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Research Article

Species Composition and Local Assessment of Butterflies in Mt. Sipaka, Talisayan, Misamis Oriental, Philippines

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ABSTRACT

Butterflies are bio-indicators of a healthy environment. There are studies in the species composition and status of butterflies however, there is still in need to determine it species richness especially in some areas in the Philippines. The study aims to determine the species composition and local status of butterflies in Mt. Sipaka, Talisayan, Misamis Oriental. The butterflies were collected using a catching net and traps. The sampling techniques include belt transect, quadrat sampling, and opportunistic sampling from November to December. The present study revealed 36 species of butterflies collected from Mt. Sipaka, Talisayan Misamis Oriental which belongs to five (5) families and 29 genera. The local status of butterflies in Mt. Sipaka revealed 13 common species, 12 very common, three rare species, and eight very rare species of butterflies. Therefore, Mt. Sipaka is a home of the 36 species of butterflies and with mostly common butterflies' species. The present study implies that species richness and status of butterflies is potential for ecotourism project such as butterfly garden.

Keywords: butterflies, Mt. Sipaka, species composition, status

1. INTRODUCTION

The Philippines is recognized as one of the most biodiverse areas in the world, notable for its affluent population of rich entomofauna, including butterflies (Mohagan et al., 2011) It is home to 915 species and 910 subspecies of butterflies (Danielsen and Treadaway, 2004), of which 352 species are considered endemic to the Philippines (Treadaway and Schroder, 2012).

Butterflies belong to the order Lepidoptera, which is one of the four most diverse insect orders and the most intensively studied group of invertebrates (Dinca et al., 2015).They are characterized by distinctively structured wings, with vivid colors and patterns due to microscopic scales covering their wing surfaces. These scales contain pigment or possess structural properties that reflect specific light wavelengths, resulting in iridescent effects (Marcus, 2021). Butterflies are also economically and ecologically important. They are herbivores and most charismatic insect group, serving as excellent indicators (Padhye et al., 2012) and preyed upon by other animals. They can increase income-generating activity through ecotourism and butterfly gardens, and play a significant role in terrestrial ecosystems, particularly as pollinators (Guadalquiver et al., 2019). Despite the diversity, high endemicity and importance of butterflies, there are certain regions in the Philippines that have received limited research attention.

Mount Sipaka, situated in Talisayan, Misamis Oriental, is a famous trekking site, especially during the Lenten season. It offers a haven for biodiversity enthusiasts and provides a habitat for various species of flora and fauna, including a wide array of butterflies. Human disturbance and other anthropogenic activities may affect the butterfly species, particularly the endemic ones because it may result to habitat loss and food plant availability (Stefanescu et al., 2004). Mt. Sipaka remains relatively understudied, with limited scientific investigations conducted within its bounds. This highlights the need for increased research efforts and conservation initiatives to better understand and protect the unique biodiversity of this pristine mountain ecosystem. Thus, this study aims to determine the butterfly species and assess the status of butterflies found in Mt. Sipaka Misamis Oriental. Furthermore, the study can provide preliminary data and checklist of the butterfly species occurring in Mt. Sipaka Misamis Oriental, which can be used for future assessment and conservation researches.

2. METHODOLOGY

2.1 Study Site

Necessary permits such as PIC and Gratuitous permit (R10 2014-30) was secured prior to the conduct of the study. The study was conducted at Mt. Sipaka, Talisayan, Misamis Oriental. There were three study stations established in the study site. Station 1 was agroecosystem, station 2 was dipterocarp, and station 3 was the grassland. Each study station was described using Habitat Description Form of Heaney (2006). A total of fifteen (15) days of sampling was done in the study site. Five (5) days of sampling was allotted for each study station from November to December 2014.

Mt. Sipaka is surrounded by seawater with the coordinates of 9º0'42 North and 124º 52'29'' East Talisayan, Misamis Oriental. The lower portion of the mountain is a plantation and residential area of the community. The middle portion (dipterocarp) is considered forested area. The top of the mountain is a grassland wherein it is the resting site of the climbers/trekkers.

2.2 Sampling Techniques and Collection of Butterflies

The sampling technique includes quadrat sampling, belt transect and opportunistic sampling. Three sampling stations were established in the study. A catching net was used to collect the specimen. To increase species richness and abundance of butterflies, traps were established in each study station. Fermented fruit such as banana or pineapple was served as bait to attract butterfly species. There were two traps established in each study station. These traps were placed outside the quadrat and belt transect.

Specimen collected was labeled with their location, date of collection and the name of collector (Toledo and Mohagan, 2011). Butterflies collected were pinned into a Styrofoam box. A powdered mothball was placed in the mounted butterflies to preserved them. All collected and preserved specimens were deposited in the University Museum, Central Mindanao University.

2.3Assessment of Butterflies

Butterflies were assessed in their local and ecological status. Local assessment of butterflies was done based on the number of butterfly individual occurrences in the study site (adapted from Toledo and Mohagan, 2011) wherein:

1-3 occurrences-very rare;
4-10 occurrences – rare;
11-20 occurrences – common;
21- above occurrences – very common.

3. RESULTS AND DISCUSSION

Species composition

A total of 36 butterfly species were collected from Mt. Sipaka Talisayan, Misamis Oriental, belonging to five (5) families (Table 1 and Fig. 1). The agroecosystem and grassland has the highest number of collected species (27 species) compared to the dipterocarp forest, which only has 20 species. The highest number of individuals was observed

in grassland with 270 individuals, followed by agroecosystem 210 individuals, and dipterocarp 175 individuals. This result is inconsistent to different studies near Mt. Sipaka. Mohagan et al., (2022) studied in Marilog District where they collected 61 species and mostly in the forested area such as dipterocarp. In addition, Gaudalquiver et al., (2019) collected 62 species in watershed of Misamis Oriental. This result may be due to the present of food plants in the grassland. In addition, some butterflies preferred sunlight penetration or open canopy such as grassland (Abdul et al., 2022). Compared to other studies in Mindanao, such as the study of Toledo and Mohagan (2011) with 81 species in Camiguin; Mohagan and Treadaway (2010) with 142 species in Mt. Hamiguitan, Davao Oriental; and Mohagan et al. (2011 and 2013), with 108 species in Dinagat Island; 147 species in Mt. Kitanglad and 104 species in Mt. Apo, respectively and recent study of Domine and dela Cruz (2020) our results showed a lower species composition. This may be due to various factors that affects butterfly species composition, such as the availability of food plants and human disturbance.

However, this data is higher as compared to the study of Abdul et al., (2022) which only collected 16 species in the agroecosystem of Koronadal City. This is maybe due to the present of forested area in this present study. This also implies that human disturbance can really affect the species richness and diversity of butterflies

The twenty-seven (27) species recorded in station 1 (Agroecosystem) predominantly belong to the Family Nymphalidae. According to Nacua et al. (2014), the family Nymphalidae are fruit feeders. Station 1 was characterizedby moderate fruit tree abundance and the presence of domesticated trees such as Citrus sp., coconut and jackfruit, which are considered the food of these butterflies. This result is consistent to the study of Gaudalquiver et al., (2019) wherein Nymphalidae showed the most abundant species found.

Reiche (2015) suggests that human disturbances can cause further problems for butterflies and other wildlife. These anthropogenic activities of residential people may affect the species composition of butterflies in the area. As compared to the present study the agroecosystem site showed human disturbance such as farming or conversion of forest to farm. According to Jaramillo et al. (2021), the abundance and species richness of butterflies are highly correlated to relative humidity, vegetation coverage, and pollution levels. Furthermore, land-use patterns and landscape structures impact butterfly diversity and abundance in organic agroecosystems (Guderjan et al., 2023). According to Ramirez and Mohagan (2012) vegetation affects the species composition of butterfly where food plant availability differs from one vegetation to another. As cited by Nacua et al., (2014), plants that are rich sources of nectars may influence the occurrence of butterflies. In addition, there is also a significant relationship between butterfly species richness and habitat quality, in the form of vegetation height and abundance of flowers (Ockinger and Smith, 2000).

Another factor that affects species composition is their seasonality. As cited by Gowda et al. (2011), butterflies are seasonal in their occurrence, and many species are strictly seasonal. There are species that are common for only few months and rare or absent in the other parts of the year, preferring only a particular set of habitats. However, study of Jaramillo et al., (2021) observed that seasonality did not have a significant impact on species richness. Concerning species abundance, notable differences were observed between the dry season and the rainy season in most sites, except for the moderately contaminated site. This suggests that seasonal variations may play a more pronounced role in shaping species abundance dynamics.

Table 1. List of butterfly species sampled in Mt. Sipaka Talisayan Misamis

Oriental FAMILY/SPECIES	AGRO ECOSYTEM	DIPTEROCARP	GRASSLAND	**TOTAL**
HESPERIDAE				
Oriens californica	5	1	7	**13**
Tagaides gana elegans	1			**1**
Taractrocera luzonensis	1			**1**
LYCAENIDAE				
Everes laturnus laturnus	6	11	15	**32**
Catochrysops strabo luzonensis	8	10	15	**33**
Hypolycaena sipylus tharrytas		11	19	**30**
Jamides celeno celeno		6	12	**18**
Rachana platini platini	1		7	**8**
Rapala caerulescens		8	11	**19**
Zezeeria karsandra	8	7	14	**29**
Zizina otis oriens	9	15	30	**54**
NYMPHALIDAE				

Amathucia phidippus policares	2			**2**
Cupha arias dapatana	2			**2**
Charaxes solon shohag	1			**1**
Doleschallia bisaltide pilippinensis	1			**1**
Hypolimnas bolina philippinensis	14		5	**19**
Hypolimnas leliana philippinensis	11		8	**19**
Ideopsis juventa manillana	13	19	13	**45**
Junonia hedonia ida	18	12	11	**41**
Junonia orithya leucasia	17	8	18	**43**
Melanitis leda leda	7	5	4	**16**
Mycalesis mineus philippina	6		8	**14**
Orsotriaena medus medus		4	12	**16**
Tarratia cosmia cosmia			13	**13**
Vagrans sinha sinha	9		3	**12**
Ypthima sempera chaboras	10	8	12	**30**
Ypthima stellera stellera	12		11	**23**
PAPILIONIDAE				
Menelaides deiphobus rumanzovia	1			**1**
Menelaides polytes ledebouria	2	11	4	**17**
Papilio demoleus libanus	9	2		**11**
PIERIDAE				
Appias olfera payudara			1	**1**
Eurema alitha alitha	13	7	2	**22**
Eurema hecabe tamiathis	11	6		**17**
Eurema sarilata sarilata	13		4	**17**
Captopsila pomona pomona	1			**1**
Leptosia nina terentia	10			**10**
TOTAL	**210**	**172**	**270**	**652**

Status of Butterfly

There were seven endemic butterflies species collected in Mt. Sipaka. Six of these species are Philippine endemics. This includes *Oriens californica*, *Tagaides gana elegans, Catochrysops strabo luzonensis, Ypthima stellera stellera, Eurema sarilata sarilata,* and *Ypthima sempera chaboras*. *Eurema alitha alitha* is the only one Mindanao endemic collected in the study. Only 19.44% of the butterfly species present in the area are endemic. These species may be widely distributed because they were also collected in the studies of Toledo and Mohagan (2011) in Camiguin Mohagan and Treadaway (2009) in Mt. Hamiguitan. This implies that butterflies have a certain of habitat preferences which is consistent to the study Gaudalquiver et al., (2019), were endemic species preferred habitat where there is food and water available and less human disturbances.

Local status showed twelve (12) very common species, thirteen (13) common species, three (3) rare species and eight (8) very rare species of butterflies in Mt. Sipaka (Table 2). Agroecosystem and grassland showed morerare species than the dipterocarp vegetation. In addition, there were eight very rare species collected in the Mt. Sipaka, which includes *Tagaides gana elegans, Taractrocera luzonensis, Amasthucia phiddipus policares, Charaxes solon shohgun, Dolechalia bisaltide philippenensis, Melanaitis deiphobus rumanzovia*, *Appias olferna peducera*, and *Catopsila pomona pomona.* Out of these species, the four species collected in traps belong to the Family Nymphalidae and Hesperiidae. Both families are known as fruit feeders (Nacua et al., 2014). This only indicate that the grassland and agroecosystem may have unique habitats on the mountain, which are preferred by rare species of butterflies. As emphasized by Soliveres et al. (2016), the influence of locally rare species of butterflies in the grassland ecosystems highlights their vital role in preserving biodiversity. However, the availability of host plant may still be the reason why butterflies are present (Ramirez and Mohagan, 2012).

Table 2. Local Status and Endemicity of Butterflies in Mt. Sipaka, Talisayan, Misamis Oriental

FAMILY	**LOCAL STATUS**				**ENDEMIC**
	Very common	Common	Rare	Very Rare	
HESPERIDAE		1		2	2
LYCAENIDAE	5	2	1		1
NYMPHALIDAE	6	6	1	2	2
PAPILIONIDAE		2		1	
PIERIDAE	1	2	1	2	2
TOTAL	**12**	**13**	**3**	**7**	**5**

A **B** **C**

Plate 1. Dorsal view of Family Papilionidae collected in Mt. Sipaka, Talisayan Bukidnon. (a) *Menelaides deiphobus rumanzovia* (b) *Menelaides polytes ledebouria (*c) *Papilio demoleus libanus*

A **B** **C**

D **E** **F**

Plate 2. Dorsal view of Family Nymphalidae collected in Mt. Sipaka, Talisayan Bukidnon. (A) *Amathucia phidippus policares* (B) *Charaxes solon shohag* (C) *Hypolimnas bolina philippinensis* (D) *Ideopsis juventa manillana* (E) *Melanitis leda leda* (F) *Tarratia cosmia cosmia*

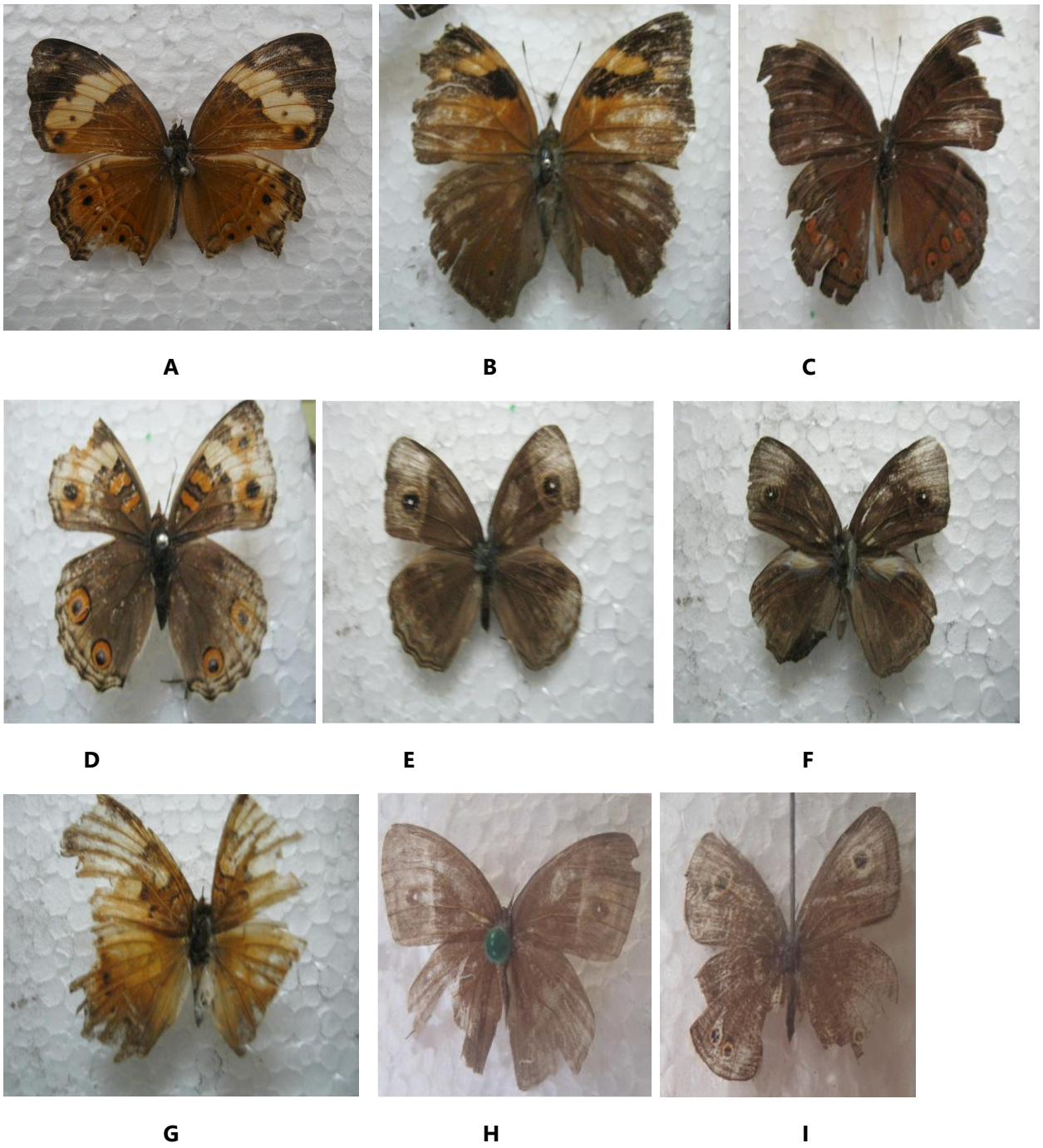

Plate 3. Dorsal view of Family Nymphalidae collected in Mt. Sipaka, Talisayan Bukidnon. (A) *Cupha arias dapatana (B) Doleschallia bisaltide pilippinensis (C) Junonia hedonia ida* (D) *Junonia orithya leucasia* (E) *Mycalesis mineus philippina (F) Orsotriaena medus medus* (G) *Vagrans sinha sinha* (H) *Ypthima sempera chaboras (I) Ypthima stellera stellera*

A B C

Plate 4. Dorsal view of Family Lycaenidae collected in Mt. Sipaka, Talisayan Bukidnon. (A) *Catochrysops strabo luzonensis (B) Rapala caerulescens (C) Rachana platini platini*

A B C

D E F

Plate 5. Dorsal view of Family Pieridae collected in Mt. Sipaka, Talisayan Bukidnon. (A) *Appias olfera payudara* (B) *Eurema alitha alitha (C) Eurema hecabe tamiathis (D) Eurema sarilata sarilata (E) Captopsila pomona pomona (F) Leptosia nina terentia*

A

Plate 5. Dorsal view of Family Hesperidae collected in Mt. Sipaka, Talisayan Bukidnon. (A) *Oriens californica*

4. CONCLUSION

Therefore, Mt. Sipaka has 35 species of butterflies belonging to butterfly species belonging five to families and 29 genera. It has low endemicity which is only 19.44%.

It is recommended that more sampling effort should be observed to reach the minimum data set needed for a more conclusive report. Other vegetation types of the mountain should also be considered. In addition, a new method of sampling technique might be helpful to collect those fast and high-flying butterflies to increase the species richness. Lastly, the conservation of different types of butterflies and other species is highly recommended.

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Conflicts of Interest: The authors declare that there is no conflict of interest.

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