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# Butterfly diversity in botanical garden of MB Patel College Sadak Arjuni, district Gondia Maharashtra

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**Abstract**
Plant and Insect are having unique relationship of food chain. Insects belongs to Lepidopteran shows fecundity mores based on choice methods of host plants on not only choice methods of host plants not only for egg laying but also survival of futher generation by actively feeding all life stages on host plant species. During our study we found 48 host plants among 63 noted cultivated species of botanical garden of college belongs to 19 families viz., Asteraceae, Verbenaceae, Fabaceae, Rubiaceae, Apocynaceae, Euphorbiaceae, Moringaceae. For to check diversity of butterflies Line transect method, was used. About 69 butterfly's species were recorded among them, 20 species belong to Nymphalidae, 12 belong to Pieridae, 12 belongs to Papilionidae and 25 species belong to Lycaenidae.As preferred host plant such as *Tridax procumben*, Tagetes (Marigold) (Family: Asteraceae) harbored 10 species of Pieridae, 12 species of Nymphalidae as well 8 species of Lycaniedae During our study we found host plant relationship between host plant and butterfly species. A weed plant with multicolored flowers, *Lantana camara* (Family:Verbenaceae) hosted 6 species of Papilionidae, 3 species of Pieridae, and 9 species of Nymphalidae, similarly *Euphorbia hirta* (Family:Euphorbiaceae) and *Tephrosia purpurea* (Family: Fabaceae) hosted 9 species of Nymphalidae, and 4 Papilionidae and about 10 species from Lycaenidae found on plant *Cosmos sulphurus* (Family:Asteraceae).The present study thus revealed that there is need for the conservation of varied species of butterflies, which were hazardously influenced by the rising cementary and cutting of forest vegetation, thus raising Botanical gardens in college level enhances mode of conservation of diversity of not only butterflies but also helps to conserve floral diversity of botanical gardens.

**Keywords:** *Cosmos sulphurus*, butterflies, botanical garden, host plant interaction

## Introduction
Angiospermic flowering plant is closely associated with pollinator of insect belonging to order Hymenoptera and Lepidoptera. There occurs a close morphological and host plant feeding association in between nectar exploiting pollinator and phenotype of plant having flowering mass and aromatic nectary within floral parts of angiospermic plants. Among butterflies being a nectar feeder of angiospermic plants shows variant host specificity, regarding their biotypes and conservation strategies. For the conservation of varied species of butterflies, biotypes must have a combination features like good quality, showy and attractive flower and flower massing. (Dennis *et al* 2003,2006,2007) [3, 4]. Butterfly species shows larval and adult host plant interdependency which shows that a biotype where larval host plant present and other butterflies' resources may be different their resultant will be less competition among them for nectar feeding and mate location site (Dennis *et al* 2003.,2006.,2006) [3, 4]. It has also been shown that them has a morph metric and feeding link in between butterflies and host plant species, in relation to nectaring of flowering plant, contrasting morphology of flower viz., corolla depth, flower clustering, consequently in life forms (A. tiple 2009) [14]. In Central India (D. Abreeu 1931) [1] documented total 77 species in the erstwhile Central Provinces, liosting 92 species of butterflies from Nagpur city. Pandharipande (1990) [12] recorded only 61 species of butterflies from Nagpur City. India hosts 1,501 species of butterflies (Gaonkar 1996) [6], of which peninsular India hosts 350, and the Western Ghats. (A. Tiple 2009) [14] Studied the seasonal patterns in butterfly's population, states, occurrence, biotopes recorded 145 butterfly's species with 62 new species. The increases in butterfly diversity in Nagpur City, is due to abundance of favorable host plant specificity and vegetation covering herbs and shrubs, and trees for nectaring of butterflies (A. Tiple 2009) [14].

## Material and Methods
### Study site and Methodology
Butterfly survey were done during early morning hours as it is ideal time for butterfly diversity study, during observation biotype and their host plant hosting butterfly species was recorded. Botanical grden survey were done using Line transect methods in all directions and adjoining teak wood plantation at border of gardens walls. Identification of butterfly species were done directly in the field followed photography. The generic and scientific name given following fields guide Wynter-Blyth 1957 [15], Haribal, M 1992 [7] and Kunte 2000 [10]. Common English name followed by Wynter-Blyth 1957 [15]. Identified butterfly's species were categorized as Very Common (VC), Common (C), Rare (R).


*Junonia lemonias* "lemon pansy


*Danus Chrysippus* "Plain Tiger"


*Euploea Core* "Common Indian Crow''


Hypolimnas bolina "great egg fly"


Precis iphita "choclate pansy"


Phalantha phalantha "common leopard"

**Fig:** Butterflies found in Botanical Garden of MB Patel College of Arts Commerce and Science, Sadak Arjuni

## Results

The results recorded during survey was illustrated in Table 1,2,3, and Figures 1, indicate that in and around Ambazari Lake there were almost 69 species of butterflies hosting 9 families of angiospermic plant belonging to higher taxa. As preferred host plant such as *Tridax procumben* (Family: Asteraceae) harbored 6 species of Pieridae, 9 species of Nymphalidae. A typical phenomenon of correlation observed between host plant and butterfly species. A weed plant with multicolored flowers, *Lantana camara* (Family:Verbenaceae) hosted 6 species of Papilionidae, 3 species of Pieridae, and 9 species of Nymphalidae, similarly *Euphorbia hirta* (Family:Euphorbiaceae) and *Tephrosia purpurea* (Family: Fabaceae) hosted 9 species of Nymphalidae, and 4 Papilionidae and about 10 species from Lycaenidae found on plant *Cosmos sulphurus* (Family:Asteraceae).The result indicates that there is a need for conservation of varied species of butterflies which were hazardously influenced by the rising cementary and cutting of Forest vegetation.

**Table 1:** Butterfly species recorded in and around botanical gardens of M B Patel College of Arts Commerce and Science

| Species | Common Name | Family | Subfamily |
|---|---|---|---|
| *Pachliopta aristolachiae* | Common Rose | Papilionidae | Papilioninae |
| *Pachliopta hector* | Crimson Rose | Papilionidae | Papilioninae |
| *Graphium agamemnon* | Tailed Jay | Papilionidae | Papilioninae |
| *Papilio polymnestor* | Blue Mormon | Papilionidae | Papilioninae |
| *Papilio demoleus* | Lime Butterfly | Papilionidae | Papilioninae |
| *Papilo dissimilis* | Common Mine | Papilionidae | Papilioninae |
| *Anaphaeis aurota* | Pioneer | Pieridae | Pierinae |
| *Cepora nerissa* | Common Gull | Pieridae | Pierinae |
| *Catopsilia crocale* | Common Emigrant | Pieridae | Coliadinae |
| *Catopsilia pyranthe* | Mottled Emigrant | Pieridae | Coliadinae |
| *Eurema brigitta* | Small Grass Yellow | Pieridae | Coliadinae |
| *Eurema laeta* | SpotlessGrassYellow | Pieridae | Coliadinae |
| *Eurema blanda* | Three Spot grass yellow | Pieridae | Coliadinae |
| *Eurema andersoni* | One Spot Grass Yellow | Pieridae | Coliadinae |
| *Melanitis leda* | Common Evening Brown | Nymphalidae | Satyrinae |
| *Melantis phedima* | Dark Evening Brown | Nymphalidae | Satyrinae |
| *Phalantha phalantha* | Common Leopard | Nymphalidae | Nymphalinae |
| *Tirumala limniace* | Blue Tiger | Nymphalidae | Danainae |
| *Danus genutia* | Striped Tiger | Nymphalidae | Danainae |
| *Danus chrysippus* | Plain Tiger | Nymphalidae | Danainae |
| *Euploea core* | Common Indian Crow | Nymphalidae | Danainae |
| *Melanitis zitenius* | Great Evening Brown | Nymphalidae | Satyrinae |
| *Euthalia nais* | Baronet | Nymphalidae | Nymphalinae |
| *Hypolimnas missipus* | Danaid Egg fly | Nymphalidae | Nymphalinae |
| *Hypolimnas bolina* | Great Egg Fly | Nymphalidae | Nymphalinae |
| *Junonia orithya* | Blue Pansy | Nymphalidae | Nymphalinae |
| *Junonia lemonias* | Lemon Pansy | Nymphalidae | Nymphalinae |

| | | | |
|---|---|---|---|
| *Junonia atlites* | Grey Pansy | Nymphalidae | Nymphalinae |
| *Precis iphita* | Chocolate Pansy | Nymphalidae | Nymphalinae |
| *Tarucus alteratus* | Rusty Pierrot | Lycaenidae | Polyommatinae |
| *Tarucus extricatus* | Rounded Pierrot | Lycaenidae | Polyommatinae |
| *Tarucus nara* | Striped Pierrot | Lycaenidae | Polyommatinae |
| *Tarucus callinara* | Spotted callinara | Lycaenidae | Polyommatinae |
| *Pseudozizeeria maha* | Pale Grass Blue | Lycaenidae | Polyommatinae |
| *Chilades contracta* | Gram Blue | Lycaenidae | Polyommatinae |
| *Chilades pandava* | Plains Cupid | Lycaenidae | Polyommatinae |
| *Catochrysops strabo* | Forget –Me-Not | Lycaenidae | Polyommatinae |
| *Lycaenesthes lycaenina* | Pointed Ciliate Blue | Lycaenidae | Polyommatinae |
| *Zizina otis* | Lesser Grass Blue | Lycaenidae | Polyommatinae |

*All the scientific name followed by Larsen 1987 [11].

**Table 2:** Host plant association of Butterflies in among different families of Angiospermic Plants

| Family of Angiospermic plant | Plant Species | Hosting Butterfly Families |
|---|---|---|
| Asteraceae | *Tridax procumbens, Tagetes Cosmos sulphurus* | Pieridae, Nymphalidae, Lycaenidae. |
| Verbenaceae | *Lantana camara, Vitex negundo* | Pieridae, Nymphalidae, Papilionidae |
| Euphorbiaceae | *Euphorbia hirta* | Pieridae, Nymphalidae, Papilionidae, Lycaenidae. |
| Moringaceae | Moringa oleifera | Papilionidae, Lycaenidae |

**Table 3:** Host plant families hosting butterflies' families

| Families | Nymphalidae | Pieridae | Papilionidae | Lycaenidae |
|---|---|---|---|---|
| Asteraceae | 9 | 6 | 0 | 0 |
| Verbanaceae | 9 | 3 | 6 | 0 |
| Fabaceae | 9 | 0 | 4 | 10 |
| Euphorbiaceae | 9 | 0 | 4 | 10 |

**Table 4:** List of Botanical Plants cultivated in botanical gardens of MB Patel College of Arts Commerce and Science

| Sr.No. | Venacular name | Scientific Name | Host Family Prefrence |
|---|---|---|---|
| 1 | Adulsa | *Justica adhathoda L.* | Acanthaceae |
| 2 | Aghada | *Achyranthus apera L.* | Amamranthaceae |
| 3 | Ashwagandha | *Withania somnifera L.* | Solanceae |
| 4 | Bahava | *Cassia fistula* | Caesalpinaceae |
| 5 | Bel | *Agele marmelos L.* | Rutaceae |
| 6 | Bhuiawali | *Phyllanthus niruri L.* | Phyllanthaceae |
| 7 | Gokharu | *Tribulus terrestris* | Zygophyllaceae |
| 8 | Gulwel | *Tinospora cardifolia Thunb.* | Menispermaceae |
| 9 | Hadjod | *Cissus quadrangularis L.* | Vitaceae |
| 10 | Insulin Plant | *Costus igneus* | Costaceae |
| 11 | Jhinjhardi | *Triumfetta rhomboidea Jacq.* | Tiliaceae |
| 12 | Kaduneem | *Azadirachta indica A. Juss.* | Meliaceae |
| 13 | Kalmegh | *Andrographis paniculata* | Acanthaceae |
| 14 | Karangi | *Pongamia pinnata L.* | Fabaceae |
| 15 | Korphad | *Aloe vera L.* | Asphodelaceae |
| 16 | Lajalu | *Mimosa pudica L.* | Mimosaceae |
| 17 | Lemon | *Citrus limon L.* | Rutaceae |
| 18 | Lemon Grass | *Cymbopogan citratus* | Poaceae |
| 19 | Nagdon | *Euphorbia tithymaloides L.* | Euphorbiaceae |
| 20 | Panfuti | *Kalanchoe pinnata Lam.* | Asparagaceae |
| 21 | Pudina | *Mentha spicata L.* | Lamiaceae |
| 22 | Ritha | *Sapindus mukorossi* | Sapindaceae |
| 23 | Rui | *Calotropis procera (Ait.)* | Asclepiadaceae |
| 24 | Sabja | *Ocimum basilicum L.* | Lamiaceae |
| 25 | Sarpagandha | *Rauwolfia serpentina L.* | Apocynaceae |
| 26 | Shatawari | *Asparagus racemosus Willd.* | Asparagaceae |
| 27 | Shisham | *Dalbergia sisoo Roxb.* | Fabaceae |
| 28 | Tulsi | *Ocimum santum L.* | Lamiaceae |
| 29 | Vasanvel | *Cocculus hirusutus* | Menispemaceae |
| 30 | Videyeche Pan | *Piper betle* | Piperaceae |
| 31 | Amba | *Magnifera indica L.* | Anacardaceae |
| 32 | Arjun | *Terminalia arjuna (Roxb.)* | Combretaceae |
| 33 | Ashoka | *Polyalthia longifolia* | Annonaceae |
| 34 | Bor | *Ziziphus jujube Mill.* | Rhamnaceae |
| 35 | Buddha's Palm | *Alocasia cucullata Lour.* | Araceae |
| 36 | Chafa | *Plumeria rubra L.* | Apocynaceae |

| | | | |
|---|---|---|---|
| 37 | Chichbilai | *Pithecellobium dulce Benth.* | Mimosaceae |
| 38 | Chinch | *Tamarindus indica L.* | Caesalpinaceae |
| 39 | Dragon Bones | *Euphobia lacteal Haw.* | Euphorbiaceae |
| 40 | Elephant Ear | *Alocasia macrorrhiza* | Araceae |
| 41 | Jacobs ladder | *Euphorbia tithymaloides* | Euphorbiaceae |
| 42 | Jagganath | *Catharanthus roseus L.* | Apocynaceae |
| 43 | Jambhul | *Syzugium cumini L.* | Myrtaceae |
| 44 | Jarul | *Lagerstroemia speciose L.* | Lythraceae |
| 45 | Jaswand | *Hibiscus rosasinensis L.* | Malavaceae |
| 46 | Kadamb | *Neolamarckia cadamba Roxb.* | Rubiaceae |
| 47 | Kadipatta | *Murrya koenigii L.* | Rutaceae |
| 48 | Kochai | *Colocasia esculaenta L.* | Araceae |
| 49 | Kunda | *Jasminum multiflorum Burm.* | Oleaceae |
| 50 | Mulberry | *Morus alba* | Moraceae |
| 51 | Nishigandha | *Polianthes tuberosa L.* | Asparagaceae |
| 52 | Palas | *Butea monosperma Lam.* | Fabaceae |
| 53 | Pencil Cactus | *Euphorbia tirucalli* | Euphorbiaceae |
| 54 | Peru | *Psidium guajava L.* | Mytraceae |
| 55 | Rhoeo | *Tradescantia spathacea* | Commenlinaceae |
| 56 | Rose | *Rosa indica L.* | Rosaeceae |
| 57 | Sadaphuli | *Tabermontana divaricata* | Apocynaceae |
| 58 | Sagvan | *Tectona grandis L.* | Verbenaceae |
| 59 | Shendri | *Bixa orellana* | Bixaceae |
| 60 | Shewanti | *Chrysanthemum indicum* | Asteraceae |
| 61 | Sitaphal | *Annona squamosal L.* | Annonaceae |
| 62 | Snakeplant | *Dracaena trifasciata Prain* | Asparagaceae |
| 63 | Subabhul | *Leucaena leucoceplala Lam.* | Mimocaceae |
| 64 | Zandu | *Tagetes erecta L.* | Asteraceae |
| 65 | | *Thuja occidentalis L.* | Cuspressaceae |

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