DIVERSITY AND DISTRIBUTION OF BUTTERFLIES (Lepidoptera: Rhopalocera) IN CAMPUS AREA INDRALAYA SRIWIJAYA UNIVERSITY OF SOUTH SUMATRA.

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ABSTRACT

Research on Diversity and distribution of butterflies, was held at the Campus Indralaya Sriwijaya University of South Sumatra. The purpose of this study was to Obtain information species diversity of butterflies at the Sriwijaya University of Inderalaya and distribution of species of butterflies in Several different habitat types in the campus area UnsriIndralaya. The study used purposive and collection methods in November 2014-january 2015. Sampling sites were divided into five locations: Arboretum, Science Faculty, Faculty of Law, Faculty of Agriculture and Swamp Cape Disconnect. The parameters used are the index of species diversity, dominance index, and evenness index. The results Showed that the diversity of butterflies in the region is classified as moderate. Overall found as many as 40 species of butterflies with a number of 609 individuals consisting of 5 the Papilionidae, Nymphalidae, Pieridae, Lycaenidae, and Hesperiidae.Regions Sriwijaya University has a diversity of butterflies that were moderate with criteria (H'1≤H'≤3), in each different habitat types, and not found a butterfly species that dominate in every type of habitat in this region Unsri. Distribution of butterflies found in the campus area Unsri Indralaya Categorized fairly evenly with a range of values from 0:58 to 0.68.

Keywords: Butterflies, Diversity, Distribution, Sriwijaya University of Indralaya

INTRODUCTION

Butterflies are one group of animals that provide benefits in human life, such as a high aesthetic value, acts as an agent pollinating flowers or herbs, even a butterfly itself has economic value, some of which can be used as quality guidelines, environmental quality (Achmad , 2002).

Habitats and ecosystems butterfly very important role in pollinating flowering plants, ecologically helped contribute in maintaining the ecological balance and ensuring biodiversity.Economically, the butterfly has a high value and is the object of recreation (Borror *et al.,* 1992 *in* Peggie, 2011). Butterflies can also be learning materials for the benefit of scientific studies (Subahar& Yuliana, 2010).

Currently in Indonesia there are about 2500 species of butterflies, some species are endangered and protected as an endangered species. Eastern Indonesia is regarded as a haven butterfly world, because the natural environment is still well preserved and discovered several species of exotic butterflies and protected (Suhara, 2009).

Diminishing natural habitat in which there are host plants either as larvae feed or as a place to put eggs and plant flowers that contain nectar as food butterfly can cause the butterfly population lessened, where host plants are available in such environments, the habitat can the continuity of the life of a butterfly from generation to generation (Soekardi, 2007).

The spread of individual butterflies on each habitat type or different each month.Habitat support the deployment of butterflies in compare with other habitats, but some species are more like a ledge and riverbanks. In general, individuals of butterflies have distribution patterns in groups, but some species are spread out on a regular basis or otherwise (Hardiansyah, 2001).

The spread of any type of butterfly is following a clear distribution pattern. Species of butterflies found in the western parts of Indonesia, its spread came from mainland Asia, while the butterflies are in eastern Indonesia, the spread of the continent of Australia (Suhara, 2009).

Sriwijaya University (UNSRI) Inderalaya has a land area of 712 hectares, was originally an area of lowland forest that consists of terrestrial areas and swampy areas with a diversity of different habitat types in each part (BAPSI, 2012).

But Natural conditions are increasingly changing with increased activity or human activity such as the increasing development of the lecture building new, land clearing for the manufacture of canals, retention ponds, etc., leads to reduced vegetation that can indirectly affect species of butterflies, and a decrease in the number of butterflies in regional Sriwijaya University Indralaya

Research on the inventory of butterflies in the campus area UnsriInderalayave never done before and found as many as 30 species of butterflies Octarina (2012). From a previous study also suggested research annually for monitoring the increase or decrease in population or species of butterflies that occur within a certain period, especially the diversity of butterflies in the campus area UnsriInderalaya.

In addition, research on the data distribution of butterflies in the area of Campus UnsriIndralaya unknown then it is important to do research on the diversity and distribution of butterflies in the campus area UnsriIndralaya.

This study aims to find out, the diversity of species of butterflies as the latest data on several different types of habitat in the area UnsriIndralaya. And distribution of species of butterflies on a couple of different habitat types in the Region UnsriIndralaya.

MATERIALS AND METHODS

Time and place

This study was conducted in November 2014 until January 2015. Sampling was done at the time of high activity butterfly at 08:00 to 12:00 pm and 1:00 p.m. to 16:00 pm located in in campus area indralayasriwijaya university of south sumatra

Tools and materials

The tools used in this study was the stationery such as notebooks and pens, identification book Lepidoptera, insect nets *(insect net),* awl, digital camera, plastic bags, paper labels, folding paper (paper papilot), safe (box collection), *Lup* (magnifying glass). While the materials needed are distilled, camphor and butterfly specimens.

Method

Research diversity and distribution patterns of butterflies done using methods of exploration. Determining the location of the sampling is done by *purposive random sampling* method.According Fachrul, (2007), *purposive random sampling* is a sampling technique is used based on certain considerations. Is done by searching, collecting and researching / diaries butterflies from each region designated are divided based on the needs and goals of the study.

Ways of working
Methods of Catching Butterflies

Field sampling carried out by the method of exploration, with selected five sampling sites, each of which have different criteria based on consideration of the type of habitat and environmental conditions. Observations done at each predetermined sampling area 3 times a week for a month in November 2014 until January 2015. The butterflies are captured using *insect net* (net) with a diameter of 35 cm and a length of the stick 1, 5 m. Samples are captured are stored and transported to the laboratory to be collected and identified. Butterflies are not documented in the form of photographs.

Making Specimen Collection

Butterfly captured in the field gathered for their collection. This collection method is done in order to facilitate the identification and documentation. Butterfly caught in a field directly inserted in Styrofoam, then stunned by chloroform. Move the specimen using tweezers carefully to the board extender made from Styrofoam to spread wings and cover the wings that were stretched using oil paper is pricked with a needle on a tepid and dried by means inserted

into the oven for 3 days in a temperature of 60 °C. Keep butterfly specimens in the collection box and put mothballs / mothballs inside the box. Specimens obtained in research and can be used in the study of entomology courses for students in which the students can see firsthand the type of butterfly nice colors, sizes and shapes not only learn through photos or images. By Peggie, (2011) in order to meet the relevant standards butterfly specimens should receive proper treatment and care. We recommend that specimens have been obtained in the capture site is not touched for antennae and legs can be broken and the scales on the wings can come off when touched, thereby reducing even ruin the aesthetics of the specimen. Each sample butterfly photographed on both sides of its body (dorsal and ventral).

Species Identification of Butterflies

Identification of species of butterflies obtained will be conducted at the Laboratory of Zoology Department of Biology, Faculty of Mathematics and Natural Sciences, University of SriwijayaIndralaya by referring Kirton (2014), Peggie and Amir (2006), Salmah *et al.,* (2002), and Soekardi (2007).

Data Analysis
Species Diversity Index Butterflies

According to Michael, (1995) to determine the level of species diversity of butterflies use Shannon Diversity Index using the formula:

$$H' = -\sum pi \, Ln \, pi$$

Information:
H '= Shannon Diversity Index
Pi = ni / N
ni = Number of individuals of all kinds i
N = total number of individuals of all kinds

The criteria according to Hill, (1973) *in* Santosa, (1995): H '<1 = low diversity, community declared unstable, H'1≤H'≤3 = Diversity being, the community is quite stable, H'> 3 = high diversity, community declared stable.

Dominance Index (C) Simpson

Dominance index is used to obtain information about the types of butterflies that dominates in a community in each habitat. Dominance index proposed by Simpson namely

$$C = \sum_{i=1}^{S} [ni/N]^2$$

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Information:

C = Dominance Index Simpson

S = Number of types (species)

Ni = The total number of individual species of butterfly to-i

N = total number of individuals in total n

ni / N = as a proportion of all i

The criteria used to interpret the dominance of types:Close to 0 ($\leq$ 0.5) = index lower or dominance by one species of butterfly or no dominant. Approaching 1 ($\geq$ 0.5) = large index or tend to dominance by a few species of butterflies(Simpson, 1949 *in* Odum, 1971 *in* Fachrul, 2007).

Evenness Index types

Index evenness (evenness) is used to determine the symptoms of dominance among species in a community. Evenness in a habitat index is calculated using the formula evenness (Peilou, 1977 *in* Utami, 2012).

$$E = H'/\ln S$$

Information:

H '= shannon-Wiener Diversity Index

S = Number of species found

criteria:

0.00 to 0.25: unevenly

0.26 to 0.50: uneven

0,51- 0,75: Pretty evenly

0,76- 0,95: Almost uniformly

0.96 to 1.00: evenly

RESULTS AND DISCUSSION

The composition and amount of Butterflies

From the research that has been done in November 2014 until January 2015 on several different types of habitat in the area of Campus UnsriIndralaya, overall found as many as 609 individuals comprising 40 species of butterflies belonging to the 5 families, which Papilionidae comprising of 6 types: *Graphium Agamemnon, G. Doson, G. sarpedon, Papilio demoleus, P. demolion, P. Memnon,* and *P. polytes.* Nymphalidae which consists of 20 types: *Acraea violae, Amanthusia phidippus, Danaus chrysippus, Doleschallia bisaltidae, Hypolimnas bolina, H. missipus, Ideopsis juventa, Junonia atlites, J. almana. J. hedonia, J. iphita, J. orithya, Lexia scanescens, L. pardalis, Mycalesis mineus, M. mineus, Neptis hylas, Polyura schreiber, Thaumantis klugius,* and *Ypthima heubneri.* Pieridae consisting of eight types: *Appias libythea, Catopsilia pamona, C. phyrete, C. Scylla, Delias hyparete, Eurema hecabe, E. sari,* and *Leptosianina.* Lycaenidae consisting of three, namely: *Chilades Pandavas, Rapalaiarbus,* and *Zizina Otis.* And Hesperiidae consists of two types, among others: *Oriensgola, Pelopidas mathias.* (Tabel.4.1)

Distribution

Based on the research that has been done, it is known that the distribution of most types found in species of butterfly *acrea violae* and *Junonia orityha,* (Tabel.4.2). According Utami, (2012), this shows that the butterfly is categorized as cosmopolitan. Based on the distribution characteristics of larval host plants, the presence of butterflies at all study locations alleged to be caused by the larva food plants are spreading that is broad and cosmopolitan. IndralayaUnsri in the campus area, there are plants of this type of family passifloraceae *Pirique taracemosa* are estimated to be food butterfly larvae *acrea violae.*

Diversity Index (H ') Type Butterfly

Diversity as indicated by Shannon index have different values at each location of the observations (Table 4.2).

No.	Sampling Location	Indek Diversity
1.	Regional Arboretrum	2,27
2.	Rear Region Fak Law	2,24
3.	Rear Region FakMIPA	2,52
4.	Rear Region Fak Agriculture	2,48
5.	Wetlands Tanjung End	2,15
	The range	**2,15-2.52**

Table 4.2 shows the differences in species diversity indices of butterfly in the five study sites. The highest value found in the study site in the back area of the faculty of Mathematics with the value of diversity index of 2.48, followed by the location of the research behind the faculty of Agriculture, with the value of diversity index of 2.40, with 2.27 Arboretum area location, location behind the faculty of Law index value 2.24 and the lowest diversity in the location of the Swamp with a diversity index of 2.15. According to Hill, (1973) *in* Santosa, (1995) which states that the value H'1 $\leq$H '$\leq$3 means diversity are at a moderate level, and shows that the stability of the community is still stable,

Dominance Index (C')

Dominance index is used to determine the extent to which a species dominate other groups.

No.	Sampling location	C'
1.	Regional Arboretum	0.13
2.	Region behind Fak. Law	0.15
3.	Region behind Fak. MIPA	0.15
4.	Region behind Fak. Agriculture	0.16
5.	Wetlands Tanjung End	0.15
	The range	**0.13 to 0.16**

The above table shows that the dominance index butterfly type at each location is different, the index value is highest dominnasi on location behind the Faculty of Agriculture with dominance index value of 0.16, followed by the location behind the Faculty of Science with dominance index value of 0.15, the location of the rear the law faculty and the Cape End Swamp area with dominance index value of 0.14 and the lowest in the Arboretum area location with dominance index value of 0.12. According to Odum (1971) *in* Untari, (2010) when the dominance index value close to 0 ($\leq$0,5) indicate no dominant species, and if the dominance index value close to 1 ($\geq$0,5) indicates the dominance of types- certain types.

Evenness Index Type

Evenness which is indicated by the index evenness *(evenness)* has the following values (Table 4.4).

No.	Sampling location	Index Evenness
1.	Arboretum	0.61
2.	Rear Region Fak Law	0.61
3.	Rear Region Fak MIPA	0.68
4.	Rear Region Fak Agriculture	0.67
5.	Wetlands Tanjung End	0.58
	The range	**0.58 to 0.68**

From Table 4.4 above, generally the value of index evenness on the fifth research location ranges are 0.58 to 0.68. Based on the criteria according pengolonggan (Pielou, 1977 *in* Utami, 2012) classified into the criteria fairly evenly, evenness index in the study area of Mathematics Rear Region had the highest evenness index value of 0.68, followed by a side area, the rear area of the farm that has a value of index values evenness of 0.67, then followed by region sampling area behind the faculty of Law, and the Arboretum area has evenness index value of 0.61, and the last or lowest in areas Swamp Tanjung Disconnect the evenness index value of 0.58. According to the opinion (Winarni 2005 *in* Utami, 2012), which states the higher the evenness showed that the number of individuals of each type more evenly or uniformly.

CONCLUSIONS

Based on the research that has been done, then obtained some conclusions as follows:

1. Found 5 Famili, 40 species and 609 individuals, types of butterflies in the area of the campus of the University of SriwijayaIndralaya, namely *Acrae aviolae, Amanthusia phidippus, Appiaslibythea, Catopsilia Pomona, C. pyrhanthe, C. Scylla, Chilades pandavas, Danaus chrysippus, Delias hyparete, Doleschallia bisaltidae, Eurema hecabe, E.sari. Graphium Agamemnon, G. Doson, G. sarpedon, Hypolimnas bolina, H. missipus, ideopsis juventa, Junonia almana, J. atlites, J. hedonia, J. iphita, J. orithya, Leptosianina, Lexia scenescens, L. pardalis, Mycalesis horsfieldi, Neptis hylas, Oriens gola, Papilio demoleus,P. demolion, P. memnon, P. polytes, Pelopidas mathias, Polyura schiber, Rapala iarbus, Thaugmantis klugius, Ypthima heubneri,* and *Zizina otis.*

2. Region Sriwijaya University has a diversity of butterfly classified as moderate with the criteria (H '1 ≤ H' ≤ 3), on each of different habitat types, and can not be found species of butterflies that dominates in every type of habitat in the region Unsri.

3. Distribution of butterflies found in the campus area Unsri Indralaya categorized fairly evenly with a value of 0, 58 -0.68.

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