

ORIGINAL ARTICLE



A checklist of butterfly and odonata in Thiruvathavur lake, Madurai district, Tamil Nadu, India

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ABSTRACT

Butterflies are fabulous, delicately coloured insects with wings. Because of their beauty and delicacy, they have always captivated the average person. By imitating the surroundings, the beautiful colour pattern of butterfly wings aids in their defence against predators. They also serve as pollinators for a variety of native plants, and in tropical areas where butterflies are abundant and highly diverse, they aid in the development, maintenance, and growth of flora. In this regard, A total 48 butterfly (5 family, 41 genus) and 19 Dragonfly species (6 Family, 13 genera) observed during the study period (Jan-2023 to December 2023). Butterfly status of Common (24) species, Occasional (11) species, very common (4) species, Rare (8) species, very rare in only one species recorded in study area.

KEY WORDS

Dragonfly; Abundance; Butterfly; Checklist

ARTICLE HISTORY

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Introduction

Biological diversity is becoming more widely acknowledged as an essential metric for evaluating local and global environmental changes as well as the sustainability of development initiatives. Despite the rich and varied butterfly fauna found in the tropical region, there is a dearth of knowledge about the species found in various habitats, especially in the Indian region [1]. In Tamil Nadu, the systematic study of invertebrates particularly on butterflies has not been carried out in most of the protected areas. The process of calculating the value of biodiversity components, such as the number of species present, a species' population, a habitat, or the total of all such components within a specific area or site, is known as biodiversity evaluation [2]. Biodiversity is the contraction of biological diversity. The contraction of biological diversity is called biodiversity. In addition to the scientific community, the general public, environmental organizations, conservationists, industrialists, and economists all frequently use the term "biodiversity."

Lepidoptera, which includes moths and butterflies, provide excellent subjects for population and community ecology research. Many species only favour a specific set of habitats and are strictly seasonal. Despite this, community ecologists have largely ignored butterflies, and there are very few studies on their population dynamics, community structures, and the ecoclimatic factors that influence them. They can be useful in developing conservation strategies since they are reliable indicators of seasonal and ecological changes as well as climatic conditions. However, both policymakers and conservation biologists have largely disregarded them. Therefore, the inclusion of butterflies in biodiversity studies and biodiversity conservation prioritization programs is encouraging [3].

The ancient insect order known as odonates, which includes dragonflies and damselflies, originated approximately 250 million years ago during the Carboniferous era. According to Andrew et al., they most likely represent the first instance of

evolution experimenting with the capacity to hover over an object of interest [4]. In their pre-adult stages, they are mostly aquatic, have stunning colours, and are closely associated with freshwater ecosystems like rivers, streams, lakes, marshes, and rice fields. Although most species are extremely habitat-specific, some have adapted to use artificial water bodies [5]. In this paper an attempt is made to study diversity of status and occurrence of Butterflies and Dragonflies in Thiruvathavur lake, Madurai district, Tamil Nadu state, India.

Materials Method

Study area

Thiruvathavur Lake (9.9569°N 78.3145°E) situated in Madurai District of Tamil Nadu State, India. In this place, the birth place of Manikavasakar, who sang Thiruvasakam. One of famous Sivan temple- Arulmigu Thirumarainatha Swamy Temple. In addition to irrigating nearby agricultural lands, this wetland supplies water for fishing and aquaculture.

Butterfly identification

Observations of butterflies were made from 7.00 to 10.00 h and 4.00 to 6.00 h [1,6] and photographed using a Nikon Power shot camera with appropriate megapixel lenses. Pollard walking method was followed for observing butterflies [7]. Photographic documentation was done and the data was maintained. Since photographs alone are insufficient for species-level identification, survey techniques were employed, in which individuals were gathered using a simple bag of mosquito hand net.

Dragonflies' identification

The study was carried out from January to December of 2023. Insect activity peaked between 7:00 am and 10:00 am and between 4:00 pm and 6:00 pm. The majority of the odonates that were seen in the field were photographed and directly identified. In order to preserve biodiversity, odonates

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were immediately observed, captured, identified, and released. Wing venation, colour pattern, and genitalia as reported in field guides and standard taxonomic literature were used for identification. In order to personally confirm the identification, experts were also consulted. Common names follow Kiran et al., and taxonomy and nomenclature are used in accordance with Subramanian [8,9].

Results and Discussions

Butterflies are undoubtedly the most well-known and prominent group of insects. The presence and variety of butterflies are thought to be reliable markers of the health of any particular terrestrial biotope, and they play a crucial role in ecosystems [10,11]. Studies on population and community ecology can benefit from studying butterflies and moths (order

Lepidoptera) [2].

The Butterfly result shows that total 48 species were recorded in during the study period (Table 1). Five family is are Hesperidae, Lycaenidae, Nymphalidae, Papilionidae, Pieridae (Figure 4) and 41 genus recorded (Figure 5). Butterfly abundance status was carried out for the Common (24) species, Occasional (11) species, very common (4) species, Rare (8) species, very rare in only one species (Figure 1). Rare butterfly Namely are Golden angle (*Caprona ransonnetti*), Common guava blue (*Deudorix Isocrates*), Dark cerulean (*Jamides bochus*), Black rajah (*Charaxes solon*), Blue pansy (*Junonia orithiya*), Common baron (*Euthalia aconthea*), Common bushbrown (*Mycalis mineus*), Common banded peacock (*Papilio crino*) and Chestnut bob (*Iambrix salsala*) Very rare species observed in study area.

Table 1. Showing the butterfly diversity in Thiruvathavur lake at Madurai, Tamil Nadu.

S. No	Common Name	Scientific name	Family	Genus	Status
1	Brown awl	<i>Badamia exclamationis</i>	Hesperidae	<i>Badamia</i>	Common
2	Bush hopper	<i>Ampittia dioscorides</i>	Hesperidae	<i>Ampittia</i>	Common
3	Chestnut bob	<i>Iambrix salsala</i>	Hesperidae	<i>Iambrix</i>	Very rare
4	Common banded awl	<i>Hasora chromus</i>	Hesperidae	<i>Hasora</i>	Common
5	Common snow flat	<i>Tagiades japetus</i>	Hesperidae	<i>Tagiades</i>	Common
6	Common dartlet	<i>Oriens goloides</i>	Hesperidae	<i>Oriens</i>	Common
7	Golden angle	<i>Caprona ransonnetti</i>	Hesperidae	<i>Abaratha</i>	Rare
8	Grass demon	<i>Udaspes folus</i>	Hesperidae	<i>Ancistroides</i>	Occational
9	Angled pierrot	<i>Caleta caleta</i>	Lycaenidae	<i>Caleta</i>	Common
10	Apefly	<i>Spalgis epius</i>	Lycaenidae	<i>Spalgis</i>	Common
11	Banded blue pierrot	<i>Discolampa ethion</i>	Lycaenidae	<i>Discolampa</i>	Common
12	Common acacia	<i>Surendra quercetorum</i>	Lycaenidae	<i>Surendra</i>	Occational
13	Common cerulean	<i>Jamides celeno</i>	Lycaenidae	<i>Jamides</i>	Common
14	Common line blue	<i>Prosotas nora</i>	Lycaenidae	<i>Prosotas</i>	Occational
15	Common guava blue	<i>Deudorix Isocrates</i>	Lycaenidae	<i>Deudorix</i>	Rare
16	Common pierrot	<i>Castalius rosimon</i>	Lycaenidae	<i>Castalius</i>	Common
17	Common silver line	<i>Spindasis vulcanus</i>	Lycaenidae	<i>Cigaritis</i>	Occational
18	Dark cerulean	<i>Jamides bochus</i>	Lycaenidae	<i>Jamides</i>	Rare
19	Dark grass blue	<i>Zizeeria karsandra</i>	Lycaenidae	<i>Zizeeria</i>	Common
20	Forget me not	<i>Catochrysops Strabo</i>	Lycaenidae	<i>Catochrysops</i>	Common
21	Bamboo tree brown	<i>Lethe europa</i>	Nymphalidae	<i>Lethe</i>	Common
22	Black rajah	<i>Charaxes solon</i>	Nymphalidae	<i>Charaxes</i>	Rare
23	Blue pansy	<i>Junonia orithiya</i>	Nymphalidae	<i>Junonia</i>	Rare
24	Blue tiger	<i>Tirumala limniace</i>	Nymphalidae	<i>Tirumala</i>	Common
25	Chocolate pansy	<i>Junonia iphita</i>	Nymphalidae	<i>Junonia</i>	Common
26	Chestnut-streaked sailor	<i>Neptis jumbah</i>	Nymphalidae	<i>Neptis</i>	Occational
27	Club beak	<i>Libythea myrrha</i>	Nymphalidae	<i>Libythea</i>	Very common
28	Commander	<i>Moduza procris</i>	Nymphalidae	<i>Moduza</i>	Occational
29	Common baron	<i>Euthalia aconthea</i>	Nymphalidae	<i>Euthalia</i>	Rare
30	Common bushbrown	<i>Mycalis mineus</i>	Nymphalidae	<i>Mycalis</i>	Rare
31	Common castor	<i>Ariadne merione</i>	Nymphalidae	<i>Ariadne</i>	Common
32	Common crow	<i>Euploea core</i>	Nymphalidae	<i>Euploea</i>	Common
33	Common banded peacock	<i>Papilio crino</i>	Papilionidae	<i>Papilio</i>	Rare

34	Common blue bottle	<i>Graphium sarpedon</i>	Papilionidae	<i>Graphium</i>	Occational
35	Common jay	<i>Graphium doson</i>	Papilionidae	<i>Graphium</i>	Common
36	Common rose	<i>Pachliopta aristolochiae</i>	Papilionidae	<i>Pachliopta</i>	Common
37	Common mormon	<i>Papilio polytes</i>	Papilionidae	<i>Papilio</i>	Occational
38	Crimson rose	<i>Atrophaneura hector</i>	Papilionidae	<i>Pachliopta</i>	Occational
39	Lime butterfly	<i>Papilio demoleus</i>	Papilionidae	<i>Papilio</i>	Common
40	Common albatross	<i>Appias albina</i>	Pieridae	<i>Appias</i>	Common
41	Common emigrant	<i>Catopsilia Pomona</i>	Pieridae	<i>Catopsilia</i>	Very common
42	Common grass yellow	<i>Eurema hecabe</i>	Pieridae	<i>Eurema</i>	Very common
43	Common gull	<i>Cepora nerissa</i>	Pieridae	<i>Cepora</i>	Common
44	Common jezebel	<i>Delias eucharis</i>	Pieridae	<i>Delias</i>	Common
45	Common wanderer	<i>Pareronia valeria</i>	Pieridae	<i>Pareronia</i>	Common
46	Crimson tip	<i>Colotis danae</i>	Pieridae	<i>Colotis</i>	Occational
47	Dark wanderer	<i>Pareronia ceylanica</i>	Pieridae	<i>Pareronia</i>	Occational
48	Great orange tip	<i>Hebomoia glaucippe</i>	Pieridae	<i>Hebomoia</i>	Very common

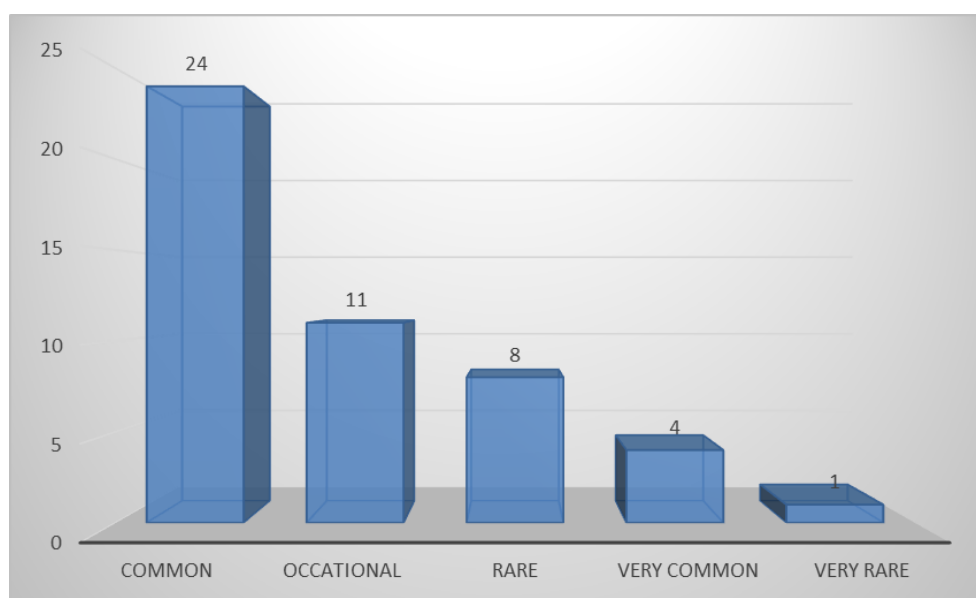


Figure 1. Abundance status of Butterfly in Thiruvathavur lake, Madurai, Tamil Nadu.

19 Dragonfly species, 6 Family, 13 genera observed during the survey period (Table 2). The Highest number of genus were identified in *Lestes* (3), followed by *Aethriamanta* (2), *Anax* (2), *Diplacodes* (2), *Ischnura* (2), *Brachythemis*, *Ceriagrion*, *Copera*, *Ictinogomphus*, *Pantala*, *Paragomphus*, *Paragomphus*, *Tramea*

were represented in only one genus (Figure 2). The most dominant family was *Libellulidae* (8) species, followed by *Coenagrionidae* (3) species, *Lestidae* (3) species, *Gomphidae* (2), *Aeshnidae* (2) and only one species of *Platynemididae* family (Figure 3).

Table 2. Showing the number of dragonfly species along with their families observed in Thiruvathavur lake.

S. No	Common Name	Scientific name	Genus	Family
1	The gossamer damselfly	<i>Ischnura rubilio female</i>	<i>Ischnura</i>	<i>Coenagrionidae</i>
2	Coromandel marsh dart	<i>Ceriagrion coromandelianum male</i>	<i>Ceriagrion</i>	<i>Coenagrionidae</i>
3	Senegal golden dartlet	<i>Ischnura senegalensis male</i>	<i>Ischnura</i>	<i>Coenagrionidae</i>
4	Red-mantled saddlebags	<i>Tramea onusta</i>	<i>Tramea</i>	<i>Libellulidae</i>
5	Magnificent emperor male	<i>Anax immaculifrons male</i>	<i>Anax</i>	<i>Aeshnidae</i>
6	Magnificent emperor Female	<i>Anax immaculifrons female</i>	<i>Anax</i>	<i>Aeshnidae</i>

7	Yellow bush dart,	<i>Copera marginipes</i>	Copera	Platycnemididae
8	Black Ground Skimmer	<i>Diplacodes lefebvrii</i>	Diplacodes	Libellulidae
9	Common Picture Wing-Female	<i>Rhyothemis variegata</i>	Rhyothemis	Libellulidae
10	Wandering glider	<i>Pantala flavescens</i>	Pantala	Libellulidae
11	Ditch jewel	<i>Brachythemis contaminata</i>	Brachythemis	Libellulidae
12	Black-headed basker	<i>Aethriamanta brevipennis subsignata</i>	Aethriamanta	Libellulidae
13	Scarlet marsh hawk	<i>Aethriamanta brevipennis</i>	Aethriamanta	Lycaenidae
14	Ground skimmer Female	<i>DIPLACODES TRIVIALIS female</i>	Diplacodes	Libellulidae
15	Common clubtail	<i>Ictinogomphus rapax</i>	Ictinogomphus	Gomphidae
16	Lined hooktail	<i>Paragomphus lineatus</i>	Paragomphus	Gomphidae
17	Emerald spread wing	<i>Lestes elatus</i>	Lestes	Lestdae
18	Dusky spread wing	<i>Lestes concinnus</i>	Lestes	Lestdae
19	Emerald-striped spread wing	<i>Lestes viridulus</i>	Lestes	Lestdae

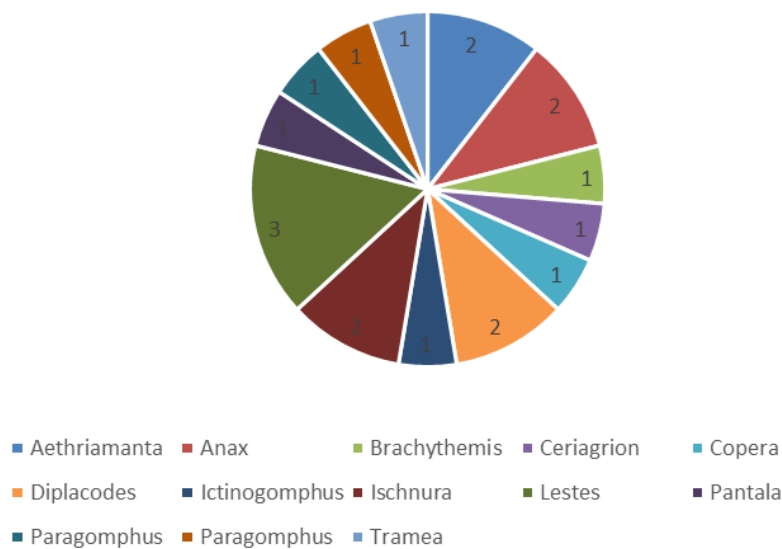


Figure 2. Dragonflies Genus wise observed in Thiruvathavur lake, Madurai district.

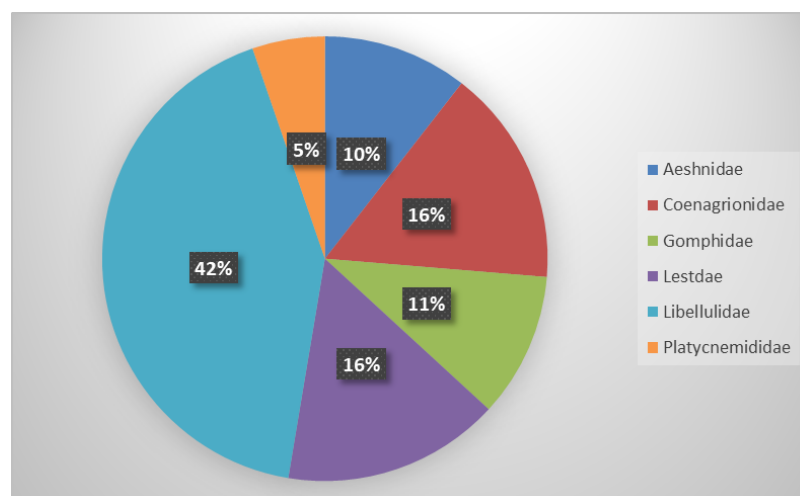


Figure 3. Family wise distribution of Dragonflies in Thiruvathavur lake, Melur taluk.

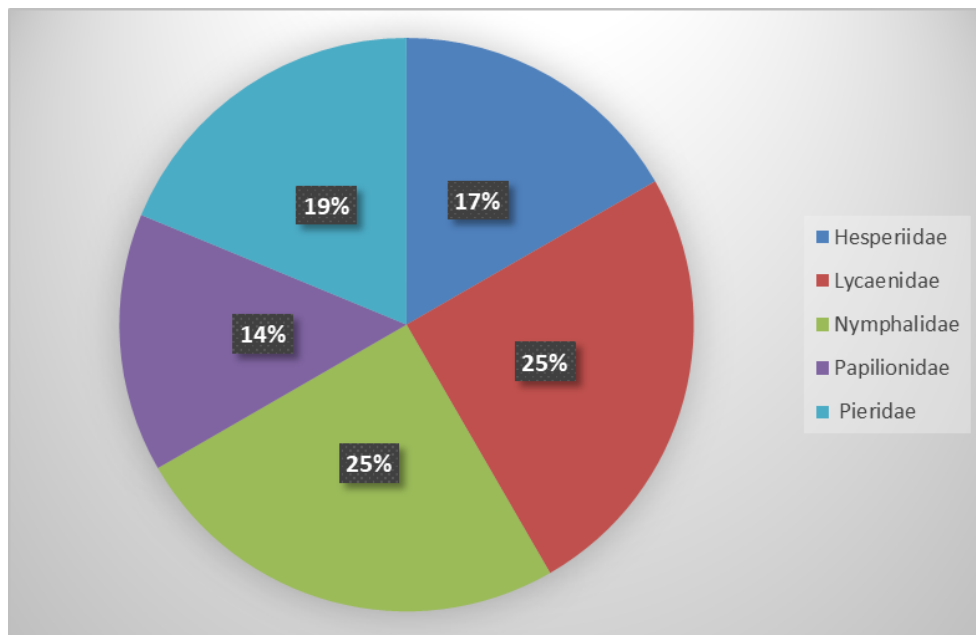


Figure 4. Family wise distribution of Butterflies in Thiruvathavur lake.

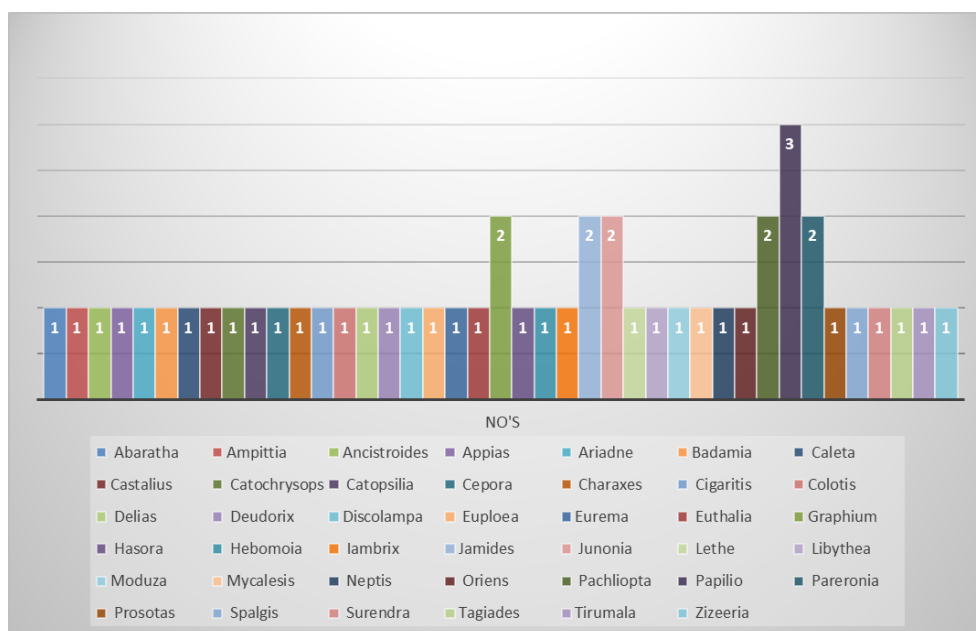


Figure 5. Butterfly Genus wise observed in Thiruvathavur lake.

According to Clark et al., the richest, rarest, and most specialized species of butterflies were most negatively impacted by increased human activity [12]. The recent studies are reported 34 Butterfly and 13 dragonfly species from kadaichanenthal lake, Madurai district, Tamil Nadu [13]. 32 Butterfly species from Narasingam Pond Madurai, Tamil Nadu recorded by Selvamurugan [14]. 45 Butterflies identified in foot hills of Western ghats, Coimbatore, Tamil Nadu [15]. At the eight study sites (Seminary Hills, Satpuda Botanical Garden, Agricultural Land and Bull Rearing Center, R.T.M. Nagpur University and L.I.T. Campus, Ambazari Garden and Bare Land at Lake Side, Sides of National Highway, Maharaj Bag and Futala Farm Area), a total of 145 species of butterflies

were identified in and around Nagpur City [15]. The growth rate of Lepidopteran individuals depends on the host plants with constitute the nutritional composition of the insects [16].

Andrew et al., stated that diversity of Odonata is far above the ground level in forest streams and rivers than in impounded wetlands such as ponds, lakes, and reservoirs [17]. Odonata species are good bio-indicators effectively indicated the condition of the environment [18]. Previous researchers recorded, 114 species of butterflies and 44 species of odonata recorded from Arittapatti Biodiversity Heritage Site, Madurai district, Tamil Nadu, India [19]. 61 species reported from

Perumal malai Madurai, Tamil Nadu [20]. Subramanian reported the order Odonata was reasonably large with worldwide distribution of approximately 5,952 species, of which 474 species out of 142 genera [21]. 20 Dragonfly species recorded from Uthankudi pond in Madurai, Tamil Nadu [22].

Conclusion

According to reports, butterflies, dragonflies, and damselflies are perfect model insects for studying the effects of climate change and environmental warming because of their tropical evolutionary history and adaptations to temperate climates. Thus, research on these creatures' diversity patterns can provide insight into the shifting climate and how it affects the surrounding vegetation. This study is the first of its kind in the region. As a result, it is advised that the study area be continuously observed to see any changes in the discovery of dragonflies and butterflies, as the only way to see changes in the diversity is to compare the data from each year.

Disclosure Statement

No potential conflict of interest was reported by the author.

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