Species Richness of Butterflies (order: Lepidoptera) in Mount Ungaran Central Java

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Abstract. Mount Ungaran is an area that has a relatively high biodiversity potential, including butterflies. The diversity of ecosystems in the Ungaran Mountains such as natural forests, plantations, fields, and settlements are the factors for diverse biodiversity. Butterflies are one of the most important assemblages of insects that act as biodiversity indicators as well as the ecosytems. The objective of the research was to analyze the species richness of the butterfly (order Lepidoptera) in Mount Ungaran and their status. The research was conducted on five (4) station, there are Medini, Gadjah Mungku, Semirang and Banyuwindu. Time of the research start from January to June 2018. The method of the research using point count method and analysis by description qualitative. The Result showed that total 62 species (5 Family) of Lepidoptera was recorded, followed by Nymphalidae (39 species), Papilionidae (11 species), Pieridae (9 species), Lycaenidae (3 species), and Hesperidae (2 species). There were one species was protected by Indonesian ruler and CITES appendix II (*Troides helena*), two species was endemic of java (*Prioneris autothisbe* and *Mycalesis sudra*), and two species was LC (Least Concern) by IUCN red list data (*Lampides boeticus* and *Vanesa cardui*).

1. Introduction

Mount Ungaran is one of the area that has remaining natural forest in Central Java and also has a potential biodiversity such as flora, fauna, fungi, microorganisme, and diverse of ecosytem [1]. Established for AZE (Alliance for Zero Extinction) to designate and effectively conserve the most important sites for global biodiversity conservation. Mount Ungaran AZE site in Mount Ungaran triggered by *Philautus jacobsoni* (Amphibia) which are the areas that hold the last-remaining populations and evaluated to be Critically Endangered on the IUCN Red List. Disruption of natural forest, such as habitat fragmentation, forest clearing for coffee or tea plantations, illegal logging, hunting, and trading, has become a serious threat that could interfere with the presence of biodiversity at Mount Ungaran [2]. The natural forest dry land in Central Java (include area on Mount Ungaran) was decreasing and being fragmented at an alarming rate. This consequently will affect the survival of biodiversity that inhabit inside the natural forest dry land [3]. Habitat lost and fragmentation is a major threat to global biodiversity [4].

The habitat change of green open space functions also can be a threat to butterflies on Mount Ungaran. It can be eliminate the presence of plants that are hosts of butterflies in the area. Most butterflies species depend on one or two species of host plants, so the threat to these species of plants is the same as threatening the existence of butterflies [5]. Plants whose pollination or seed dispersal must be assisted by animals (butterflies,birds, bat, other insect), the structure and composition of vegetation must be able to support the preservation of these animals [6]. Butterfly is part of biological variety that should be kept the preservation from extinction or descent kinds variety. The effort is need because butterfly have important values such as: ecology value, endemic value, conservation value, education value, culture value, aesthetic value, and economic value [7]. Butterflies will leave their

habitats because the increasing human activities, particularly in excessive exploitations of natural resources, result in changes of organism compositions in the ecosystem [8]

Nowadays, the knowledge base of Lepidopteran fauna and their distribution in different habitats is uneven and considering there is no complete data species richness in Mount Ungaran. This research was important to complete information scientifics about the species richness of butterfly on Mount Ungaran especially on the Forest area, settlement, coffe and tea plantation, and also around the water fall ecosystem around Mount Ungaran. The objective of the research was to analyze the species richness of the butterflies in Mount Ungaran Central Java.

2. Methods

The research was done in Mount Ungaran and conducted on four (4) station, there are Medini, Gunung Gentong, Semirang and Banyuwindu. Time of collecting data start from January to June 2018. The research used by point count method [7]. In this method observer was stand up in a location that decided during 10 minutes and recorded also counted the species of butterfly. Observation was done in point count which is placed on the line that decided before. Every point count have radius limit of 25 m from the observer standing position. The distance between point count was minimum 100 m, it is intended to minimize the possibility of double counting [6].

Observation time stated from 6.30 to 11.00 AM. It was done, when butterfly activity is high enough and the sun was illuminate enough or to dry their wings. In taking sample of each one butterfly specimen was collected for one species. If a similar specimen was found butterfly specimen has been released. To avoid double calculation, which had been caught were marked/labelled and then released. The identification and classification of butterflies specimen used by an identification book of butterflies species [9,10,11]. Data analysis of the richness of the species was based on the number of species present at the study site and done by qualitative description.

3. Result and Discussion

The results of species richness analysis showed total 62 species which belong to 5 families : Papilionidae, Nymphalidae, Pieridae, Hesperiidae, and Lycaenidae was recorded in four station of Mount Ungaran, (Table 1). Family-wise distributi3 of butterflies showed that members of Nymphalidae was the biggest species (39) followed by Papilionidae (11 species), Pieridae (9 species), Lycaenidae (3 species), and Hesperidae (2 species) (Figure 1). There were one species was protected by Indonesian ruler and CITES appendix II (*Troides helena*), two species was endemic of Java (*Prioneris autothisbe* and *Mycalesis sudra*), and two species was LC (Least Concern) by IUCN red list data (*Lampides boeticus* and *Vanesa cardui*) (Figure 1). *Troides helena* species widely hunted for commercial use because of its beauty and rarity [12].

Table 1. Species richness of butterlies in 4 (four) station of Mount Ungaran

	Medini	Curug Semirang	Banyuwindu	Gadjah Mungkur	Total
Species	52	26	26	11	62
Famili	4	4	5	3	5

Troides helena host plants, including *Aristolochia sp.* and *Thottea sp.* (Figure 1) only found in primary and secondary forests in gentong-medini mountains and few in number. This condition can threaten the survival of *Troides helena*, because in addition to rare host plants, the ability to breed this type is low. *Troides helena* zise are large, the low eggs produced , and the reproduction time is quite long. Based on Nurjannah's research [13], *Troides hele*na produces 35-150 eggs, and the success rate until the imago phase is only 8-12%. This condition causes the number of individuals *Troides helena* smaller and the frequency of meetings with their image is rare. This phenomenon showed that this area needs to be preserved. The population of butterflies is limited in nature, and its sensitivity is high to disturbances when the environment is disturbed, its survival will be threatened, even causing the extinction of butterflies in the area.

dok.Samsul Arif/GC

dok.Teguh Heny/GC

Figure 1 Conservation status Buterflies species CITES appendix II *Troides Helena* (A), host plant *Aristolochia sp*

The distribution of butterflies species showed that Nymphalidae was the most dominant family in 4 station area (Medini, Curug Semirang, Banyuwindu, and Gajdjah Mungkur) followed by Papilionidae and Pieridae. Hesperidae family have recorded on Medini, Curug Semirang, and Banyuwindu but Lycaenidae only recorded on the Banyuwindu station (Figure 2).

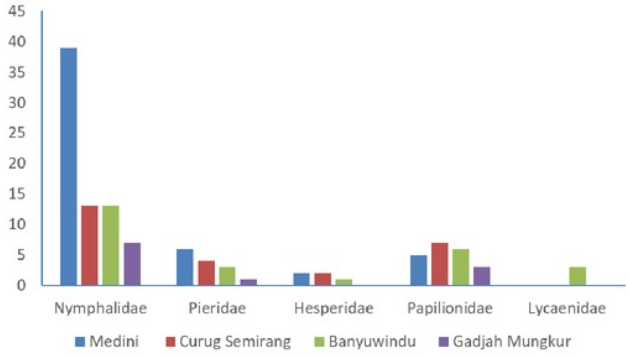

Figure 1 Species richess compotition of family in 4 (four) station

The result showed that Medini station have diversity of species richness than another station. Medini area support by diversity habitat such as tea plantation, coffee plantation, edge area of natural forest and secundary forest, and settlement. Butterfly habitat is a humid place that has lots of flower vegetation, water bodies and lots of sunlight. Most types live in open land, fruit gardens, agricultural

areas, primary and secondary forests, also edge area [14]. This condition because of Nymphalidae has the most members in the Rhopalocera suborder, so the possibility of encounters with more diverse species of this family is greater. Nymphalidae is the family with the highest number of species in the Rhopalocera suborder. Another factor is the type of flower plant and the host Nymphalidae is the most in the area. The presence of of butterfly apecies somewhere also was determined by the availability of host plants from the caterpillar [15].

4. Conclution

Total 62 species (5 Family) of Lepidoptera was recorded in four station area of Mpunt Ungaran and Nymphalidae was the dominnat family which 39 species. There were one species was protected by Indonesian ruler and CITES appendix II (*Troides helena*), two species was endemic of Java (*Prioneris autothisbe* and *Mycalesis sudra*), and two species was LC (Least Concern) by IUCN red list data (*Lampides boeticus* and *Vanesa cardui*)

Knowledment

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