STUDIES ON THE BUTTERFLIES (LEPIDOPTERA), BEETLES (COLEOPTERA) AND PLANTS OF THE MARAI- PARAI TROPICAL MONTANE FOREST OF MOUNT KINABALU, SABAH, MALAYSIA

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ABSTRACT

This collaborative research study focuses on the fauna and fauna of Marai-Parai, research study focuses on the fauna and flora of Marai-Parai, situated on the northwestern side of Mount Kinabalu in the state of Sabah organized by Sabah Parks from the 11th to the 21st of October 2023. This route also serves as an option for climbers, although only a few parties have attempted it. The first recorded traverse of Marai-Parai through Mount Kinabalu was completed in 1987. Our journey commenced from the base camp at Kampung Kiau Nuluh (880m), passing through Nunuk Camp, which is 2.66km away (1215m), and finally reaching Marai-Parai Camp, which is 2.34km further (1652m).

Key words: *Butterflies, Beetles and plants. Montane forest, Marai-Parai, Mt. Kinabalu*

INTRODUCTION

The purpose of this study is to investigate the species richness of insects and plants groups of butterflies, beetles & plants assemblages at different levels of the forest. Only the interesting and potential indicator insects and plants species were sampled, as to minimize the workload in preparing the specimens for identification. Common insects and plants were not sampled but photographs were taken for record purposes. This study was conducted on the diversity of insects and plants was recorded from 6th to the 10th of October by Kipandi Park.

METHODOLOGY

In this survey, a brief period was dedicated to studying two major insect groups: butterflies and beetles. For plant groups, the focus was on six major categories: Orchids, Ginger, Hoya, *Aeschynanthus*, *Gesneriaceae*, and Begonia. Only interesting and potentially indicative insect and plant species were sampled to minimize the workload in specimen preparation, especially for plants. Common insects and plants were not sampled, but photographs were taken for documentation purposes.

Insect Light Trap

A light trap was employed to attract nocturnal insects. The setup consisted of a vertical white sheet (2.5 x 2 meters) illuminated by a 150W LED bulb. The trap was strategically placed in an open area facing a forest reserve and operated from 7:00 PM to 10:00 PM. Collection was conducted using white cloths, targeting a diverse array of night-active and flying insects. The light trapping took place at Nunuk Camp for two nights and Marai-Parai for one night.

Butterfly Sampling

Sweep nets were used to capture flying insects, such as butterflies. Collected butterflies were placed in triangle paper envelopes, while beetles were preserved in vials containing an ethanol solution. Sampling was performed along open areas and riverine and stream habitats.

Plant Sampling

A small trowel was used to excavate plants, which were then placed in transparent plastic bags to create a humid microclimate, aiding in the rooting of cuttings and maintaining the freshness of humidity-loving plants. Wet newspaper was placed inside the bags to enhance humidity.

RESULTS

A total of five beetle families were recorded and sampled from Nunuk Camp (2 nights) and Marai-Parai (1 night). light trap sites. Among these, the leaf beetles (Chrysomelidae) were notably common during night trapping.

Table 1. Compiled list of recorded and sampled beetle.

Location	Species	Remarks
Nunuk Camp & Marai-Parai	*Curculionidae*	Snout beetle
	Carabidae	Ground beetle
	Dynastinae	Scarabaeidae
	Chrysomilidae	Leaf insect
	Tettigarctidae	Cicada

Figure 1. *Chrysomilidae* sp.

Figure 2. *Tettigarctidae* sp.

Butterfly diversity was notably high in the survey area, with over 21 species recorded. Notably, species endemic to Mount Kinabalu, including those found in Crocker Range National Park, were recorded during this survey. This includes the state butterfly of Sabah, *Troides andromache* (Bornean Birdwing), which was sampled during the survey. Additional butterfly species were recorded at the Sungai Tahubang and Kinabalu Sambau sites.

Table 2. Compiled list of recorded and sampled butterflies.

Location	Species	Remarks
Sungai Tahubang	*Trogonoptera brookiana*	Endemic to Borneo
	Trodies andromache	Endemic to Borneo
	Graphim stratiotes	Endemic to Borneo
	Graphium procles	Endemic to Sabah
	Graphium agetes kinabaluensis	Endemic to Borneo
	Ixias udatus	Endemic to Sabah
	Prioneris cornelia	Endemic to Borneo
	Cepora pactolicus	Endemic to Borneo

	Hebomoia glaucippe borneensis	Endemic to Borneo
	Prioneris vollenhovi	Endemic to Borneo
Nunuk Camp	*Stibochiona schoenbergi*	Endemic to Borneo
	Terinos clarissa	Endemic to Borneo
Kinabalu Sambau	*Parantica crowleyi*	Endemic to Sabah
	Delias cinerascens	Endemic to Sabah
	Delias eumople	Endemic to Sabah
	Delias ninus	Endemic to Borneo
	Idea sp.	
	Charaxes sp.	
	Papilio acheron	Endemic to Borneo

Figure 3. *Delias ninus*

Figure 4. *Trogonoptera brookiana*

Plant diversity in the surveyed area was impressively high, particularly around Nunuk Camp at elevations of 1,000–1,215 m.a.s.l. The vegetation was especially diverse, with the *Hanguana* sp. family being among the most diverse plant groups observed. Plants were collected along river sites, revealing a variety of interesting species.

Table 3. Compiled list of recorded and sampled plants.

Location	Species	Remarks
Nunuk Camp	*Hanguana* sp.	*Hanguanaceae*
	Cytandra sp.	*Gesneriacea*
	Sonerilla sp.	*Melastomataceae*
	Begonia sp.	*Begonicea*
	Angiopteris evecta	Marattiaceae
Bukit Permatang	*Dendrobium marai-paraiense*	*Orchidaceae*
	Dendrochilum kiauense	*Orchidaceae*
Sg. Kinotoki	*Cyrtandra* sp.	*Gesneriacea*
Marai- Parai	*Cyrtandra* sp.	*Gesneriacea*

Figure 5. *Hanguana* sp.

Figure 6. *Cyrtandra* sp.

DISCUSSION

Our survey revealed low insect diversity at Nunuk Camp and Marai-Parai, likely due to adverse weather conditions. Only five beetle families were recorded, with Chrysomelidae being the most common. This suggests that beetle activity may be significantly impacted by weather, and further studies under different conditions are needed.

In contrast, butterfly diversity was high, with over 21 species recorded, including several endemic to Sabah and Borneo. The presence of *Troides andromache* (Bornean Birdwing) underscores the importance of conserving these habitats. The stable microclimates and diverse flora likely support this rich butterfly population.

The plant diversity, especially around Nunuk Camp, was notable, with a significant variety of species, including orchids, Gesneriaceae, and Begonia. The rich plant life along river sites highlights the ecological value of riparian zones.

These findings emphasize the need for continued biodiversity assessments and conservation efforts in these regions. Future research should focus on long-term monitoring to understand temporal variations and develop effective conservation strategies.

CONCLUSION

The study concludes that Marai-Parai hosts a diverse range of insects and plants, with significant endemic species. The data collected contributes to understanding the biodiversity of Mt. Kinabalu's northwestern side.

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