagar area. It comprises of rich biodiversity including plants with colorful flowers, birds, insects, mammals etc., which opens the pathway for better learning and understanding of environment in its natural form. Capital of the state is having many parks, gardens with road side-strip plantation along huge circles with dense green covered area. Butterflies are one of the unique creatures in nature. Interpreted status of butterflies shows that there are total 43 species belonging to 5 families interlinked with 110 plant species belonging to 98 genus and 45 families. Further, habit wise there are 24 trees, 30 shrubs, 41 herbs and 14 climber species which are enumerated during the pertaining study. This study plays a vital role for in situ conservation of butterflies in its own plant world with selective plant species. As butterflies are highly sensitive to the various environmental parameters, therefore for their sustainable existence in the respective habitat. Hereby, it is essential to maintained and conserve the healthy environment.

Introduction:

Insect visits flower to obtain food, usually in the form of pollen or nectar. The plants obtain the service of pollinators in carrying pollen form one flower to another (Protocture and Lake, 1996). Butterflies are one of the most beautiful crateful creatures of the world. They are the insects belonging to the order Lepidoptera (Parasharya, 2007). Butterflies are often considered as opportunistic foragers that visit a wide verity of available flowers. Butterflies feed primarily on nectar form flower. Butterflies visit flowers for nectar and thus play an important ecological role as pollinators (Parasharya, 2007). However, their chose of flower is not random and they exhibit distinct flower preference which can differ between species (Jennersten, 1984). The Choice of plants as nectar source by butterflies depends on various factors including innate colour preference, corolla depth, clustering of flower from which nectar can be extracted (Porter, 1992 and Corbet, 2000). Some also derive nourishment from pollen, tree sap, rotting fruit, dung, and dissolved minerals in wet sand or Dirt. They feed on nectar from flower for energy from sugars in nectar and for sodium and other minerals which are vital for their reproduction (Parasharya, 2007). Butterflies are often dependent on specific host plants. Butterflies are highly diversified in their habits and require specified ecological condition for survival. The floral scent is an impotent cue signal for butterfly to recognize and distinguish among rewarding plants. Hence, in order to understand the butterfly-flower interaction, the present study was undertaken.

Study Area

Gandhinagar is a green city of Gujarat state. The study area has numerous gardens and road side plantations, kitchen gardens, and home gardens which are having gardening and wild plants with lush green vegetation. The study area located in semi arid region and its vast peripheral area touched with left side of the Sabarmati river through riverine forest type and scrubby forest. They are providing shelter, food, clean and fruitfully environment. They also act as host for the eggs, pupa and caterpillar of butterflies and huge numbers of birds, reptiles, insects, termites and other faunal diversity.

Methodology

Initial visited the garden and its like place and observed their butterflies occurrence and frequency and illustrate the place. Methodical study was carried out to find out the food resource and hosting plant of butterflies in various selected place of Gandhinagar (to N latitudes and to E longitudes) from June 2008 to September 2010. All plant enumerated visited by butterflies used for food and host plants. To find out the food resource of Butterflies, in the blooming season. Plant was identified through local flora and literature as Flora of Gujarat (Shah, 1978), The flora of Presidency of Bombay (Cook, 1903), Plants of Northern Gujarat (Saxton, 1918) A Documentation of Plants of Indroda Nature Park (Gadani et al., 2006 and Gadani, 2006) and Trees of Gujarat (Singh, 2005).

Butterflies are most active during sunlight (Pollard, 1993). The observations were carried out Morning, Noon, Evening. Butterfly species were taken precise still photographs through Digital camera; some are collected and identified by using The Book of Indian Butterflies (Kehimkar, 2008), All color book of Butterflies. (Goodden, 1973) Common Butterflies of India (Gay and Punetha, 1992) and Butterflies of Gujarat (Parasharya, 2007). Butterfly attracting flower grouped into three size classes, namely small (< 1 cm) medium (1-3 cm) and large (> 3cm); Five colure categories namely Red, White, blue, green and Yellow. Butterflies preferred hosting plant for eggs, pupa and caterpillar categories into with latex and without latex. Flower shape based categories in three groups flat, bowl shaped and tubular shaped.

Result and Discussion

Plant Diversity:

Most butterflies have specific habitat and food requirements. Although adult butterflies are sensitive to their choice of flower for feeding, most species never visit some flowers (Feltwell, 1986) All the butterflies are not flower visitors; only the highly evolved species, whose mouth-parts are represented by a long, thin proboscis, is adapted for feeding on liquid diet such as nectar (Wynnter- Blyth, 1957). A floral vegetation and water source are needful to butterfly diversity (Prajapati and Prajapati, 2013). A total 110 plant species belonging to 98 genus and 45 families classified into 99 dicotyledons and 11 monocotyledons members of Angiosperm plants. 24 trees, 31 shrubs, 41 herbs and climber 14 plants habit of occurred plants in the studied area of Semi arid region.

The important factor to be considered when choosing the nectar plants are the feeding preferences of the butterfly species and the length and timing of flowering. Which flower almost continually are the commonly used plants. Since the flowers of these plants have nactaries close to the surface, nectar is very easily accessible to most of the butterflies. Lyeaenids and Pierids with short proboscis prefer smaller flowers less than 1 cm or 1 to 3 cm while for the larger Papilionids butterflies preferable tubular and greater than 3 cm flower size. Point up the flower shape and structured 33 plants has bowl shaped flowers, 25 plants having Flat shape and 52 plants having Tubular shapes flowers. Illustrate flower size of all occurred plants in the study area 33

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plants having less than 1 cm, 53 plant species has 1cm to 3 cm and 23 plant species greater than 3 cm flower size.

According to (Faegri, 1979) colour and form of a plant play an important role in butterfly foraging. Most butterfly species have innate colour preference and show high fidelity to colour variation; in some cases these may be modified by experience or training (Reddi, 1984; Feltwell, 1986; Jennersten, 1984). Butterflies often have strong species-specific colour preferences. Since such colour preferences can change with age, it is important to provide a wide range (Parasharya, 2007). Flower colour 9 plants are having Blue, 17 plants having green, 30 plants having Red, 26 plants having white and 28 plant having yellow colour.

Larval host plants have to be mentioned both in the flight area (For enabling oviposition) as well as in the breeding area (to tend the larvae). Among the various factors involved, the growth and regeneration rate of the food plants, larval feeding efficiency, the part of the host plant used and total number of ovipoisting butterflies are critical. Furthermore, some birds were the communal roosters and mostly used wide canopied and tall trees which conferred safe roosts for them (Prajapati and Prajapati, 2012). 14 plants species requisite host and 24 plant species provide hosting and feeding for the period of larval and caterpillar stage of butterflies.

Butterflies have been regarded as opportunistic nectar feeders some species (Shreever, 1992). Show preferences to flowers with particular nectar concentrations (Watt and Mills, 1974; Pivnick, 1985). 45 plant species having nectar for adult butterflies.

The sap provides them with pyrrolizidine alkaloids, which are essential for the production of male pheromones. These alkaloids are also known to contribute towards making these butterflies unpalatable. 56 plant species having latex in that 50 plant species having watery latex while 6 plant species having milky latex.

Butterfly Diversity:

A Total 43 species among 35 genus of butterflies belonging to five families and 16 sub families were illustret (Annexure 1). The family Nymphalidae dominated with 18 species followed by Lycanidae (9), Pieriidae (8) and Hesperidae(5) and Papilionidae(3) respectively. 12 species are found in the study area which is not mentioned in earlier secondary literature (Parasharya, 2007; Aldrich, 1946; Rohit, 2001; Anonymous, 2006; Suresh et al., 2001). All species occurrence in moist and warm condition having surrounding area during monsoon season among these some species are available during all year.

The Nymphalids are a large and most divers of robust-bodied butterflies that come in almost every shape and colour. 18 members have this family and they belonging 5 subfamily. Nymphalidae has 11 members followed Danainae has 3 members; Satrinae has 2 members while Acraeinae and charaxinae have one members. Indeed Nymphalids are in many places the most visible members of the local butterfly Fauna (Parasharya, 2007). Some do visit flowers but they are generally more partial to overripe fruits, tree sap and even animal and urine. It avoids shade and dense vegetation but frequents openings in all vegetation types, including clearing in evergreen forest.

8 members of pieridae belonging to 2 subfamilies in these 3 members are and 5 members are pierinae. These are white, yellow or orange butterflies, often with black marking. They are sun- worshippers and quickly withdraw in the foliage if a cloud obscures the sun. All pirids have great affinity to flowers. (Gay and Punetha, 1992). Generally all they fly close to the ground at the level of herbs and shrubs where the nectar is most abundant. Its larval food plants are Cassia, Caesalpinia, Delonix, Bauhinia sp. And all are frequently occurred in the study area.

9 members occurred of Lycanidae family separate out in three subfamilies as one member of Curetinae, Theclinae has one member and 7 members have Polymmatinae subfamilies in the study area. They are common in open deciduous forest, scrub and grasslands near the human habitations. They feed on variety of food resources such as Acanthaceae and tree sap of Cappariaceae. Major food donor plant member are Rhamnaceae, Capparaceae, Acanthaceae and Fabaceae for larval stage. All family members are abundance and more adaptive in semi arid region.

5 members of Hesperiidae occurred in the study area. They are belonging 3 subfamily Hesperiinae and Pyrginae having 2 members and one species member of Cocliadinae subfamily. Skippers inhabit woody areas, mostly deciduous and evergreen forests. They are largely non- migratory. Adults feed on a variety of resources like flower, wet soil, bird drooping, etc.

Swallowtail distributed throughout the India and Gujarat except dense and wet forest. Lime butterfly and Common Mormon these are most common swallowtail occurred near human habitation or human dwelling. Three members as common rose, Lime butterfly and Common Mormon are commonly occurred in study area. They prefer to host or feeder plants mostly Indian Birthwort (Aristolochia bracheolata Lam.) Beal (Aegle marmelos (L.) Corr.) and Kadipataa (Murraya koenigii (L.) Spereng). These plants are commonly available and abundant in the studied area.

Conclusion

It is important to mention here that the butterfly fauna depends mainly on the floristic elements, climate, rainfall, temperature in Gujarat. The nature of vegetation is the important factor that determines the survival of herbivores in a particular habitat. Being highly sensitive to changes in environment, butterflies are easily affected by even relatively minor perturbations in the habitat. Maintaining a healthy habitat is a very important to sustain these herbivores. Hence, to attract butterflies, butterfly attracting plant species listed here may be included in the afforestation programs. Protect their habitat and to generate public awareness of their role and utility in maintaining the ecological balance. Several of the splendid insects are exclusively forest dwellers and being conspicuous, their presence or absence serves to monitor ecological changes in habitat, thus warning us deteriorating environment.

Appendix-I A list of occurred butterflies in the Study area

Sr. No.	Common Name	Family	Sub Family	Zoological Name	Status in study area
1	Great Eggfly Male	Nymphalidae	Nyphalinae	Hypolimnas bolina Linn.	Un common
2	Danaid Eggfly Female			Hypolimnas misippus Linn.	Common
3	Yellow Pancy			Junonia hiertaFabricius.	Common
4	Chocolate Pansy			Precis iphitaCramer.	Un common
5	Lemon Pansy			Junonia lemonias Linn.	Un common
6	Common sailor			Neptis hylas Bryk.	Common
7	Angled Castor			Ariadne ariadne Okano	Common
8	Common Castor			Ariadne merione Okano	Common
9	Painted Lady			Cynthis cardui Linn.	Rare
10	Common Baron			Euthalia aconthea Carm.	Common
11	Common Leopard			Phylanta phalantha	Un common
12	Common Evening Brown		Satyrinae	Melanites leda Drury	Common
13	Common Five-ring			Ypthima baldus Fabricus.	Un common
14	Black Rajah		Charaxinae	Charaxes solon Fabricius	Rare
15	Tawny Coster		Acraeinae	Acraea violae Fabricus	Common
16	Plain Tiger		Danainae	Danaus chrysippus Linn.	Common
17	Striped Tiger			Danaus genutia Cramer	Un common
18	Common crow			Euploea core Cramer	Common

19	Common Emigrant	Pieridae	Coliadinae	Catopsilia pomona Nomura	Common
20	Mottled Emigrant			Catopsila pyranthe Fabricius	Common
21	Common Grass Yellow			Eurema hecabe Linn.	Common
22	Pioneer		Pierinae	Anaphaeis aurota Fabricius	Common
23	Small Orange Tip			Colotis etrida	Common
24	Common Jezebel			Delias eucharis Drury	Common
25	White Orange Tip			Ixias marianne Cramer	Common
26	Common Wander			Peroronia valeria	Common
27	Indian Sunbeam	Lycaenidae	Curetinae	Curetis thetis Drury.	Common
28	Common Silverline		Theclinae	Spindasis vulcanus Fabricius	Un common
29	Common Pierrot		Polymmatinae	Castalius rosimonFabricius	Common
30	Plains Cupid			Chilades pandava Hsu.	Common
31	Grass Jewel			Chilades trochylusBytinski-Salz. & Brandt.	Common
32	Indian Cupid			Everes lacturnus Couchman	Un common
33	Pea Blue			Lampides boeticus Linn.	Common
34	Pale Grass Blue			Psuedozizeeria maha	Common
35	Lasser Grass Blue			Zizina otis Fabricius	Common
36	Rice Swift	Hesperiidae	Hesperiinae	Borbo cinnara Wallace.	Common
37	Common Red Eye			Matapa aria Moore	Common
38	Brown Awl		Coeliadinae	Badamia exclamationisFabricius	Common
39	Common samal Flat		Pyrginae	Sarangesa dasahara Moor	Common
40	Spotted small flat			Sarangesapurendra Moor	Common
41	Common Rose	Papilionidae	Papilioninae	Pachliopta aristolocvhae Reaking	Common
42	Lime Butterfly			Papilo demoleus Linn.	Common
43	Common Mormon			Papilo polytes Linn.	Common

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