

Butterflies in the Agro-ecosystem of Brgy. San Jose, Koronadal City, South Cotabato, Philippines

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ABSTRACT

Butterflies are sensitive towards changes in the environment. Therefore, they are often used as bioindicators on the status and health of the environment. The study was conducted in Tinago, San Jose, Koronadal City to provide baseline information on the species composition of butterfly fauna specifically in the agro-ecosystem. Using opportunistic rapid sampling, it revealed 16 species of butterflies belonging to 4 families and 14 genera. The dominant family is Pieridae (38%), followed by Nymphalidae (31%), Lycaenidae (25%) and Papilionidae (6%). The data further showed all species are classified as common and one species is endemic in Mindanao, *Eurema alitha alitha*. An endangered butterfly listed in Appendix II of CITES, *Troides rhadamantus rhadamantus*, was also recorded in the area.

Keywords: Endangered, endemic, Pieridae, opportunistic rapid sampling, Mindanao

INTRODUCTION

The intrinsic value of butterflies is immense and is worthy of conservation. Butterflies are part of the rich biodiversity in the tropical ecosystem, and many are iconic and flagship species which contribute significantly to forest conservation. Many flowering plants in the tropics depend on insects to pollinate them either partially or entirely for survival. Butterflies are the third most abundant pollinator behind bees/wasps and flies. Without pollinators, there will be no fruits and this will adversely affect the food supply for humans as well as animals. Butterflies are sensitive towards changes in the environment. They are often used as bioindicators on the status and health of the environment (Chung et al., 2018).

Some butterfly species are disturbance-tolerant and can be found in areas altered by humans and are effectively tolerant to removal of the native vegetation. However, habitat-sensitive species have more specific requirements for habitat and vegetation composition to suit the needs of their other life stages and are often found only in relatively natural areas with native vegetation. In tropical forests, butterfly species richness has been shown to decrease with anthropogenic disturbance. Change in climatic parameters, such as increasing temperature, humidity and rainfall, could affect butterfly distribution (Kioko et al., 2020). Understanding the significance of butterflies in an ecosystem as an environmental health indicator and pollination of flowering plants is crucial to achieve sustainability and conservation of floral diversity.

OBJECTIVES OF THE STUDY

This study aimed to provide information on the species composition and status of butterflies at the agro-ecosystem area in Purok Tinago, Brgy. San Jose, Koronadal City, South Cotabato. Studies on butterfly are very limited in South Cotabato, specifically in Koronadal City. Data presented in this study will show the importance of conserving the butterfly species considered endemic and endangered in the Philippines.

MATERIALS AND METHODS

The study was conducted in Purok Tinago, Brgy. San Jose, Koronadal City. The site is an agro-ecosystem area with an open field for corn, a portion for banana and other fruit trees. Opportunistic rapid sampling was considered along the area. An approved Wildlife Gratuitous Permit RXII-2021 No. 5 was obtained prior to collection. Collection was done in the morning between 8:00 A.M. to 12:00 noon. Butterflies were collected using a catching net. Utmost of 3 individuals of butterflies per species were collected in approximately 500 m walk.

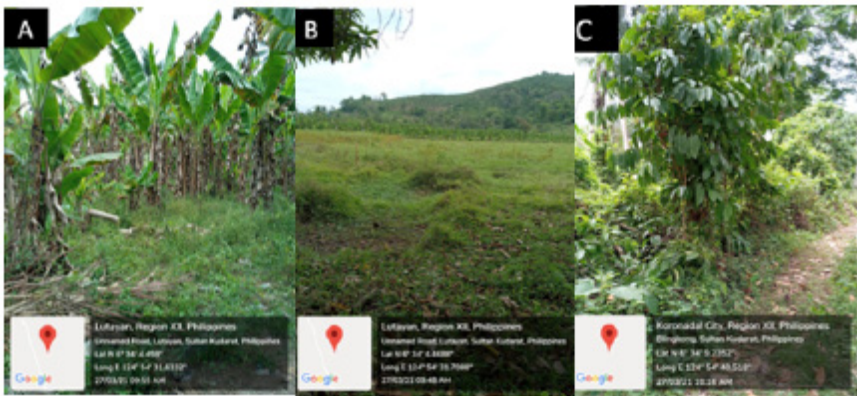


Figure 1. Habitat of Butterflies in Purok Tinago, Brgy. San Jose, Koronadal City, South Cotabato.

The specimens of butterflies per species were slightly pressed at the thorax and were placed in the triangular paper with moth balls to kill and preserve. Classification and initial identification of butterflies were done using books, journals, and photographs of identified specimens and later confirmed by an expert. Status of butterflies was assessed using the checklist of Treadaway (1995).

RESULTS AND DISCUSSION

Results revealed 16 species in 14 genera and 4 families of butterflies found in the agro-ecosystem of Brgy. San Jose, Koronadal City. It was found out that the dominant family is Pieridae (38%), followed by Nymphalidae (31%), Lycaenidae (25%) and Papilionidae (6%) (Figure 2).

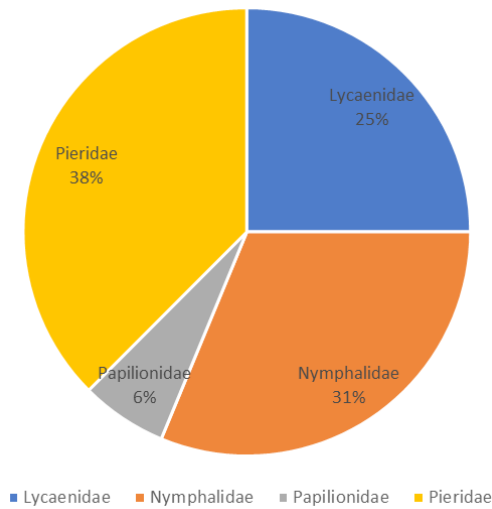


Figure 2. Percentage Species Composition of Butterflies in Purok Tinago, Brgy. San Jose, Koronadal City

Table 1

List of butterflies from Purok Tinago, Barangay San Jose, Koronadal City and their status

| Family / Species | Status (Treadaway, 1995) |
|--|------------------------------|
| Lycaenidae | |
| 1. <i>Zizina otis oriens</i> Butler, 1883 | common |
| 2. <i>Lampides boeticus boeticus</i> Linnaeus, 1767 | common |
| 3. <i>Megisba malaya sikkima</i> Moore, 1884 | common |
| 4. <i>Zizula bylax pygmaea</i> Snellen, 1876 | common |
| Nymphalidae | |
| 5. <i>Euploea eunice</i> Godart, 1819 | common |
| 6. <i>Hypolimnas bolina philippensis</i> Butler, 1874 | common |
| 7. <i>Junonia almana almana</i> Linnaeus, 1758 | common |
| 8. <i>Junonia hedonia ida</i> Cramer, 1775 | common |
| 9. <i>Melanitis ledaleda</i> Linnaeus, 1758 | common |
| Papilionidae | |
| 10. <i>Troides rhadamantus rhadamantus</i> Lucas, 1835 | common (Endangered, CITES) |
| Pieridae | |
| 11. <i>Appias olferna peducea</i> Fruhstorfer, 1910 | common |
| 12. <i>Catopsilia scylla asema</i> Staudinger, 1885 | common |
| 13. <i>Eurema alitha alitha</i> C. & R. Felder, 1862 | common (Endemic in Mindanao) |
| 14. <i>Eurema blanda vallivolans</i> Butler, 1883 | common |
| 15. <i>Leptosia nina terentia</i> Fruhstorfer, 1920 | common |
| 16. <i>Pareronia boebera trinobantes</i> Fruhstorfer, 1911 | common |

According to Nacua, Mohagan, & Alejandro (2015), the following butterflies have aggregate assemblages *Zizina otis oriens* (Butler), *Hypolimnas bolina*, and *Leptosia nina*. These butterflies feed on herbs growing on the cleared areas of the forest. Thus, they require sunlight penetration or an open canopy as these butterflies are sun lovers and are mostly found in the disturbed habitats. Purok Tinago is an agricultural area in the city of Koronadal and exposed to anthropogenic disturbances. Mohagan and Treadaway (2010) said that anthropogenic butterflies are abundant in the agro-ecosystem than in higher elevation with less human activities or disturbances.

In the study of Remini and Moulai (2015), with a total of 22 species in 5 families compared to the result of this study with 16 species in 4 families, there are only few references to the distribution and abundance of butterfly species in agricultural environment mainly because of low diversity of these species in the fields. Certain critical factors for butterflies, such as larval food plants and nectar plants for adults, vary considerably among sites with different vegetative stages. These changes can affect the distribution and abundance of species.

The data further reveals all species are classified as common. Furthermore, one species is classified as endemic in Mindanao, *Eurema alitha alitha* belonged to the family Pieridae. This indicates that endemism is low in the study site. This could be attributed to the condition of the area. Purok Tinago has a lot of seasonal crops where sometime may left unplanted. Mangaoang et al. (2016) mentioned in their paper that disturbed habitats such as hill slopes, agricultural lands and urban habitats showed very less richness with no endemic species perhaps due to changes in the land use pattern and subsequent changes in the original landscape.

As stated in the study of Abro et al. (2018), the family Pieridae includes most familiar butterflies. They have long stable status of the species in this family. The larvae of most Pierid butterflies feed on different cultivars of mustard (Brassicaceae) and leguminous (Fabaceae). *Troides rhadamantus rhadamantus*, an endangered butterfly listed in Appendix II of CITES (Mape and Concepcion, 2020), was also recorded in the area.

Table 2

Original photographs of the butterfly samples collected from Purok Tinago, Brgy. San Jose, Koronadal City, South Cotabato Philippines







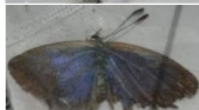




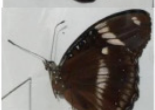
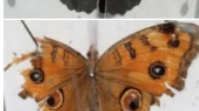















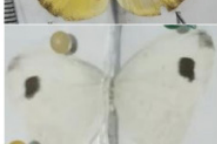


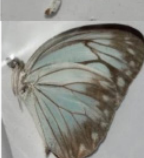
| Butterfly Family/Species | Dorsal | Ventral |
|--|---|---|
| I. Lycaenidae | | |
| 1. <i>Zizina otis oriens</i> Butler, 1883 |  |  |
| 2. <i>Lampides boeticus boeticus</i> Linnaeus, 1767 |  |  |
| 3. <i>Megisba malaya sikkima</i> Moore, 1884 |  |  |
| 4. <i>Zizula hylax pygmaea</i> (Snellen, 1876) |  |  |
| II Nymphalidae | | |
| 5. <i>Euploea eunice</i> |  |  |
| 6. <i>Hypolimnas bolina philippensis</i> Butler, 1874 |  |  |
| 7. <i>Junonia almanac almanac</i> Linnaeus 1758 |  |  |
| 8. <i>Junonia hedonia ida</i> Cramer 1775 |  |  |
| 9. <i>Melanitis ledaleda</i> Linnaeus 1758 |  |  |

Table 2 continued.

| Butterfly Family/Species | Dorsal | Ventral |
|--|--|--|
| III Papilionidae 10. <i>Troides rhadamantus rhadamantus</i> Lucas 1835 |  |  |
| IV Pieridae 11. <i>Appias olferna peducea</i> Fruhstorfer 1910 |  |  |
| 12. <i>Catopsilia scylla asema</i> Staudinger 1885 |  |  |
| 13. <i>Eurema alitha alitha</i> C. & R. Felder 1862 |  |  |
| 14. <i>Eurema blanda vallivolans</i> Butler 1883 |  |  |
| 15. <i>Leptosia nina terentia</i> FRuhstorfer 1920 |  |  |
| 16. <i>Pareronia boebera trinobantes</i> Fruhstorfer 1911 |  |  |

CONCLUSIONS

The lepidopteran fauna of South Cotabato remain to be poorly studied. The present attempt provides the baseline data to give future researchers a list on butterfly diversity in Purok Tinago, Brgy. San Jose, Koronadal City. In conclusion, endemism is low in the study site because of anthropogenic disturbances.

RECOMMENDATIONS

Future attempts for collection may be planned and undertaken to update the status and measure the diversity of butterflies. Extensive study of butterfly in reference to the different agro-ecosystems is recommended.

LITERATURES CITED

- Abro, N., Khatri, I., Rustamani, M., Abro, M., & Kandhro, R. (2018). Biodiversity of Family Pieridae from Tandojam. *Pakistan Journal of Agriculture Agricultural Engineering and Veterinary Sciences*, 2018, 34(2), 136-139.
- Chung, A., Bosuang, S., & Chan, C. (2018). *Importance of Butterflies. Insects in promoting nature tourism in Sabah*. Conference: Insect Diversity Course, Tabin Wildlife Resort, Lahad Datu, Sabah, November 2017.
- Kioko, E., Musyoki, A., Luanga, A., Kioko, M., Mwangi, E., & Mon, L. (2020). Swallowtail butterflies (Lepidoptera: Papilionidae) species diversity and distribution in Africa: The Papilionidae collection at the National Museums of Kenya, Nairobi, Kenya. *Biodiversity Data, Journal* 8. DOI: 10.3897/BDJ.8.e50664
- Mangaoang, C., Gumban, C., Abarquez, V., Mohagan, D., & Mohagan, A. (2016). Species composition and status of butterflies in two selected waterfalls of Caraga, Davao Oriental, Philippines. *Journal of Biodiversity and Environmental Sciences*, Vol. 8, No. 5, p. 45-51, 2016.
- Mape N., & Concepcion, S. (2020). Butterflies and Moths of Kawa-Kawa Hill Natural Park, Ligao City, Southern Luzon, Philippines. *Philippine Journal of Science*. 150 (S1): 309-318, Special Issue on Biodiversity.
- Mohagan, A., & Treadaway, C. (2010). Diversity and Status of Butterflies across Vegetation Types of Mt. Hamiguitan, Davao Oriental, Philippines. *Asian Journal of Biodiversity*. DOI: 10.7828/ajob.v1i1.99

- Nacua, A., Mohagan, A., & Alejandro, G. (2015). Diversity and distribution of butterflies in the open and close canopy forests of Cadaclan, San Fernando La union botanical garden of North Luzon, the Philippines. *Journal of Biodiversity and Environmental Sciences*, Vol. 6, No. 1, p. 169-177.
- Remini, L., & Moulai, R. (2015). Diversity and structure of butterfly populations in agro-ecosystems of Mitidja (Algeria). *Zoology and Ecology*, Vol. 25, No. 4, 355–364.

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