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FAUNAL COMPOSITION OF MACROMOTHS OF MT. MUSUAN, MARAMAG, BUKIDNON

Kerk Rekkem R. Rafil and Joliesa Mae S. Toledo

Department of Biology, College of Arts and Sciences
Central Mindanao University, Musuan, Bukidnon, Philippines, 8710

ABSTRACT

The present study was conducted to compile information on species composition of moths found from Mt. Musuan, Maramag, Bukidnon. The moths were collected using a light trapping method from November to December 2014 on three vegetation types namely grassland, pine trees and mixed dipterocarp vegetations of Mt. Musuan.

The study revealed the presence of 29 species belonging to 11 families and 24 genera. The species abundance was recorded highest in mixed dipterocarp vegetation with 6.681 mean individuals, followed by in pine tree vegetation with 3.085 mean individuals and 1.723 mean individuals in grasslands. Sixteen (16) species are randomly distributed which includes Asota Hubner, Amerila Walker, Carriola ecnomoda Swinhoe, Creatonotos gangis Linneaus, Nyctemera baulus Boisduval, Oenistis altica Linnaeus, Gastrina cristaria Guenée, Pingasa chlora Stoll, Taxeotis sp. 1 Guest, Hypomecis Hubner, Pingasa ruginaria Guenée, Pinara sp. 1 Walker, Persectania dyscrita Common, Noctuidae sp. 1 Latrielle, Dudusa Walker and Ourapteryx Leach.

Therefore, Mt. Musuan is a home of 29 species of moth belonging to twenty-four (24) genera and eleven (11) families. There are 16 species species of moths that are randomly distributed.

Keywords: Mt. Musuan, moths, species composition, habitat preferences

INTRODUCTION

Lepidoptera has 160,000 described extant species (Kawahara et al., 2019). Moths constitute one of the most prevalent terrestrial insect groups because they play an important role in ecosystems as these organisms are herbivorous and prey for many animals and other insect groups (Lara-Perez et al., 2017). The caterpillars of some species are a vital source of proteins and fats in rural communi. Almost all Lepidoptera are phytophagous species feeding on specific vegetation and exhibiting strong associations with vegetation structure and composition (Schmidt and Roland, 2006).

Amidst the diversity of moths in the group of Lepidoptera and its contribution to the conducive ecosystem, there are studies and articles that account for the species found in the Philippines.However, there is still a need to document more species in the country (Badon et al., 2019). The discussions of the moths found in the Philippines are cited only in few publications, and the knowledge about moths that can be found in Mindanao is minimal.

Therefore, there is a need to determine the species of moths in Mt. Musuan of Central Mindanao University, Musuan, Bukidnon to address further knowledge of moths found in the Philippines.

The objectives of the study was to determine the species composition of moth species and determine its distribution in Mt. Musuan, Maramag, Bukidnon. The study provides information about the species of moths in Mt. Musuan, which could be used by lawmakers in formulating strategies for the conservation of the species.

METHODOLOGY

Study Site and Establishment of Study Station

According to the RA 9147 and following with DAO No. 2004-55, a gratuitous wildlife permit was granted with the permit number R10 2014-35. The research was conducted in Mt. Musuan, Maramag, Bukidnon on the different vegetation types. The study was done from November to December 2014.

Mt. Musuan was located along Sayre Highway and its boundary between Valencia City, Bukidnon, and Musuan, Maramag, Bukidnon. It has an elevation of 646 masl and coordinates of 7.88° north and 125.07° east. There were three stations established in the study area. Station 1 was the mixed dipterocarp an elevation of 380-415 masl / 07° 52.30N 125° 02.30E. Station 2 was grassland with an elevation of 550-595 masl / 07° 50.10N

ARTICLE INFORMATION
Joliesa Mae S. Toledo
Email Address: : joliesamaetoledo@gmail.com
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125° 10.05E and station 3 was pine tree forest with an elevation of 615-625 masl / 07° 51.40N 125° 02.25E.

Moth Collection and Preservation

Light trapping was used in collecting moth species. Only one light trap was established per night of sampling. It was done using two hundred fifty (250) watts of mercury bulb set against a 2 x 4 meters white cloth sheet as modified from Sutrisno (2008). Moths were collected by handpicking and directly injected with 90% ethanol in the thorax to paralyze them as modified from Sutrisno (2008). The sampling period was done at 6:00 pm to 9:00 pm. Each station allotted four nights of sampling.

The moth collected was placed in a triangular wax paper to avoid damage of their wings and body parts. Information like the name of the collector, study station, and date of collection was written in the wax paper. The labeled moth collected was placed in a container containing naphthalene balls to preserve them.

Preserved moths were pinned in a spreader board (Styrofoam). Powder mothballs (naphthalene balls) were scattered around the body of the preserved moths. The preserved moths were deposited in the University Museum of Central Mindanao University.

Ecological Parameters Identification of Moth

Ecological parameters were measured and assessed during the sampling period. These include, air temperature, humidity, and elevation. The air temperature was measured using thermometer hung 1 meter above the ground at the start of the sampling period and it ranges from 25 to 28oC. Humidity was measured using a sling psychrometer and result ranges from 94-96%. Elevation was determined by using the Global Positioning System (GPS).

Identification was done using books and journals like Zilli and Hogenes (2002) and Townsend and Paul Waring (2007). Together with Mr. Dave Mohagan, moths were initially identified. Moths collected were photographed, and images were sent through e-mail into different experts like Mr. Greg Watson for confirmation.

Data Analysis

Analysis of the data was done using BioPro software version 2 (McAlleece et al., 1993). BioPro Software calculated the diversity indices and distribution of species.

RESULTS AND DISCUSSION

Species Composition

A total of twenty nine (29) species were collected in three vegetation types of Mt. Musuan, Maramag, Bukidnon. These species belong to twenty-four (24) genera and eleven (11) families. The families are Aganinae, Erebidae, Geometridae, Lassiocampidae, Notodontidae, Sesiidae, Saturniidae, Sphingidae, Uraniidae, Xyloryctidae and Noctuidae.

The species abundance was highest in mixed dipterocarp with 6.681 mean individuals, followed by pine tree forest with 3.085 mean individuals and 1.723 mean individuals in grassland.

The mixed dipterocarp has the most significant number of species collected, 46 moth species with 314 individuals and it has the highest species number and individuals since that Mixed dipterocarp are abundant in grown-up trees greatly covered by underground grasses and sedges and has the present of water source that serves as microhabitats of moths.

According to Ellis (2003), species habitat preferences, just like the larva stage of Noctuidae that are known to be stem borers, prefer to live in mixed dipterocarp and pine tree vegetation. However, as mentioned in the study of Singh et al., 2017, that abundance of flowering plants is the preferred habitat of lepidopteran species. In addition, moth larvae preferred also abundant trees and shrubs which enable them to survive. The availability of critical resources (food and water sources) in different vegetation types makes differences between the Lepidopteran species composition in each vegetation type.

The canopy cover of the mixed dipterocarp indicates the less penetration of sunlight and less interference from other light sources such lunar cycle in time of sampling, which is competing to light trap light during the collection of moth species, which gains the highest moth species documented during the sampling period. Besides, higher canopy cover provides indirect sunlight penetration on moth species since most of the moths were nocturnal species, and a few of them are diurnal species that can adapt to direct sunlight penetration (Sutrisno, 2007). In addition as cited by Horvath et al. (2016) canopy layer per se plays a decisive role for herbivore communities.

There was low moth species composition and individuals in grassland with 32 moth species and 81 individuals. This probably due to the limited availability of food resources since grassland was dominated by cogon grasses and few trees, and there was no water source present. It is consistent with Sutrisno (2007). Hence, larvae of moths often show high specificity to host plants. Also, there were certain moth families associated with grasses, but most moths are forest inhabitants.

As cited by Horvath et al. (2016), habitat suitability among moth species is also critical in species composition, and distribution in different habitats. Most of the insect herbivores respond rapidly to changes in their habitat. Moth species specifically live on the area where they are capable of surviving and a habitat that can give them their resources to survive.

Grassland moth species also preferred a low temperature; their numbers decreased with the increasing temperature that resulted in increasing water precipitation (Kobori & Amano, 2003). Increase of precipitation may lead to less air humidity that causes Lepidopteran immature stages to migrate to other habitats which are suitable for metamorphism (Wallisdevries & Van Swaay, 2006). This is consistent to the study of Lara-Perez et al., (2016) that

Many ectothermic insects depend on external thermal conditions such as evapotranspiration and temperature to maintain viable populations and these variables are the best predictors of species richness and abundances of some families of large moths and butterflies. However, due to expansion of natural grassland, study showed the decline of moth species (Kamikura and Sakata, 2019).

CONCLUSION AND RECOMMENDATION

Therefore, Mt. Musuan is a home of 29 species of moth belong to twenty-four (24) genera and eleven (11) families. These include family Aganinae, Erebidae, Geometridae, Lassiocampidae, Notodontidae, Sesiidae, Saturniidae, Sphingidae, Uraniidae, Xyloryctidae and Noctuidae. Sixteen (16) species are randomly distributed. The study recommends increasing the number of sampling, and more sampling techniques must be done to increase the number of species present in the study site.

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Table 1

Species composition of macromoth in Mt. Musuan, Maramag, Bukidnon

Mixed Dipterocarp	Grassland	Pine Tree
Aganinae		
Asota	*Asota*	*Asota*
Erebidae		
Amerila	*Amerila*	*Amerila*
Carriola ecnomoda	*Carriola ecnomoda*	*Carriola ecnomoda*
Creatonotos gangis	*Creatonotos gangis*	*Creatonotos gangis*
Nyctemera baulus	*Nyctemera baulus*	*Nyctemera baulus*
Oenistis altica	*Oenistis altica*	*Oenistis altica*
Eudocima sp 1		*Eudocima sp 1*
Oxyodes scrobiculata		*Oxyodes scrobiculata*
Geometridae		
Gastrina cristaria	*Gastrina cristaria*	*Gastrina cristaria*
Pingasa chlora	*Pingasa chlora*	*Pingasa chlora*
Taxeotis sp. 1	*Taxeotis sp. 1*	*Taxeotis sp. 1*
Hypomecis	*Hypomecis*	*Hypomecis*
Pingasa ruginaria	*Pingasa ruginaria*	*Pingasa ruginaria*
Lassiocampidae		
Pinara sp. 1	*Pinara sp. 1*	*Pinara sp. 1*
Noctuidae		
Apsarasa radians	*Persectania dyscrita*	*Apsarasa radians*
Persectania dyscrita	Noctuidae sp. 1	*Persectania dyscrita*
Noctuidae sp. 1		Noctuidae sp. 1
Noctuidae sp. 2	Noctuidae sp. 3	Noctuidae sp. 2
Noctuidae sp. 3		Noctuidae sp. 3
Noctuidae sp. 4	Noctuidae sp. 5	Noctuidae sp. 4
Noctuidae sp. 5		Noctuidae sp. 5
Notodontidae		
Dudusa	*Dudusa*	*Dudusa*
Sesiidae		
Sesiidae sp. 1	*Sesiidae sp. 1*	
Spingidae		
Ambulyx sp. 1		*Ambulyx sp. 1*
Ascomeryx sp.1	*Ascomeryx sp.1*	
Saturniidae		
Cricula sp. 1		*Cricula sp. 1*
Uraniidae		
Ourapteryx	*Ourapteryx*	*Ourapteryx*
Urapteroides sp. 1		*Urapteroides sp. 1*
Xyloryctidae		
Crypthophasa russata		Crypthophasa russata
Total Number of Species 29	20	28
Total number of individuals 314	81	145

Plate 1. Family Geometridae: *Gastrina cristaria* (a), *Pingasa chlora* (b), *Taxeotis* sp.1 (c), *Hypomecis* (d) and *Pingasa ruginaria* (e).

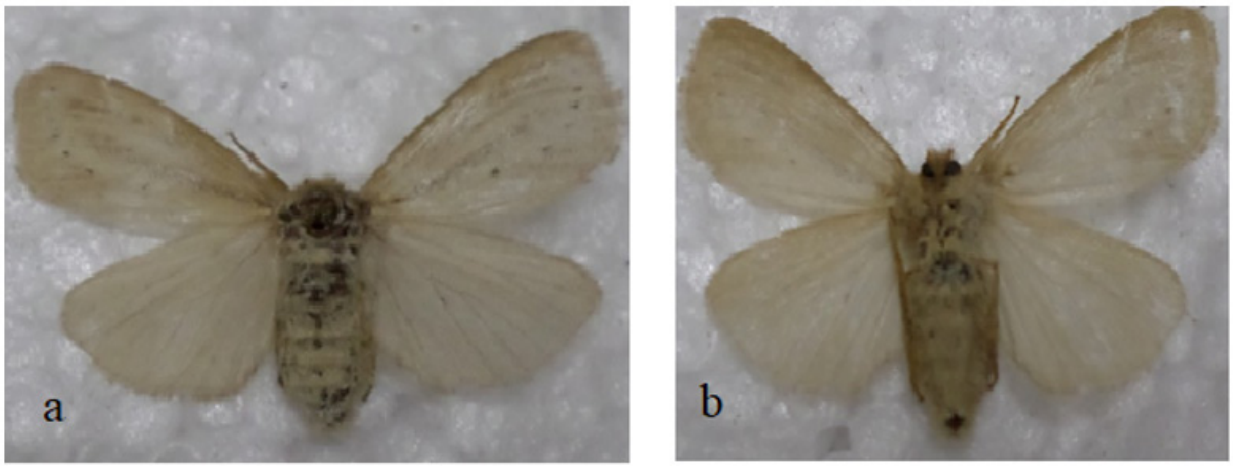

Plate 2. Family Lassiocampidae: *Pinara* sp. 1, dorsal (a) and ventral (b) view.

Plate 3. Family Erebidae: *Carriola ecnomoda* (a) , *Amerila* (b), *Nyctemera baulus* (c) *Creatonotos gangis* (d) *Oenistis altica* (e), *Eudocima sp 1*(f), *Oxyodes scrobiculata* (g)

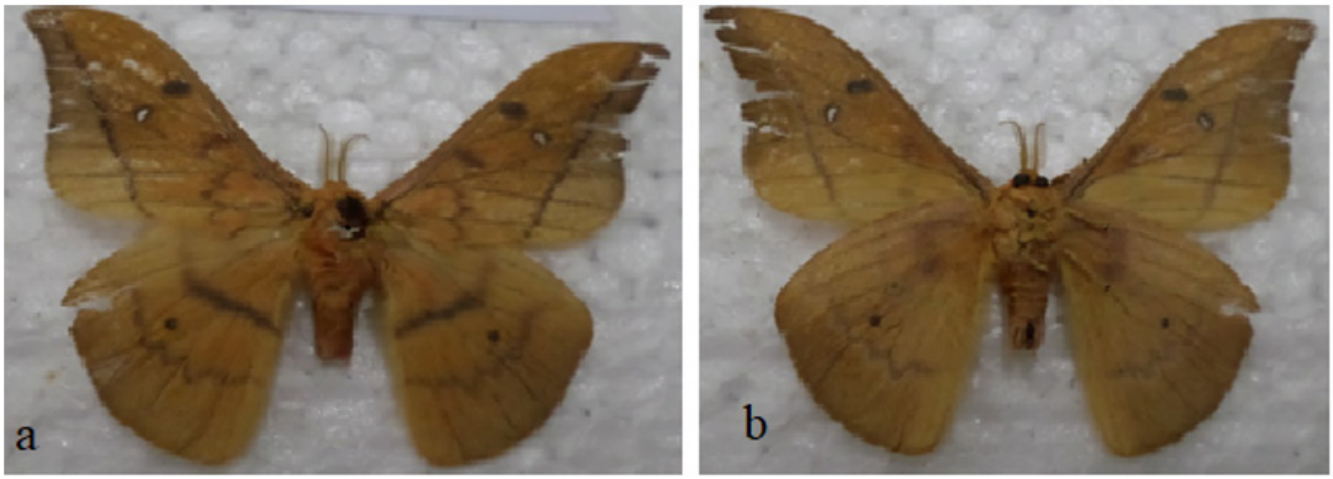

Plate 4. Family Saturnidae: *Cricula* sp. 1, dorsal (a), ventral (b) view.

Plate 5. Family Sesiidae: *Sesiidae* sp. 1

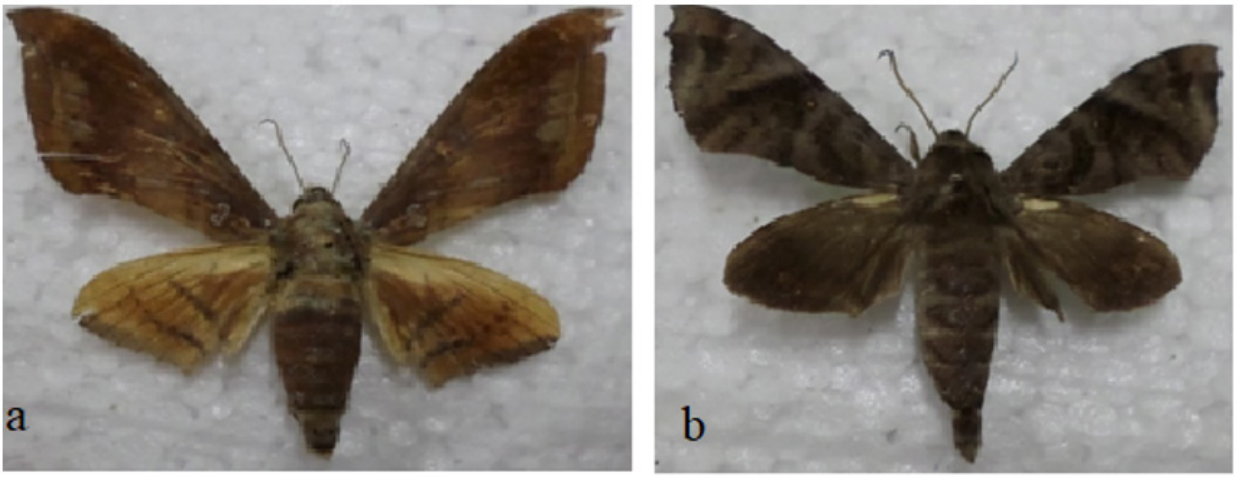

Plate 6. Family Spingidae: *Ambulyx* sp. 1 (a) and *Ascomeryx* sp. 2 (b).

Plate 7. Family Uraniidae: *Ourapteryx* (a), *Lyssa* sp. 1 (b) and *Urapteroides* sp. 1 (c).

Plate 8. Family Xyloryctidae: *Crypthopasha russata*, dorsal (a) and ventral (b) view.

Plate 9. Family Noctuidae: *Apsarasa radians* (a), *Persectania dyscrita* (b), *Noctuidae* sp. 1(c), *Noctuidae* sp. 2 (d) *Noctuidae* sp. 3 (e), *Noctuidae* sp. 4 (f), *Noctuidae* sp. 5 (g)

Plate 10. Subfamily Aganinae: *Asota* (a)

Plate 11. Family Notodontidae: *Dudusa* (a)