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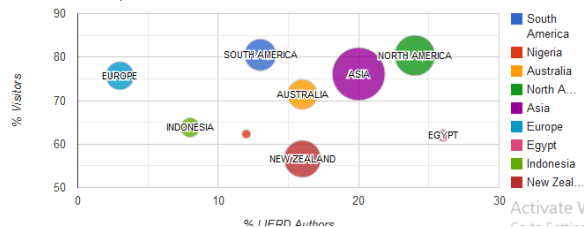
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Butterfly on the Island Bacan

by Masud A

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Butterfly on the Island Bacan North Mollucas Province; How Density

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Abstract: Bacan Island is an island in the administrative region of South Halmahera, North Mollucas Province. One of the biological richness of the region, it is Diorama butterfly. Potential diversity of butterfly in Bacan Island and surrounding areas, requiring require ecologically and molecular studies as a database in the preservation and conservation of the species and its habitat. The purpose of this study is to assess the density and distribution of species of butterfly in Bacan island. This research method is done in several stages, including: a survey to know the various species of butterflies in Bacan island based on morphological characters, sampling (identification and manufacture insectarium), as well as measuring the density and distribution of species of butterflies were observed. The results showed that there are 34 species of butterflies and 424 individuals / ha were collected in 4 Family in Bacan island. Density of butterfly species in the study area, respectively from highest to lowest is *Catopsillia pomona* species (IVI = 14.97%) of the Family Pieridae, *Hypolimnas misippus* species (IVI = 12.87%) of the Family Nymphalidae, species *Appias albina* (IVI = 12.40%) of the Family Pieridae, and *Eurema candida* (IVI = 11.45) of the Family Pieridae.

Keywords: Butterfly, distribution, density, Bacan Island

I. INTRODUCTION

In the region there Bacan Island Nature Reserve Mount Sibela (CAGS). Local communities that are around the area CAGS harness the potential of forests by exploiting species, flora resources to meet daily needs, such as rottan, indigo sap, wood, and other forest products. Hunting of some animals also carried out, for example, black monkeys, several species of birds, and deer. So far, there has been no breeding activity against several species of flora and fauna valuable forest ecological and economical. This is because of the knowledge society to attempt the cultivation of flora and fauna is still limited. Exploitation activities are carried out continuously without any effort cultivation, can reduce the diversity of certain species of flora and fauna, which will eventually lead to the scarcity of the species of flora and fauna [10]. If this situation continues, it is feared at a time not too long and endangered species endemic to this Bacan Island would be locally extinct.

The availability of different types of butterflies in Bacan island and surrounding areas, is the main attraction in the region and add to the exotic nature reserve of Mount Sibela. In addition to providing the charm and beauty of nature with the acculturation of color on the body and wings, butterflies also play a role as pollinators in the ecosystems through pollination in various plant species. Role is very important for the sustainability and balance of the ecosystem, so that the existence of butterflies in nature is one indicator of ecosystem damage. The decline in the population of butterfly in nature caused by forest conversion, illegal logging, habitat fragmentation, and illegal arrests. One way to maintain butterfly populations in nature is the outreach to the community and do captivity. Breeding activities can be carried out in natural open, semi-closed, and closed. This activity can increase the income of people in Bacan Island and surrounding islands, which in turn will increase the level of social welfare.

The study of the diversity of butterfly in Bacan island, can be based on data and molecular ecology. Ecological data obtained in the form of population estimation, richness and abundance of species, and vegetation analysis (important value index), while the data were examined in the form of molecular and phenotypic analysis of genetic relationships butterfly on Bacan island. Overall the data butterflies can be a database for potential development of a butterfly through conservation efforts are quite popular today that eco-tourism or eco-eduwisata. The principle of this conservation effort is to utilize the natural potential of an area to be used as a tourist attraction. Tours are conducted aims to encourage conservation activities in the area. The advantage of this kind of conservation effort is the active involvement by local people to support conservation efforts. Local residents will indirectly acquire additional revenue from tourists who visit, so that conservation efforts will benefit all parties involved. To realize conservation through ecotourism development efforts, it is necessary to synergy of local communities by researchers so that the results obtained through this research can

be applied by the community. The purpose of this research is to study the density and distribution of species of butterfly in three locations Bacan Island.

II. RESEARCH METHODS

The sampling method used is the method of survey sampling purposif. Butterfly collection done by sweeping technique [6], following the line transect were applied at random along the 1000 m. Techniques of data collection by making butterfly conducted in three point Bacan island, covering the river Ra (point I), Balitro (point II), and Papaloang (Point III) with insect nets (sweepnet). Butterflies are taken, turned off by using 70-96% alcohol by 0.2 cc / tail [6]. Butterflies that have died, collected and put into newsprint then laid on top of the board skelter while drying. After the chemicals evaporate (dry), butterfly insect moved into envelopes made of translucent paper, envelopes insects formed a triangle. In one envelope insects, there is only one species of butterflies that are not easily damaged (broke out) [3]. The data have been obtained and analyzed using the density of the species with the following formula:

$$\bar{D} = \frac{\sum_{i=1}^q X_{i.k}}{a} \quad [7] \quad (1)$$

Remarks:

\bar{D} = density of population conjecture (individuals/ha)
 $X_{i.k}$ = number of individuals are found in habitas to-I (individual)
 a = area of each habitat transect observation (ha) ($a = p \times l$)
 i = plot observation to 1,2,3,...

To determine the range of the results of estimating population size, use the following equation:

$$\bar{D}_j = \frac{\sum_{j=1}^k D_j}{k} \quad (2) \quad S_{\bar{D}}^2 = \frac{\sum D_j^2 - \frac{(\sum D_j)^2}{k}}{k-1} \quad (3) \quad S_{\bar{D}} = \sqrt{\frac{S_{\bar{D}}^2}{k}} \quad (4)$$

Remarks:

\bar{D}_j = The mean density of the alleged whole transect (individuals/ha)
 D_j = Population density observation plot to-j
 k = total transect sighting

Based on the calculation above, the range of the size of the population in all areas studied were as follows:

$$P = [\bar{D}_j \pm (t_{\alpha/2,db} \cdot S_{\bar{D}})] \cdot A \quad (5)$$

Remarks:

\bar{D}_j = Mean density of the alleged whole transect (individuals/ha)
 $S_{\bar{D}}$ = Standard deviation if average (individuals/ha)
 A = Total area of the transect observation

To calculate the presence and absence of a species in each habitat, use the following formula:

$$Fi = \frac{\text{The number of sample plots were found species to-i}}{\text{The number of sample plots}}$$

To calculate the relative frequency (FR) species of butterflies, use the formula:

$$FR = \frac{Fi}{\sum Fi} \times 100\%$$

Description (Remarks):

FR = Relative frequency of butterfly
 Fi = Frequency of the absolute species to-i
 Analysis results are then determined based on the important value index (IVI) to determine the role and contribution of the species to ecosystems. Important Value Index is obtained by summing the value of the relative density (Dr) and relative frequency (Fr) by the equation:

$$\text{Important value index (IVI)} = Dr + Fr \quad [7]$$

III. RESULTS AND DISCUSSION

From this study has identified as many as 34 species with a total of individuals observed in the three-point Bacan island as much as 424 individuals, and are grouped into four families. A complete list of species of butterflies the observed from the location of the specimen can be seen in Table 1 below:

Table 1. Species composition Butterfly Found in Bacan Island

Location	Nr	Species	Family	Habitat
BACAN ISLAND	1	<i>Papilio Ulysses</i>	Papilionidae	Point 1,2 and 3
	2	<i>Ornithoptera Croesus</i>	Papilionidae	Point 2 and 3
	3	<i>Troides criton</i>	Papilionidae	Point 1,2 and 3
	4	<i>Papilio polytes</i>	Papilionidae	Point 1
	5	<i>Graphium Agamemnon</i>	Papilionidae	Point 1,2 and 3
	6	<i>Graphium Deucalion</i>	Papilionidae	Point 1
	7	<i>Eurema candida</i>	Pieridae	Point 1 and 3
	8	<i>Appias paulinus</i>	Pieridae	Point 3
	9	<i>Catopsillia Pomona</i>	Pieridae	Point 3
	10	<i>Appias albino</i>	Pieridae	Point 1 and 3
	11	<i>Delias candida</i>	Pieridae	Point 1
	12	<i>Delias poecelia</i>	Pieridae	Point 3
	13	<i>Taenaris m. macrops</i>	Pieridae	Point 1
	14	<i>Anthraea sp.</i>	Pieridae	Point 3
	15	<i>Gandaca sp.</i>	Pieridae	Point 2 and 3
	16	<i>Lexias aeropa eporidorix</i> (Fruhstorfer, 1913)	Nymphalidae	Point 1
	17	<i>Cirrochroa regina</i>	Nymphalidae	Point 1 and 3
	18	<i>Acraea molluccana</i>	Nymphalidae	Point 1,2 and 3
	19	<i>Hypolimnas misippus</i>	Nymphalidae	Point 1,2 and 3
	20	<i>Hypolimnas b. bolina</i> (Linnaeus, 1758)	Nymphalidae	Point 2 and 3
	21	<i>Euploea phaenareta</i>	Nymphalidae	Point 1 and 2
	22	<i>Hypolimnas alimena eligia</i> (Fruhstorfer, 1912)	Nymphalidae	Point 1 and 3
	23	<i>Hypolimnas antilope quinctinus</i> (Fruhstorfer, 1912)	Nymphalidae	Point 3
	24	<i>Apaturina erminea ribbei</i> (Röber, 1894)	Nymphalidae	Point 2 and 3
	25	<i>Pareronia jovaea</i>	Nymphalidae	Point 3
	26	<i>Cupillia icylla</i>	Nymphalidae	Point 3
	27	<i>Cuphas myronides</i>	Nymphalidae	Point 3
	28	<i>Ivlelanitis leda</i>	Nymphalidae	Point 3
	29	<i>Hebomoia glaucippe</i>	Nymphalidae	Point 3
	30	<i>Jamides boschus toscius</i> (Fruhstorfer, 1916)	Lycaenidae	Point 1 and 3
	31	<i>Jamides seminiger</i> (Grose-Smith, 1895)	Lycaenidae	Point 2 and 3
	32	<i>Bindahara phocides</i>	Lycaenidae	Point 1,2 and 3
	33	<i>Jamides philatus emetallicus</i> (Druce, 1895)	Lycaenidae	Point 1 and 3
	34	<i>Danis danis philostratus</i> (C. & R. Felder, 1865)	Lycaenidae	Point 1 and 3

Species butterfly collection results are taken from the island of Bacan in three data collection points include River Ra (point I), Balitro (point II), and Papaloang (point III), by using insect nets (sweepnet), assuming that the distribution of bow butterfly evenly, then the location of the butterfly is done randomly, so it may represent existing species on Bacan Island.

Based on the data above species composition is known that the species of butterflies that the collected as many as 34 species (424 individuals) and classified into four families. All four families will be described in detail as follows.

1. Family Pieridae

This butterfly species of medium size, color white wings, yellow or orange, sometimes with a murky color on the lower rear wing. Black vein, the larvae usually light green, long, cylindrical, no tail, sometimes hairy rarely [1]. Pieridae species encountered are *Eurema candida*, *Appias paulinus*, *Catopsillia pomona*, *Appias albina*, *Delias candida*, *Delias poecelia*, *Taenaris m. macrops*, *Anthraea sp.*, dan *Gandaca sp.*

2. Family Nymphalidae

Butterfly species is most often found on the island of Bacan and Kasiruta with variations in size, shape and color. This butterfly has a front leg and not used to running. His pupa depends on the object where pupasi with anal hook which is also called "cremaster". Nymphalidae species are found in as many as 14 types of

Bacan Island, among others *Lexias aeropa eporidorix*, *Cirrochroa regina*, *Acraea molluccana*, *Hypolimnna misippus*, *Hypolimnna b. bolina*, *Euploea phaenareta*, *Hypolimnna alimena eligia*, *Hypolimnna antilope quinctinus*, *Apaturlina erminea ribbei*, *Pareronia jovaea*, *Cupillia icylla*, *Cuphas myronides*, *lvlelanitis leda*, dan *Hebomoia glaucippe*.

3. Family Papilionidae

Currently there are 570 species of butterflies Papilionidea known name, of which 116 species are found in Indonesia [2]. Butterfly Papilionidae largely a large species with a beautiful color pattern. Both pairs of wings has lines (line-strokes) to form a closed cell. In some species pairs of wings behind elongated shape of the building resembles a tail. Some species slow fly like swallows. Therefore, it is often called the bird birdwing butterfly wings or swallow tails [4]. In addition there are several species of male butterfly have wings folded behind the anal edge, which is equipped with a secondary sex organs, with dense fur. In general, the shape of a butterfly male and female alike, but some species have the same shape (dimorphism).

Some species of butterfly *Papilio agamemnon* example, female butterflies have a shape and a variety of color patterns. Eggs are usually laid one on one on the host, round-shaped, yellowish green with diverse sizes. Larvae have osmeterium organs contained in protoraks (front thorax). This organ is associated with a scent glands, and when the larvae being disturbed osmeterium automatically be extended coupled with a distinctive odor spray [3]. The larvae eat the parts of the forest vegetation. Each species has a different host Papilionidae, but most of the clans have the same host [3]. Pupa or chrysalis is generally supported by a silk thread, with head tilted, the rear end attached to the substrate with a padded silk. Future pupa formation depends on its species and ranges from 10-15 days [11]. Papilionidae species encountered in Bacan Island there are 6 species which; *Papilio ulysses*, *Troides criton*, *Papilio polytes*, *Ornithoptera croesus*, *Graphium agamemnon*, dan *Graphium deucalion*.

4. Family Lycaenidae

Species are included in this family has between 15-80 mm wing span, usually colorful metallic, blue or purple [2]; [11]. On the back there is a tail wing spots. Speckled Eggs flat, protruding or speckled. Slightly flattened larvae are green or brown. Sized pupa short and strong. This family has nearly 2,000 species belonging to the genus *Eumaeus*, *Evenus*, *Thestius*, *Theritas*, *Cyenus*, *Javonica*, *Arawaeus*, *Facoona* and *Rapala*. Butterfly species found in Bacan Island, among others: *Jamides boschus tosciuis*, *J. seminiger*, *Bindahara phocides*, *J. philatus emetallicus*, and *Danis danis philostratus*. According to [4], vegetation is feeding caterpillars of this species, among others, came from the family: Fagaceae and Myrtaceae.

Distribution and Density Butterflies

Family of four found that Papilionidae, Nymphalidae, Pieridae, and Lycaenidae. Family members are the most commonly found species of Nymphalidae the number 14, while the least was Lycaenidae much as 5 species, the distribution of each family with a density of species in each region can be shown in Table 2 below.

Table 2. Distribution of Family and density of species of butterfly are the collected on each area in Bacan Island

Nr	Family / Species	RIVER RA		BALITTRO		PAPALOANG		TOTAL (Ttl)	
		Ttl	%	Ttl	%	Ttl	%	Ttl	%
PAPILIONIDAE									
1	<i>Papilio Ulysses</i>	4	0.943396	10	2.358491	10	2.358491	24	5.660377
2	<i>Ornithoptera croesus</i>	0	0	10	2.358491	12	2.830189	22	5.188679
3	<i>Troides criton</i>	2	0.471698	4	0.943396	2	0.471698	8	1.886792
4	<i>Papilio polytes</i>	3	0.707547	0	0	0	0	3	0.707547
5	<i>Graphium agamemnon</i>	2	0.471698	4	0.943396	4	0.943396	10	2.358491
6	<i>Graphium deucalion</i>	6	1.415094	0	0	0	0	6	1.415094
PIERIDAE									
7	<i>Eurema candida</i>	13	3.066038	0	0	21	4.95283	34	8.018868
8	<i>Appias paulinus</i>	0	0	0	0	7	1.650943	7	1.650943
9	<i>Catopsillia pomona</i>	0	0	0	0	56	13.20755	56	13.20755
10	<i>Appias albina</i>	19	4.481132	0	0	19	4.481132	38	8.962264
11	<i>Delias candida</i>	5	1.179245	0	0	0	0	5	1.179245
12	<i>Delias poecelia</i>	0	0	0	0	3	0.707547	3	0.707547
13	<i>Taenaris m. macrops</i>	19	4.481132	0	0	0	0	19	4.481132
14	<i>Anthraea sp.</i>	0	0	0	0	12	2.830189	12	2.830189
15	<i>Gandaca sp.</i>	0	0	2	0.471698	1	0.235849	3	0.707547

NYMPHALIDAE									
16	<i>Lexias aeropus</i>	9	2.122642	0	0	0	0	9	2.122642
17	<i>Cirrochroa regina</i>	1	0.235849	0	0	1	0.235849	2	0.471698
18	<i>Acraea molluccana</i>	6	1.415094	1	0.235849	1	0.235849	8	1.886792
19	<i>Hypolimnas misippus</i>	24	5.660377	8	1.886792	8	1.886792	40	9.433962
20	<i>Hypolimnas b. bolina</i>	0	0	7	1.650943	3	0.707547	10	2.358491
21	<i>Euploea phaenareta</i>	6	1.415094	2	0.471698	0	0	8	1.886792
22	<i>Hypolimnas alimena eligia</i>	1	0.235849	0	0	1	0.235849	2	0.471698
23	<i>Hypolimnas antilope quinctinus</i>	0	0	0	0	5	1.179245	5	1.179245
24	<i>Apaturina erminea ribbei</i>	0	0	1	0.235849	4	0.943396	5	1.179245
25	<i>Pareronia jovaea</i>	3	0.707547	0	0	1	0.235849	4	0.943396
26	<i>Cupillia icylla</i>	0	0	0	0	8	1.886792	8	1.886792
27	<i>Cuphas myronides</i>	0	0	0	0	2	0.471698	2	0.471698
28	<i>Ivlelanitis leda</i>	0	0	0	0	5	1.179245	5	1.179245
29	<i>Hebomoia glaucippe</i>	0	0	0	0	10	2.358491	10	2.358491
LYCAENIDAE									
30	<i>Jamides boschus toscius</i>	3	0.707547	0	0	1	0.235849	4	0.943396
31	<i>Jamides seminiger</i>	0	0	1	0.235849	2	0.471698	3	0.707547
32	<i>Bindahara phocides</i>	10	2.358491	1	0.235849	2	0.471698	13	3.066038
33	<i>Jamides philatus emetallicus</i>	20	4.716981	0	0	1	0.235849	21	4.95283
34	<i>Danis danis philostratus</i>	10	2.358491	0	0	5	1.179245	15	3.537736
								424	100

Distribution and density of the species most commonly found during research in a row is *Catopsilia pomona*, as many as 56 individuals (13.21%), species *Hypolimnas misippus* much as 40 individuals (9.43%), and species *Appias albina* 38 individuals (8.96%), whereas species that has the least number of individuals is *Cirrochroa regina*, *Hypolimnas alimena eligia*, and *Cuphas myronides* each only two individual (0.47%) (Table 2). Distribution of butterfly species were found based on habitat type varies, there are the same species found in two types of habitats and species that are found only in one habitat type. *Papilio ulysses*, *Troides criton*, *Graphium agamemnon*, *acraea molluccana*, *Hypolimnas misippus*, and *Bindahara phocide* are species that are found in all types of habitats or generalist (Table 1). Of the three observation points Bacan Island, butterfly species are found in the observation locations respectively; Papaloang (point III), Balitro (point II), and the river Ra (point 1). The third location is secondary forest, the result of succession. According to Ramesh *et al.*, (2010) in [5], that the diversity of butterflies are generally lower in primary forests and highest in undisturbed forest, forest edge and open areas. This is due to the diversity of primary forest vegetation is very homogeneous and less light. Light will be able to attract butterfly, because butterfly need light to maintain the balance of body temperature.

Species of different butterflies have different host plants, because it has a different chemical content to the needs of larval development [8]. According to the research results [13], reported that *Papilio ulysses* observed in the Institute of Tropical Medicinal Plants (Balitro) Bacan island, has the highest percentage of preference on Yellow Flower plants as much as 100%, 45.5% Binong plants, and Banyan 40.9%. The lowest percentage in the plant preferences Nail Column 4.5% and Shrubs 4.5%. By collecting this species is expected to be useful in increasing the appreciation of visitors / public against Sibela Mountain Nature Reserve, which in turn can maintain a butterfly habitat on the island of Bacan.

Here is the number of each species of butterflies are found based on importance value index, shown in Table 3.

Table 3. Number of each butterfly species based on Important Value Index (IVI)

Nr	Family	Species	Ttl	Fi	Fr	Di	Dr	IVI
1	Papilionidae	<i>Papilio ulysses</i>	24	1	5.084746	0.0024	5.687204	10.77195
2	Papilionidae	<i>Ornithoptera croesus</i>	22	0.666667	3.389831	0.0022	5.21327	8.603101
3	Papilionidae	<i>Troides criton</i>	8	1	5.084746	0.0008	1.895735	6.98048
4	Papilionidae	<i>Papilio polytes</i>	3	0.333333	1.694915	0.0003	0.7109	2.405816
5	Papilionidae	<i>Graphium agamemnon</i>	10	1	5.084746	0.001	2.369668	7.454414
6	Papilionidae	<i>Graphium deucalion</i>	6	0.333333	1.694915	0.0006	1.421801	3.116716
7	Pieridae	<i>Eurema candida</i>	34	0.666667	3.389831	0.0034	8.056872	11.4467
8	Pieridae	<i>Appias paulinus</i>	7	0.333333	1.694915	0.0007	1.658768	3.353683
9	Pieridae	<i>Catopsilia pomona</i>	56	0.333333	1.694915	0.0056	13.27014	14.96506
10	Pieridae	<i>Appias albina</i>	38	0.666667	3.389831	0.0038	9.004739	12.39457
11	Pieridae	<i>Delias candida</i>	5	0.333333	1.694915	0.0005	1.184834	2.879749
12	Pieridae	<i>Delias poecelia</i>	3	0.333333	1.694915	0.0003	0.7109	2.405816
13	Pieridae	<i>Taenaris m. macrops</i>	19	0.333333	1.694915	0.0019	4.50237	6.197285
14	Pieridae	<i>Anthraea</i> sp.	12	0.666667	3.389831	0.0012	2.843602	6.233432
15	Pieridae	<i>Gandaca</i> sp.	3	1	5.084746	0.0003	0.7109	5.795646
16	Nymphalidae	<i>Lexias aeropus</i>	9	1	5.084746	0.0009	2.132701	7.217447
17	Nymphalidae	<i>Cirrochroa regina</i>	2	0.666667	3.389831	0.0002	0.473934	3.863764
18	Nymphalidae	<i>Acraea molluccana</i>	8	0.666667	3.389831	0.0008	1.895735	5.285565
19	Nymphalidae	<i>Hypolimnas misippus</i>	40	0.666667	3.389831	0.004	9.478673	12.8685
20	Nymphalidae	<i>Hypolimnas b. bolina</i>	10	0.333333	1.694915	0.001	2.369668	4.064584
21	Nymphalidae	<i>Euploea phaenareta</i>	8	0.666667	3.389831	0.0008	1.895735	5.285565
22	Nymphalidae	<i>Hypolimnas alimena eligia</i>	2	0.666667	3.389831	0.0002	0.473934	3.863764
23	Nymphalidae	<i>Hypolimnas antilope quinctinus</i>	5	0.666667	3.389831	0.0005	1.184834	4.574665
24	Nymphalidae	<i>Apaturina erminea ribbei</i>	5	0.333333	1.694915	0.0005	1.184834	2.879749
25	Nymphalidae	<i>Pareronia jovaeva</i>	2	0.333333	1.694915	0.0002	0.473934	2.168849
26	Nymphalidae	<i>Cupillia icylla</i>	8	0.333333	1.694915	0.0008	1.895735	3.59065
27	Nymphalidae	<i>Cuphas myronides</i>	2	0.333333	1.694915	0.0002	0.473934	2.168849
28	Nymphalidae	<i>Ivlelanitis leda</i>	5	0.333333	1.694915	0.0005	1.184834	2.879749
29	Nymphalidae	<i>Hebomoia glaucippe</i>	10	0.333333	1.694915	0.001	2.369668	4.064584
30	Lycaenidae	<i>Jamides boschus toscius</i>	4	0.333333	1.694915	0.0004	0.947867	2.642783
31	Lycaenidae	<i>Jamides seminiger</i>	3	0.666667	3.389831	0.0003	0.7109	4.100731
32	Lycaenidae	<i>Bindahara phocides</i>	13	1	5.084746	0.0013	3.080569	8.165314
33	Lycaenidae	<i>Jamides philatus emetallicus</i>	21	0.666667	3.389831	0.0021	4.976303	8.366134
34	Lycaenidae	<i>Danis danis philostratus</i>	15	0.666667	3.389831	0.0015	3.554502	6.944333
			424	19.66667	100	0.0422	100	200

Butterfly species that have the highest importance value index is *Catopsilia pomona* (IVI = 14.97%). Despite having the highest importance value index, but the distribution of this species in the three observation points, is still very limited. This species is only abundant in primary and secondary forests in Papaloang (point III), while species *Hypolimnas misippus* (IVI = 12.87%) is spread evenly and is found in the three observation points. In nature, butterfly act as pollinators, so that the ecosystem is maintained and sustainable. Reserch results [9], in 19 point City Ternate, get 56 species of butterfly were classified into 5 Family. In this study only get 34 species were classified into four families. This is because the quantity of different observation points. In addition, the research [9] in City Ternate, do not get *Ornithoptera croesus* species, whereas in Bacan Island, this species is found in Balitro (point II) and Papaloang (point III). In addition, at three points on the island of Bacan was also found that the species *Papilio ulysses*. Both of these species to be excellent in Bacan island, because it has a hue of acculturation and more attractive than the other butterfly species. Because the color is attractive, making this butterfly species are often hunted by collectors and catchers who want to sell. As a result of hunting and fishing as well as the reduction of host plants, causing species of butterfly *Papilio ulysses* and *Ornithoptera croesus* in Bacan island began to decrease and limited in the encounter.

In an effort to maintain the population of butterfly (Lepidoptera) are progressively reduced breeding needs to be done to preserve the species and habitats such as keeping the host plant by maintaining a stable condition of the forest environment, it is necessary to the protection of butterfly that exist in the core region (core zone) Sibela Mountain Nature Reserve or in the buffer zone (buffer zone) Bacan island and its surroundings, by multiplying the host plants, and reduce catching butterflies excessive. Butterflies usually spawn in certain host plants into food larvae. In this way is expected to help conserve butterflies in Bacan Island.

IV. CONCLUSION

From the results of this study concluded the following matters:

1. Potential of insects, especially butterfly (Lepidoptera) in Bacan island is found as 424 individuals / ha and 34 species were classified into four families.
2. The composition of species of butterflies found in the three study sites include four family namely; family Nymphalidae (14 species), family Papilionidae (6 species), family Pieridae (9 species), and the family Lycaenidae (5 species).
3. Species of butterflies are found to have a relatively high density in a row at *Catopsila pomona* species (13.27%), *Hypolimnas misipus* (9.48%), and *Appias albina* (9.005%). Of the 34 species of butterflies that the collected at three locations observation, more commonly found in Papaloang (point III).

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REFERENCES

- [1]. Borror, D.J., C.A. Triplehorn, and N.F. Johnson. 1996. Introduction Lesson Insects. The sixth edition. Gajah Mada University Press. Yogyakarta.
- [2]. Carter, D. 1992. Handbook Butterflies and Moth. Dorling Kindersley Pub. ISBN : 0-7513-2707-7. Singapore
- [3]. Dendang, Benyamin. 2009. Butterfly diversity in Resort Selabintana Gunung Gede Pangrango National Park, West Java. Journal of Forest Research and Nature Conservation. Vol. VI. No. 1, hal : 25-36
- [4]. Kunte, K. 2000. India A Lifescape Butterflies of Peninsular India. In: Gadgil, M. (Editor). Universitties Press-India.
- [5]. Koneril, Roni dan Saroyo. 2012. Distribution and Diversity of the Butterflies (Lepidoptera) At Mount Manado Tua, Bunaken National Marine Park area, North Sulawesi. Journal of Sustainable Earth. Volume 12 No. 2. Hlm: 357-365
- [6]. Pather, S. 2005. Insect sampling in Forest Ecosystem. Blackwell Science Pub. Australia
- [7]. Odum, E.P. 1976. Fundamentals of Ecology. W.B. Saunders Company. Toronto.
- [8]. Patton, R.L. 1963. Introductory Insect Physiology. W.B. Saunders Company, Philadelphia. London. Toronto
- [9]. Peggie, Dj. 2011. Diversity and Distribution Overview Butterfly City Ternate. In Ibnu Maryanto dan Hari Sutrisno (Ed). Ekologi Ternate. Pusat Penelitian Biologi-LIPI. LIPI Press. Bogor
- [10]. Primack, R.B., J. Supriatna, dan M. Indrawan. 2007. Revised edition of Conservation Biology. Yayasan Obor Indonesia. Jakarta.
- [11]. Resh, V. H., and Ring T. C. 2003. Encyclopedia of Insects. Academic Press-Elsevier Science. USA
- [12]. Togubu, I. 2009. Preference Study Butterflies Family Papilionidae (*Ulysses* sp., And *Croesus* sp.) In Host Plants in Natural Breeding and Bacan District of South Halmahera in North Mollucas. (Thesis Unpublished). FMIPA- Brawijaya University, Malang.

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