

**B -04**

**VEGETATION ANALYSIS OF UNDERSTORY LEVEL IN FOREST PARK  
AREA OF KGPA A MANGKUNEGORO I NGARGOYOSO KARANGAANYAR  
CENTRAL JAVA**

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**Abstract**

The aim of the study was to determine the structure and composition of vegetation, especially for understory vegetation namely seedlings and saplings in the KGPA A Mangkunegoro I Forest Park area (or Taman Hutan Raya/Tahura) in Ngargoyoso Karanganyar Central Java. KGPA A Mangkunegoro I Forest Park located in the village of Suku h Berjo Ngargoyoso Karanganyar District of Central Java. The research used quadratic method for taking the sample. The location is about 1200 above sea level (asl) consists of flora and fauna which the diversity still high. The objectives of this research are to determine species composition, structure and diversity index species of saplings and seedlings vegetation. The data were then analyzed manually. Results showed that 19 species belonging 15 families for seedlings and 10 species belonging 8 families for sapling vegetation. Results of Important Value Index (IVI) of saplings vegetation are *Elaeocarpus serratus Roxb* (110.42 %); *Schima wallichii* (DC.) Korth (70.19 %) and *Pinus merkusii* L. (31.38%). The IVI for seedlings vegetation are *Penisetum purpureum* (53.4 %); *Melastoma* sp (17.4 %) and *Chloris barbata* (13.4 %). Based on the data, it is suggested that the mountain should be conserved and long-term ecological research should be conducted.

**Key words:** Analysis of vegetation, Tahura Ngargoyoso, seedlings and saplings, Important Value Index

**INTRODUCTION**

Forest Park (Tahura) KGPA A Mangkunegoro I, located in the village of Suku h Berjo Ngargoyoso Karanganyar District of Central Java. The location is about 1200 m above sea level (asl). The park consists of native and endemic flora and fauna. The diversity of them endemic flora and fauna here attract the local and regional tourists. Ngargoyoso Suku h forest park are designated as Zone I Mangkunegoro KGPA A Tahura based on the Ministry of Forestry and Plantations No. 9 / Kpts-II / 199 on October 11, 1999 (Natural Resources Conservation Center Provonsi Central Java in 2010). This area is about 231.3 ha. Tahura Ngargoyoso under supervised by Forestry Departement of Conservation Karanganyar District Central Java. There are three main function of Tahura Ngargoyoso are : 1) As Protected Forest, which is a nature conservation area of flora and fauna that exist in it with a variety of existing ecosystems; 2) As a natural forest, with the use of natural resources that exist in it with no damage tantanan existing forest; and 3) As the People of the existing buffer around the area.

In ecosystem, vegetation or plant communities is one of the biotic components that occupy certain habitats, for example in forest ecosystems. The structure and composition of the

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vegetation in an area affected by other ecosystem components that interact with each other, so that the vegetation that grows naturally in a particular region is actually a reflection of the result of the interaction of environmental factors and can change drastically due to the influence of anthropogenic (Setiadi 1984).

Information in a society growing vegetation, plants becomes very important. Forest grouping based on its type in ekosistem that exist around the world is divided into several ecosystems, one of which is forest ecosystems (Fachrul 2007). Vegetation consists of several types of which are group based habitusnya. The term dalam dianatarnya plant ecology is a basic vegetation or undergrowth. Plants under the vegetation growing on the soil surface that acts as a ground cover. Plants that have a diameter of less than 20 cm categorized undergrowth. Plant seedlings that have high levels of <1.5 cm and saplings which has a diameter, 10 cm and a height of about 1.5 m. (Manan, 1976). The data obtained from the research will serve as basic information for the others biodiversity protection and conservation area.

## RESEARCH METHOD

The research using seedlings and saplings vegetation in 5 plots in (10 m x 10 m quadrants for saplings and 2m x 2 m quadrants for seedlings). The distances between plots are 10 m. The specimens are brought and identified in the laboratory. In each quadrant, we measured the basal diameter of all shrubs and trees <10 cm.

The data analysis followed the rule of vegetation analysis (quantitative and qualitative) i.e. Species Importance Value Index (IVI) was used for the assessment of the distribution of species abundance which is calculated in the following formula:

**IVI**= relative frequency+ relative density+ relative dominance (for saplings vegetation).

**IVI**= relative frequency+ relative density (for seedlings vegetation).

Mentioned parameters in the above formula calculated the following formulas:

$$\text{RelativeDensity} = \frac{\text{total number of certain species in the total sample plots}}{\text{number of total sample plots}} \times 100 \%$$

$$\begin{aligned} \text{RelativeFrequency} \\ = \frac{\text{number of sample plots where certain species distributed}}{\text{number of all species in the total sample plots}} \times 100 \% \end{aligned}$$

$$\begin{aligned} \text{RelativeDominance} \\ = \frac{\text{sum of total DBH of a certain species in the total sample plots}}{\text{sum total DBH of all species in the total sample plots}} \times 100 \% \end{aligned}$$

Finally, according to IVI, we can predict the ecological condition of each species. We can plotted the curve of the distribution of abundance of species in sample area (Razavi SM, Mattaji A, Rahmanis R, and Naghavi F 2012).

## RESULT AND DISCUSSION

### Species Richness and IVI Index

Species richness of the seedling species showed by density and frequency value. Relative density for *Penisetum purpureum* (46.2 %) is the highest one. *Melastoma* sp (10.2 %) and *Chloris barbata* (8.0 %) is the lowest one. Relative density for saplings vegetation were

*Elaeocarpus serratus Roxb* (44 %), *Schima wallichii* (DC.) Korth (14.6 %) and *Pinus merkusii* L. (14.6 %). Density values illustrates that species with high density values have a large adjustment pattern or adapted in the plant community (Fachrul 2007).

Frequency value or relatif frequency value of seedlings species was the parameter of vegetation. The relative frequency value showed *Penisetum purpureum* (7.2 %), *Melastoma sp* (7.2 %) and *Chloris barbata* (5.4 %). The relative frequency of sapling species were *Elaeocarpus serratus Roxb* (45 %), *Schima wallichii* (DC.)Korth (15 %) and *Pinus merkusii* L. (12.5 %).Frequency value is used as a parameter which indicates the distribution of vegetation or the distribution of plant species in the ecosystem. The frequency value shows the distribution patterns of plants(Fachrul 2007).

For saplings vegetation, *Elaeocarpus serratus Roxb* (21.42 %), *Schima wallichii* (DC.)Korth (40.59 %) and *Pinus merkusii* L. (4.28 %).Dominance value showed that a certain type of plant primary influence plant communities through the large number of types, sizes and growth are dominant (Fachrul 2007).

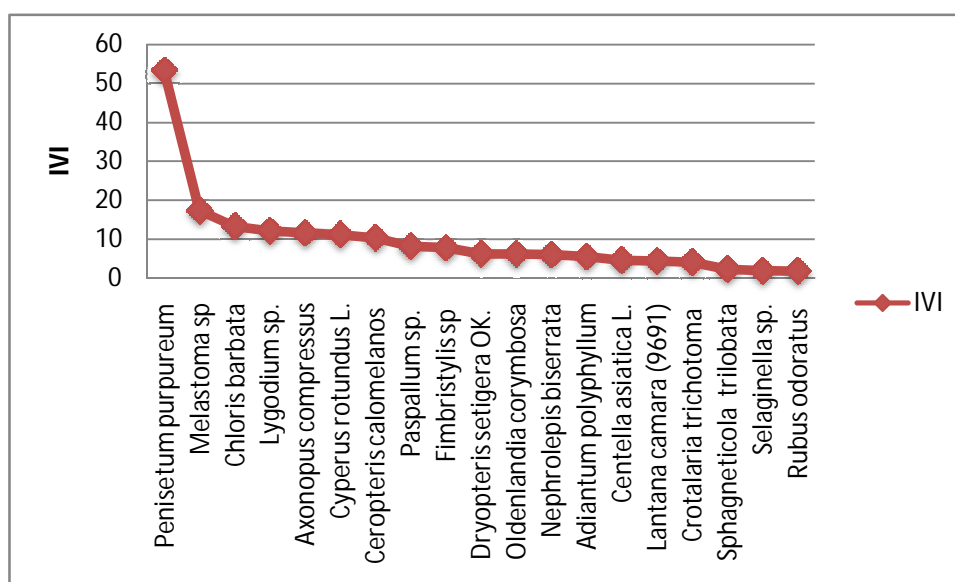


Figure. 1. IVI value for seedlings vegetation

The Important Value Index (IVI) species of seedlings vegetation *Elaeocarpus serratus Roxb* (Graminae) (110.42%), *Schima wallichii* (DC.) Korth (Melastomaceae) (70.19 %) and *Pinus merkusii* L. (Cyperaceae)(31.38%) (Figure 1).The Important Value Index (IVI) species of saplings vegetation were *Penisetum purpureum* (52.4 %), *Melastoma sp* (17.4 %) and *Chloris barbata* (13.4 %) (Figure 2).

IVI value is used to illustrate the importance of the role of a kind of vegetation in the ecosystem. If the value of the IVI high then the species greatly affect the stability of ecosystems.

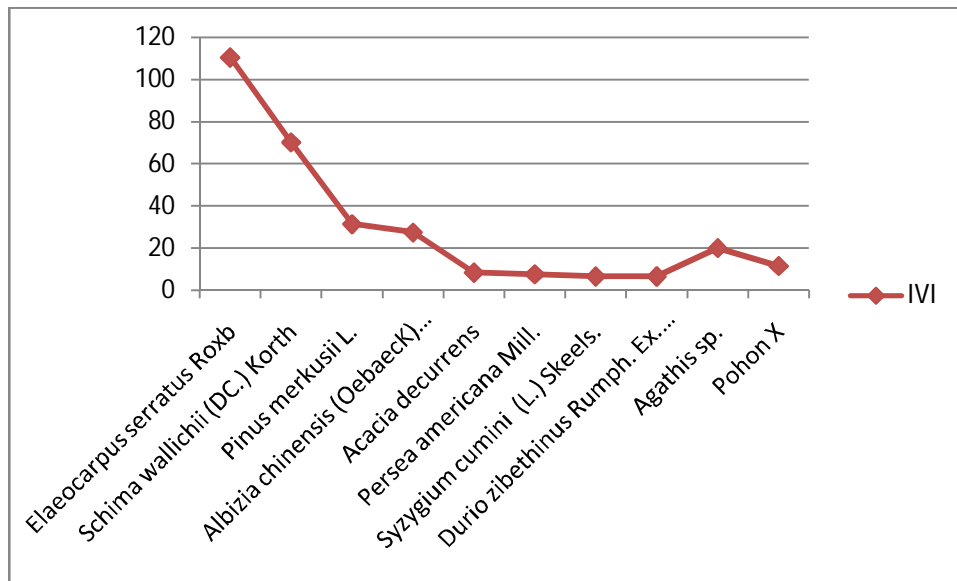


Figure. 2. IVI Index for sapling vegetation

IVI value is useful to determine the dominance of a particular type of plant to other plant species, because in a heterogeneous community composed of vegetation parameter data value of the frequency, density and dominance. Then, to determine the critical value associated with community structure can be seen from the index value of importance (Fachrul 2007).

## CONCLUSION AND SUGGESTION

The Important Value Index (IVI) species of seedlings vegetation *Elaeocarpus serratus* Roxb (Graminae) (110.42%), *Schima wallichii* (DC.) Korth (Melastomaceae) (70.19 %) and *Pinus merkusii* L. (Cyperaceae)(31.38%).The Important Value Index (IVI) species of saplings vegetation were *Penisetum purpureum* (52.4 %), *Melastoma* sp (17.4 %) and *Chloris barbata* (13.4 %).

Based on the data, it is suggested that the mountain should be conserved and long-term ecological research should be conducted

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