International Journal of Entomology Research
www.entomologyjournals.com
ISSN: 2455-4758
Received: 10-11-2023, Accepted: 25-11-2023, Published: 11-12-2023
Volume 8, Issue 12, 2023, Page No. 32-36

Butterfly diversity in four different areas of Namakkal, Tamilnadu

B Indhu[1], S Sivanantham[2], C Jayalakshmi[3], S Praveen[4]
[1] Department of Zoology, Kandaswami Kandar's College, Velur, Namakkal, Tamil Nadu, India
[2] Department of Microbiology, Kandaswami Kandar's College, Velur, Namakkal, Tamil Nadu, India
[3] Department of Botany, Government Arts College for Women, Salem, Tamil Nadu, India
[4] Department of Microbiology, Kandaswami Kandar's College, Velur, Namakkal, Tamil Nadu, India

Abstract
Butterflies belong to the order Lepidoptera, which categories insects that have scales on their wings. Ribbon, nodes, and circular are some of the stunning color patterns that may be achieved with the scales. Butterflies play a significant part in the preservation of biodiversity because of their activity as pollinators, which assists in the process of pollination carried out by plants. Birds, reptiles, spiders, and other predatory insects all rely on butterflies as a source of food. Butterflies also serve as bioindicators of the changes that occur in the quality of the environment where they live. Between the months of August 2022 and January 2023, there were 42 different species of butterflies that came from all over the world and belonged to 5 different families. The Nymphalidae family has the highest number of species, with 13, followed by the Lycaenidae and Pieridae families, each with 10 species, and the Papilionidae family, with 6 species. 3 species of butterflies were found to belong to the family Hesperiidae, which had a very small number of butterflies. Maruvurpatti has the highest species richness, with a total of 12 species, followed by Semparaiputhur, which has 11 species. c. Munichipthottam, which had 10 different species of butterflies, and Sengaligoundanur, which had 9 different species of butterflies with a lower number of species.

Keywords: Butterfly diversity, Namakkal district (4 Villages)

Introduction

The shape, size, and colour of butterflies are all incredibly varied. With the exception of the region close to the poles, they can be found anywhere in the world. It is possible to use butterflies as a tool for developing conservation plans, as they are excellent indicators of climatic conditions, seasonal changes, and ecological shifts. There is a co-evolutionary interaction between butterflies and plants, and their lives are intertwined (Ghazanfar *et al*., 2016) [4]. As a result, butterflies play an important part in ecosystems and the lives of plants. There were a total of 1504 butterfly species in India, which accounted for 8.74% of the world's butterfly population, according to Kunte *et al*. (2012) [13]. Of those, 285 species were found in southern India.

The order known as Lepidoptera, which literally translates to "scaly wings" in Greek, is the group that includes butterflies. According to Sasikala *et al*. (2018) [19], lepidoptera are beneficial since they not only generate silk but also act as pollinators and environmental indicators. The diversity of insects varies according on the ecology in which they are found, and as a result, they fulfil their respective functions. Lepidopterans are ideal model animals for the study of aposematism, polymorphism, mimicry, speciation, and insect-plant interactions (Thangaraj and Sivanantham, 2015 [25]; Sivanantham *et al*., 2023) [24]. This is because lepidopterans have a significant amount of success and variability. Butterflies, along with birds and vascular plants, are the taxonomic groupings that are observed the most frequently (Thomas, 2005) [26]. This is mostly due to the fact that butterflies are quite popular among amateur naturalists that are interested in observation.

According to Mora *et al*. (2011) [15], butterflies they are highly adapted to the landscape and react fast to any change in their habitat that may be caused by human-induced activities such as the intensification of farming and heavy forestry. According to Scott and Lemieux (2005) [21], climate change has an impact on the variety of species and is anticipated to have a negative impact on ecosystems. Vu (2009) [30] stated that forest edges have a wider variety of butterflies and more exposure to the open forest than other areas of the forest. The stream in the forest region plays an important role in the conservation of butterfly diversity, in contrast to bamboo forests, which have a lower diversity of butterfly species (Vu and Vu, 2011) [31]. Insect orders with the greatest number of species include Coleoptera, Diptera, and Hymenoptera. However, according to recent estimations, the order Lepidoptera has a greater number of species than the other orders (Shobana, 2012).

Many species are becoming increasingly rare, and some are on the verge of extinction, as a result of reasons such as expanding urbanisation, which includes roads and buildings, habitat loss, fire, the use of pesticides, and an illegal trade (Indhu *et al*., 2014 [9]; Indhu *et al*., 2017 [10]; Indhu *et al*.,2023) [11] as well as other factors. Butterfly research has been methodically documented ever since the 18th century (Heppner, 1998) [8]. Butterflies are one of the most researched groups of insects. Due to the country's diverse topography, climate, and other environmental factors, India is home to a wide variety of butterfly species. Environmental conditions, in addition to being a significant component of the Indo-Malayan biogeographical region.

India's very varied topography, climate, and vegetation, the country is home to an extraordinary variety of flora and

fauna forms. Of the approximately 1,501 butterfly species that can be found in India, there are 350 in peninsular India and 333 in the Western Ghats alone (Gaonkar, 1996) [3]. These butterflies belong to 5 different families: Papilionideae, Pierrideae, Lycinideae, Nymphalideae, and Hesperideae. They are considered to be great biological indicators due to the fact that butterflies are extremely sensitive to any kind of change that occurs in their habitat (Parmesan *et al*., 1999) [16].

Materials and Method

Study area

The diversity of butterflies in Namakkal may be found in the following four areas: a. Maruvurpatti, b. Sengaligoundanur, c. Munichipthottam, and d. Semparaiputhur. Over the course of a period of six months (from August 2022 to January 2023), numerous species of butterflies were recorded flying around.

Sampling method

The monitoring of transects was carried out either in the early morning, between the hours of 6:00 and 7:00, or in the late evening, between 5:00 and 6:00. Only when the weather was suitable (that is, when there was neither rain nor a high breeze) were the surveys carried out. In addition, there were sporadic reports of butterflies being seen. The Panasonic FZ 300 camera was utilised in order to carry out the photography. The identification of butterflies was accomplished with the use of a field guide (Gunathilagaraj *et al*., 1998 [5] and Gunathilagaraj *et al*., 2015) [6].

Result

During the period of August 2022 to January 2023, the research showed that there were 42 different species of butterflies all across the world, belonging to five different families. The Nymphalidae family has the highest number of species, with thirteen, followed by the Lycaenidae and Pieridae families, each with ten species, and the Papilionidae family, with six species. The Hesperiidae family, which only has three species, has a very small number of butterflies.

The diversity of butterflies in Namakkal may be found in the following four areas: a. Maruvurpatti, b. Sengaligoundanur, c. Munichipthottam, and d. Semparaiputhur. Over the course of a period of six months (from August 2022 to January 2023), numerous species of butterflies were recorded flying around. As shown in Table 2, a. Maruvurpatti has the highest species richness, with a total of 12 species, followed by d. Semparaiputhur, which has 11 species, c. Munichipthottam, which has 10 species, and b. Sengaligoundanur, which has a smaller number of butterflies, with just 9 species.

The extensive variety of butterflies, particularly those belonging to the families Nymphalidae, Lycaenidae, and Pieridae, is indicative of the wide range of floral species that are there. There is a diverse range of flora in Namakkal, with herbs and bushes predominating the vegetation due to the different climate conditions that exist there. The diversity of butterflies shifts with the seasons. Only a few months of the year see an abundance of them, whereas the remaining months of the year see them infrequently or not at all. According to the findings of the current study, the highest number of butterflies were observed during the post-monsoon season, which lasted from late August to October. This conclusion is comparable to the findings of other studies (Tiple *et al*., 2007, Tiple, 2012 [29], Tiple and Khurad, 2009). The monsoon season was characterised by a lower species abundance.

Discussion

There are 1,800 species and subspecies of butterflies in India, according to Kunte *et al*. (2017) [14]. Peninsular India is home to 350 species of butterflies, whereas the Western Ghats are home to 331 species of butterflies (Kunte 2001). [12] There was a strong seasonal pattern observed in butterflies across all habitats. While the month of January had the least amount of diversity, with only a few species being observed, the month of November had the most amount of diversity. It was observed that the month of November had a wider variety of species than any other month. There is a possibility that this is the result of the influence of temperature, rainfall, and humidity.

According to Arun and Azee (2003) [1], the butterflies that belong to the families Hesperiidae and Lycaenidae are notoriously difficult to correctly identify due to their diminutive size, enigmatic colours, and rapid motion. Because of this, only a small number of members of this family were observed in the area under investigation. In the Dakshina Kannada District of Karnataka, Deepak *et al*. (2016) [2] recorded a total of 172 species, which were classified into 117 genera and 18 subfamilies, and were classified into six families. Following the Nymphalidae family, which had 57 species (33.13%), the Hesperiidae family had 37 species (21.51%), the Lycaenidae family had 45 species (26.16%), the Papilionidae family had 17 species (9.88%), the Pieridae family had 15 species (8.72%), and the Riodinidae family had one species (0.58%).

In the Lakkavalli range of the Bhadra Wildlife Sanctuary in Karnataka, Gowda *et al*. (2011) [7] have reported a total of 54 species. Among them are the Grey Count, the Common Baron, the Crimson Rose, and the Danaid Eggfly. At the Alagar Hills in Madurai, Tamil Nadu, Sharmila and Thatheyus (2013) [22] recorded a total of 101 species. According to Sharmila and Thatheyus (2013) [22] and Gowda *et al*. (2011) [7], the Common Jeszebel, Danaid Eggfly, Baronet, and Great Eggfly are all endemic species: they can only be found in Peninsular India and Sri Lanka. It was discovered in the study region that the Tamil Yeoman butterfly, which has been designated as the state butterfly of Tamil Nadu (Shrikumar, 2019) [23], was. Specifically, this species can only be found in Southern India and Sri Lanka (Gaonkar, 1996) [3].

Palani Hills were 174 different kinds of butterflies, according to Gunathilagaraj *et al*. (2015) [6], whereas Thengumarahada in the Nilgiris was home to 85 different species of butterflies (Rufus and Sabarinathan, 2007) [18]. 53 different species were found in the Kanchipuram District of Tamilnadu, according to a study that was conducted in 2009 by Pavithra and Ananthi Rachel. Sethy *et al*. (2014) [20], who also observed that Nymphalidae represent the dominant family in the research area with 42.5%, as well as Papilionidae with 21.2%, Lycaenidae with 15.1%, Pieridae with 14.1%, and Hesperidae with 7.1%, are in great agreement with the findings of this study.

Conclusion

The environmental elements that are favorable for butterflies, such as temperature, humidity, soil pH, and so

on, the study locations are ideal for the existence of butterfly fauna. The plants that are used for pollination are beneficial to butterflies. Butterflies are the most stunning, colorful, and significant group of insects that may be found anywhere in the globe. In addition to their role as pollinators, these serve an important role as predators, pests, and weed killers. We, the farmers, are in need of the assistance of butterflies in order to pollinate agricultural crops. Therefore, there is a good diversity of butterfly faunas in the Namakkal district. For the research of further research, we choose species richness, species evenness, and single species diversity, among other things.

Table 1: List of butterfly fauna in Namakkal district during August, 2022 to January, 2023

S. No	Family	Scientific name	Common name
1	**Hesperiidae**	*Borbo cinnara*	Rice swift
2		*Hasora chromus*	Common banded owl
3		*Suastus gremius*	Oriental palm bob
		Total	03
4	**Lycaenidae**	*Arhopala centaurus*	Central oak blue
5		*Castalius rosimon*	Common pierrot
6		*Zizina otis*	Lesser grass blue
7		*Pseudozizeeria maha*	Pale grass blue
8		*Euchrysops cnejus*	Gram blue
9		*Prosotas dubiosa*	Tailless line blue
10		*Chilades lajus*	Lime blue
11		*Catochrysops Strabo*	Forget me not
12		*Leptotes plinius*	Zebra blue
13		*Zizula hylax*	Tiny grass blue
		Total	10
14	**Nymphalidae**	*Euthalia aconthea*	Common baron
15		*Ariadne ariadne*	Angled caster
16		*Ypthima ceylonica*	White four ring
17		*Tirumala septentrionis*	Dark blue tiger
18		*Euploea core*	Common crow
19		*Phalanta phalantha*	Common leopard
20		*Danaus genutia*	Striped tiger
21		*Danaus chrysippus*	Plain tiger
22		*Junonia iphita*	Chocolate pansy
23		*Junonia hierta*	Yellow pansy
24		*Junonia lemonias*	Lemon pansy
25		*Hypolimnas misippus*	Danaid egg fly
26		*Neptis hylas*	Common sailor
		Total	13

	Family	Scientific name	Common name
27	**Papilionidae**	*Papilio crino*	Common banded peacock
28		*Papilio polymnestor*	Blue mormon
29		*Papilo polymnestor cramer*	Common mormon
30		*Pachliopta hector*	Crimson rose
31		*Pachliopta aristolochiae*	Common rose
32		*Graphium Agamemnon*	Tailed jay
		Total	06
33	**Pieridae**	*Ixias Marianne*	White orange tip
34		*Appias albino*	Common albatross
35		*Leptosia nina*	Psyche
36		*Belenois aurota*	Indian pioneer
37		*Eurema brigitta*	Small grass yellow
38		*Catopsilia pyranthe*	Motted emigrant
39		*Catopsilia Pomona*	Common emigrant
40		*Colotis amata*	Small salmon arab
41		*Hebomoia glaucippe*	Great orange tip
42		*Cepora nerissa*	Common gull
Over all Total – 42		Total	10

Table 2: The species of butterfly recorded in the study area

S. No	Place	No. of Species
A	Maruvurpatti	12
B	Sengaligoundanur	9
C	Munichipthottam	10
D	Semparaiputhur	11
	Total	42

Fig 1: Map showing the study area (Namakkal district of Tamil Nadu)

Acknowledgement
Thanks to the administration of Kandasawami Kandar's College in Velur, Namakkal, Tamilnadu, India, the writers would like to express their appreciation for the provision of the necessary facilities.

References

1. Arun PR, Azee PA. On the butterflies of Puyankutty forests, Kerala, India,2003:(12):1276-1279.Zoos Print Journal 18.
2. Deepak N, Shafiul MM. A checklist of butterflies of Dakshina Kannada District, Karnataka, India. Journal of Threatened Taxa, 2016, 9491-9504.
3. Gaonkar H. Butterflies of the Western Ghats, India including Sri Lanka: Biodiversity assessment of a threatened mountain system, Centre for Ecological Sciences. Indian Institute of Science, Bangalore and the Natural History Museum, London, 1996, 18.
4. Ghazanfar M, Malik MF, Hussain Iqbal R, Younas M. Butterflies and their contributionin ecosystem: A review. Journal of Entomology and Zoology Studies,2016:4(2):115-118.
5. Gunathilagaraj K, Perumal TNA, Jayaram K, Kumar MG. Some south Indian butterflies. Nilgiri Wildlife and Environment Association, 1998, 253.
6. Gunathilagaraj K, Perumal TNA, Jayaram K, Kumar MG. South Indian butterflies. Krab media and Marketing, 2015, 1-358.
7. Gowda JHT, Kumara V, Pramod AF, Hosetti B. Butterfly diversity, seasonality and status in Lakkavalli range of Bhadra. Wildlife Sanctuary, Karnataka. World Journal of Science and Technology,2011:1(11):67-72.
8. Heppner JB. Classification of Lepidoptera. Part I Introduction. Holarctic Lepidoptera,1998:5:148.
9. Indhu B, Muthusami S, Thirunavukkarasu N. Studies on microflora and their role on egg shell contamination and infection." International Journal of Pharmaceutical, Chemical and Biological Sciences,2014:4(3):518-521.
10. Indhu B, Muthusami S, Thirunavukkarasu N. Study of Plankton Diversity of Cauvery River from Jedarpalayam to Velur, Namakkal District,2017:5(1):28-30.
11. Indhu B, Sivanantham S, Thangaraj N, Thirunavukkarasu N. Effect of different levels of cow manure on phytoplankton productivity in culture." International Journal of Zoology Studies,2023:8(4):32–35.
12. Kunte K. Butterfly diversity of Pune city along the human impact gradient, 2001, 40-45.
13. Kunte K, Sondhi S, Samgma BM, Lovalekar R, Tokekar K, Agavekar G. Butterflies of the Garo Hills of Meghalaya northeastern India: Their diversity and conservation. Journal of the Threatened Taxa,2012:4(10):2933-2992.
14. Kunte K, Sondhi S and Roy P. Butterflies of India, v. 2.30. Indian Foundation for Butterflies. 2017.
15. Mora C, Tittensor DP, Adl S, Simpson AG, Worm B. How many species are there on Earth and in the ocean? Plos Biology, 2011, 9(8). Article ID e1001127.
16. Parmesan C, Ryrholm N, Stefanescu C, Hill JK, Thomas CD, Descimon H, *et al*. Polewards shifts in geographical ranges of butterfly species associated with regional warming. Nature,1999:399:579-583.
17. Pavithra S, Ananthi Rachel L. Climate Change and Its Impacts on Butterfly in and around Kanchipuram District, Tamil Nadu. Internationl Journal of Recent Science and Research,2017:8(9):20311-20314.
18. Rufus KC, Sabarinathan SP. A Checklist of Butterflies of Thengumarahada in the Nilgiris, Southern India. Zoo's Print Journal,2007:22(9):2837-2838.
19. Sasikala P, Indhu B, Pugazhendy K, Sattanathan G. "Freshwater plankton culture using different organic and inorganic fertilizer." Indo American Journal of Pharmaceutical Sciences,2018:05(07):6275-6282.
20. Sethy J, Satyaranjan B, Netrapal SC. Species diversity of butterflies in south eastern part of Namdapha tiger

reserve, Arunachal Pradesh, India. Asian Journal of Conservation Biology,2014:3(1):75-82.
21. Scott D, Lemieux C. Climate change and protection area policy and planning in Canada. The Forestry Chronicle,2005:81:696-763.
22. Sharmila JE, Thatheyus JA. Diversity of butterflies in Alagarhills, Tamil Nadu, South India,2013(4):473-Current Biotica 6 479.
23. Shrikumar A. On how Tamil Yaemon will become the Statebutterfly tamilnadu. Thehindu ews paper. https://www.thehindu.com/life and style/travel/there are several reasons why tamil nadu picked the tamil yeomanas its state butterfly/, 2019. article 28712915.ece.
24. Sivanantham S, Thangaraj N, Indhu B, C Jayalakshmi C. Efficacy of Glycyrrhiza glabra as an antibacterial agent against isolates that produce biofilm and beta-lactamases." International Journal of Multidisciplinary Education and Research,2023:8(4):81–86.
25. Thangaraj N, Sivanantham S. Phytochemical Screening, Characterization, compound identification and separation from Daucus carota. INT. JI. Curr. Res. Biosci. Plant. Biol,2015:2(7):168–172.
26. Thomas JA. Monitoring change in the abundance and distribution of insects using butterflies and their indicator groups. "Philosophical Transactions of the Royal Society (B),2005:360:339–357.
27. Tiple AD, Deshmukh VP, Dennis RLH. Factors influencing nectar plant resource visits by butterflies on a university campus: Implications for conservation. 213-Nota Lpidopteralogica,2006:28:224.
28. Tiple AD. Butterflies of Vidarbha region Maharashtra, India; A review with and implication for conservation. Journal of Threatened Taxa,2011:3(1):1469-1477.
29. Tiple AD. Butterfly species diversity, relative abundance and status in Tropical Forest Research Institute, Jabalpur, Madhya Pradesh, Central India. 2713 - Journal of Threatened Taxa,2012:7:2717.
30. Vu LV. Diversity and similarity of butterfly's communities in five different habitat types at Tom Dao National park Vietnam. Journal of Zoology,2009:2(7):15-22.24.
31. Vu LV, Vu CQ. Diversity pattern of butterfly communities (Lepidoptera, Papilionoidae) in different habitat types in a tropical rainforest of southern Vietnam. Journal of Zoology, 2011, Article ID818545: 8pp.