Plant Diversity On Protected Forest Vegetation Of Dempo Mountains, Pagar Alam, South Sumatera

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Article Info	ABSTRACT
	Vegetation is a collection of plants that usually consist of several species and live together in one place. Vegetation analysis is a way of studying the composition (component type) and the shape (structure) of vegetation or vegetation communities. Forests are the most important habitat component of life, hence the condition of plant communities within the forest, whether plant species composition, species dominance, density or closure of the canopy should be measured. The island of Sumatra is one of the most diverse ecoregion regions in the world. World Wildlife Fund for Nature (WWF) as one of the world's conservation organizations incorporates mountainous rainforest as a conservation area. The Sumatra mountain forests are one of the 200 critically endorsed ecoregions and a priority of global conservation. Mount Dempo is a protected forest area located on a cluster of hills line the island of Sumatra. This mountain has a height of 3159 asl (above sea level) and is the highest mountain in the area of South Sumatra. This study aims to determine the diversity of plants in the protected forest vegetation of Mount Dempo, Pagar Alam City, South Sumatera. Vegetation analysis was done by purposive sampling with bitterlich method, i.e measurement done on plot measuring 2x2, 5x5, 10x10, and 20x20 m. Analyzes were performed on two plots of different locations, and all plant species found in each plot were recorded of the type and amount. The parameters measured include the type name, the individual number of each type, the diameter, the height, and the height of the free branch. The results obtained at the Importance Value Index (INP) in Gunung Dempo, Pagar Alam of 294 stated that Mount Dempo has a high vegetation that is still preserving the existing plant, but it is also able to used as tourist visit as the stage of environmental and nature care.

Introduction

Vegetation is a collection of plants usually consisting of several species that live together in a place. In the mechanism of shared life there is a close interaction between the individual compilers of vegetation itself and with other organisms so that it is a system that lives and grows and is dynamic. Vegetation analysis is a way of studying the composition (component type) and shape (structure) of vegetation or plant communities. Forests are the most important habitat component for life, therefore the condition of plant communities in the forest both in the composition of plant species, species dominance, and density of the canopy closure needs to be measured. In addition, in a unit forest ecology to be investigated is a stand, which is a concrete association (Natasa, Hardiansyah, Rahma, & Nurmalia, 2010).

Sumatra Island is one of the regions with the most diverse Eco regions in the world. The World Wildlife Fund for Nature (WWF) as one of the world's conservation organizations includes a mountainous tropical rainforest area. The mountainous forests of Sumatra are among the 200 critical status (CE) Eco regions and are a global conservation priority (Olson, Dinerstein, & R, 2000). Sumatra Island also has the third largest number of endemic species in the five major islands in Indonesia in selected taxa. Tropical mountain forests including the mountainous forests of Sumatra have a greater wealth of plant communities than other regions in the world (Whitten, Damanik, J, & Hisyam, 1997).

Mount Dempo is a protected forest area under the authority of the Directorate General of PHKA of the Ministry of Forestry of the Republic of Indonesia in the City of Pagar Alam, South Sumatra. The protected forest area of Mount Dempo is included in a cluster of mountain ranges stretching from the north to the south of the island of Sumatra at an altitude of 1600-3159 asl. The Gunung Dempo Protection Forest, geographically located at 103^0 13 east longitude and 04^0 03 ″ south latitude, has an area of 3,750 ha and is at an altitude between 1,200-3,159 masl, with a slope of between 45-700. The HLGD area is natural forest with vegetation that reflects mountain forests, estimated to have high biodiversity. Based on its height, the zoning of this protected forest is divided into submontana (1200-1500 masl), montane (1500-2400 masl) and sub-alpine (2400-3159 masl) (Ismaini, Lailati, Rustandi, & Sunandar, 2015)

Analysis of forest vegetation, among others, was shown to determine the composition of the type and structure of a forest (Mueller-Dombois & Ellenberg, 1974). The data is useful for knowing the equilibrium conditions of forest communities, explaining interactions within species and predicting trends in standing composition in the future (Whittaker, 1974). According to Article 1 paragraph 41 of 1999 concerning Forestry, forest is an ecosystem unit in the form of a stretch of land containing biological natural resources which are dominated by trees in the fellowship of their natural environment which cannot be separated from one another.

Materials and Methods
Study Area

The research was conducted on Augusts 14, 2018, located on one of the Dempo Mountain climbing routes (Rimau Monument) with the coordinates of S 29 ° 49'71 "E 955 ° 49 '41". The topographic condition of the study site is a bit flat and uphill, covering areas that are slightly open until they are tightly closed by vegetation.

Method

Vegetation analysis was carried out to determine the composition of vegetation in the area of Mount Dempo. Vegetation analysis was carried out by purposive sampling with the Bitterlich method measuring 2x2 m, 5 x 5 m, 10 x 10 m and 20 x 20 m. Measurements at seedling level (saplings of <1.5 m high) use a 2 x 2 m plot. Stake level (saplings with height> 1.5 m and stem diameter <10 cm) using a 5 x 5 m plot.

Pile level (plants with a diameter between 10-20 cm) using a 10 x 10 m plot. And at the tree level (plants with stem diameter> 20) use a plot measuring 20 x 20 m. There are 2 plots, and all types of plants found in each plot are recorded types and quantities. Parameters measured include type names, number of individuals per branch, diameter, height and height free of branches. This parameter is measured to calculate the relative frequency value (FR), relative density (KR) and relative dominance (DR) so that an important value index (INP) is obtained. At the tree level INP = FR + KR + DR, while the understory (seedlings) INP = FR + KR. The formula used in this study uses the formula of Mueller-Dombois and Ellenberg

Results and Discussion
Results

Based on observations and measurements that have been made on several plots in Mount Dempo Protection Unit XII Forest, the data is obtained as follows.

Table 1. Results of Vegetation Analysis in Plot 1

No	Plot 2x2 m SEEDLING	
	Plant names (Famili)	Number of individual
1	Batang Kayu Manis (Liliaceae)	2
2	Asin-asinan (Verbenaceae)	± 500
3	Rumput Tali Jenuh (Moraceae)	2
4	Duri Hutan (Melastomataceae)	3

No	Plot 10x10 m POLE					
	Plant names (Famili)	Number of individu	Tree Circumference	Tree Diameter	Distance	High Free Branch
1	Pakis (Marsileaceae)	± 30	63 cm	14 cm	3,5 m	4 m

No	Plot 20x20 m TREE					
	Plant names (Famili)	Number of individu	Tree Circumference	Tree Diameter	Distance	High Free Branch
1	Batang Akasia (Fabaceae)	1	107 cm	32 cm	3,5 m	6,43 m
2	Serean (Poaceae)	1	80 cm	28 cm	5 m	7,3 m
3	Sarangan (Hamamelidaceae)	1	-	-	-	-
4	Kelepu (Rubiaceae)	1	120 cm	60 cm	20 m	20 m
5	Pakis (Marsileaceae)	1	63 cm	21 cm	3,5 m	6,5 m

Table 2. Results of Vegetation Analysis in Plot 2

No	Plot 2x2 m SEEDLING		
	Plant names (Famili)	Number of ndividuals	Information
1	Serean (Poaceae)	9	
2	Sarangan(Hamamelidaceae)	5	
3	Perembetan (Acanthaceae)	8	
4	Ringganisan (Lamiaceae)	4	
5	Tali jenuh (Moraceae)	1	Rumpun
6	Kumis kucing (Lamiaceae)	-	
7	Alang – alang hutan (Poaceae)	2	
8	Bunga mutiara (Vitaceae)	-	
9	Medang diyut (Lauraceae)	1	

10	Gadungan (Dioscoreceae)	-
11	Sirih –sirihan (Piperaceae)	-
12	Suren (Meliaceae)	-
13	Batang tampilan (Araceae)	2
14	Krinyu (Asteraceae)	2
15	Rumput gajah (Poaceae)	-

Plot 5x5 m STAKE

	Plant names (Famili)	Number of ndividuals	Information
1	Tampilan (Arecaceae)	1	
2	Anggrung (Ulmaceae)	1	
3	Buah tepus (Zingiberaceae)	-	

Plot 10x10 m POLE

	Plant names (Famili)	Number of individuals	Tree Circumference	Tree Diameter	Total Height	High Free Branch
1	Tampilan (Arecaceae)	4	30 cm	15 cm	16 m	10 m
2	Pinang (Arecaceae)	3	35 cm	16 cm	15 m	10 m
3	Sarangan (Hamamelidaceae)	2	90 cm	41 cm	31 m	28 m
4	Kelepu (Rubiaceae)	1	30 cm	15 cm	16 m	9 m
5	Petonan	1	-	-	-	-
6	Suren (Meliaceae)	1	27 cm	13 cm	13 m	9 m

Plot 20x20m TREE

	Plant names (Famili)	Number of individuals	Tree Circumference	Tree Diameter	Total Height	High Free Branch
1	Ciru	3	60 cm	40 cm	25 m	18 cm
2	Suren (Meliaceae)	2	1, 5 m	57 cm	29 m	15 m
3	Sarangan (Hamamelidaceae)	3	1, 28 m	50 cm	30 m	16 m
4	Tampilan (Arecaceae)	6	58 cm	29 cm	24 m	14 m
5	Batang teh (Theaceae)	1	97 cm	30 cm	15 m	8 m
6	Bancetan (Achariaceae)	3	99 cm	33 cm	26 m	14 m
7	Baqwan (Altingiaceae)	1	95 cm	30 cm	25 m	20 m
8	Serean (Poaceae)	1	96 cm	30 cm	18 m	8 m
9	Jaranan (Anacardiacae)	1	58 cm	27 cm	20 m	11 m
10	Sarangan putih (Hamamelidaceae)	1	1,5 m	79 cm	35 m	20 m

Discussion

On observations that we have done on Mount Dempo, Pagar Alam is calculated by having a high density, frequency and dominance of vegetation. In this study conducted by purposive sampling with the bitterlich method measuring 2x2, 5x5, 10x10, and 20x20 m. Measurements at seedling level (saplings of <1.5 m high) use a 2 x 2 m plot. Stake level (saplings with height> 1.5 m and stem diameter <10 cm) using a 5 x 5 m plot.

Pile level (plants with a diameter between 10-20 cm) using a 10 x 10 m plot. Then at the tree level (plants with stem diameter> 20) use a plot measuring 20 x 20 m. There are 2 plots and all types of plants found in each plot are recorded types and quantities. The location point uses a compass as a direction regulator, with coordination points in plot 1 (x: 29 49 71 & y: 955 49 41) while in plot 2 (x: 29 47 44 & y: 955 49 54).

In this observation, many plants are found such as Cinnamon Stems, Salted, Saturated Rope Grass, Forest Spines, Klinyu, Perembetan, Sunflower, Fern, Rengganisan, Umbel-umbelan, Petonan, Acacia, Serean, Sarangan, Kelepu, Alang-alang Hutan, Medang Diyut, Tampilan, Anggrung, Pinang, Ciru, Suren, Tea, Bancetan, Baqwan, Jarangan and Sarangan Putih. 27 different types of plants were found and several types of families were the same in the 2 plots studied.

We calculate the large area with a formula circle $4\pi r2$, and we found that the large area are 0.005024 ha, 0.0314 ha, 0.1256 ha and 0.5024 ha. In the calculation of density where the formula for the number of individuals divided by the size of the plot, while calculating the relative density using a density divided by the density of all types multiplied by one hundred percent the density is 68,654 and the relative density 100,022% m3 indicates its density is at the highest level.

To calculate the frequency in which the number of subplots of a type is divided by the number of all subplots of observations, namely, what types of plants are found in sizes such as 2 m, 5 m, 10 m and 20 m divided by the number of subplots of observation. Obtained a frequency of 11.9 and a relative frequency of 100.01% indicating the frequency at Mount Dempo, Pagar Alam has the highest level or perfect.

To calculate the dominance studied by the formula the number of basic areas of a species divided by the area of the sample, where a species is found in the area of what is 0.005024 ha, 0.0314 ha, 0.1256 ha and 0.5024 ha. The total area of the sample added up the area to 0.664424 ha. Obtained dominance of 13.139 and relative dominance of 94.246 indicates the dominance studied is high.

The results obtained by the Important Value Index (INP) in the Gunung Dempo area, Pagar Alam, amounting to 294 states that Mount Dempo, Pagar Alam has high vegetation that is still preserving existing plants, besides being used as visiting tours as a stage of caring for the environment and nature.

(Magurran, 1988), explains that the Diversity index value (H ′) is related to species richness at a particular location, but also influenced by species abundance distribution. The higher the H′ index value, the higher species diversity, ecosystem productivity, pressure on ecosystems and ecosystem stability. Species wealth is the number of species (species) in a community. The more number of species found, the greater the wealth index. The Margalef wealth index divides the number of species with the natural logarima function which identifies that the number of species increases is inversely proportional to the number of individuals. This also shows that usually in a community / ecosystem that has many species will have a small number of individuals in each species.

Conclusion

From the results obtained, it is known that the level of vegetation on Mount Dempo, Pagar Alam is included in the high level of vegetation. Likewise, in this study, the larger the size of the plot we use, the more diversity of plants we get.

Acknoledment

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