# Analysisof Tree Vegetation Degree in Boyong River Riparian Area, Yogyakartaasa Biology LearningResource

*By* TRIKINASIH HANDAYANI

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# Analysisof Tree Vegetation Degree in Boyong River Riparian Area, Yogyakartaasa Biology LearningResource

**Trikinasih Handayani, Lusi Tranwinarti**

**Abstract**. This research was conducted in Boyong riparian river area, Yogyakarta. The purpose of this research are to find out 1) the kinds of tree vegetation degree which has the biggest role based on its INP, 2) the diversity of tree degree's type, 3) the relation between the measured abiotic environment with the grouping pattern of tree vegetation degree, 4) the potential of research finding result as Biology learning resources.

The study area on this research are divided into three, Study area A (the tip area), study area B (the middle area), and study area C (the final area). The method used in this research is Point Centered Quarter. The data analysis used to find out the grouping pattern of tree vegetation degree with the measured abiotic environment factor is cluster analysis using SPSS version 16 program.

Based on the result finding from the entire study area of Boyong river riparian area was obtained the variety of tree degrees that has the greatest role such as Leucaenaglauca, Swieteniamahagoni, Albazziafalcataria. The index mean of tree degree is 1,80. Abiotic environment factor which related with the grouping pattern tree vegetation degree is the air humidity, air temperature, soil temperature, and KPK, while the abiotic factor which doesn't have relation with the grouping pattern of tree vegetation degree are the soil pH, N, P and K. Through this study method, the result finding conducted in Boyong river riparian Yogyakarta can be used as a Biology learning resources Senior High School students grade X on biodiversity ecosystem level learning material.

***Keywords*** *: Tree Vegetation Degree, Boyong river riparian*

## 1 Introduction

River are a places, containers and also the drainage system from the springs to the estuary, restricted its right and left and along the demarcation line by the riparian river line. Based on the Indonesian Government Ruleno. 38 year 2011 article 10 verse 1b and article 3 decided that riparian area with no dyke outside the urban city is the small river with watershed (DAS) wide less than or same with 500 km2 (five hundreds metre square) from the left and right side along the river flow. Riparian aea Boyong river still overgrown with many plants, whether its herbaceous strata, shrubs, and trees. Tree degree are plants which have a very important role in the riparian area. Tree have ecological function derived from the effect of nutrients transport, nitrogen tethering, the increasing material of soil organic, the improvement of soil structure and also erotion control. Plant in the Boyong riparian area have abundant species and diversity. Variety of trees and its diversity in Boyong riparian area influenced by the abiotic factor. Thus, to know the kinds of tree strata, tree diversity, and also grouping pattern tree vegetation strata should be conducted a research in Boyong riparian area, Yogyakarta.

The types of tree vegetation strata are parts of the environment, besides giving ecological benefit, tree also give benefit towards the society that is the

commercial utilization and also scientific purposes. The society could use the tree by taking its wood and as a medical material. In an education sector, using the study method which is adjusted with the curriculum on the middle school level so the result of this research is expected to be used as the Biology learning resources Senior High School students grade X on the biodiversity learning material.

## 2 Material& Method

This research is conducted from 24 June – 7 July 2013. The equipment used in this research are the watershed Boyong river map with 1:83.000 scale which is obtained from PPIK UGM, bamboo pegs, rope, thermometer, roll meter 50 m, GPS, metal stakes, litmus paper, hygrometer, knife, scissor, plastic glass, camera and herbarium sasak.

This research use the three study area, the A study area (the tip river area), B study area (middle part), and C study area (the end of the river). The method used is Point Centered Quarter (PCQ). Data analysis used to know the pattern grouping of stand tree vegetation degree towards the measured abiotic environment (soil pH, soil KPK, air humidity, air temperature, soil temperature, and nutrient N, P and K) is a cluster analysis using SPSS program version 16. The diversity index calculation (H') using Shanon-Wiener (Odum, 1998) formula

$$H' = -\sum pi \log pi$$

Explanation :

H'= shanonindex

ni= interest value for each species

N= total interest value

*pi*= ni/N interest values opportunity for each species

## 3 Research Finding&Discossuin

The result of this research shows that the variety of tree vegetation strata found in Boyong River Riparian are 22 kinds consists of *Albazzia falcataria, Cocos nucifera, Swietenia mahagoni, Gnetum gnemon, Artocarpus communis, Hibiscus tiliaceus, Tectona grandis, Artocarpus integra, Leucaena glauca, Psidium guajava, Mangifera indica, Gliricidia sepium, Aleurites moluccana, Terminalis cattapa, Sterculiaurens, Muntingia calabura, Polyalthia longifolia, Pometia pinnata, Persea gratissima, Morinda citrifolia, Anacardium occidentale, dan Euphoria longana*. Important Index Value (INP) is the addition of Relative Density Value, Relative Dominance, and Relative Frequency.

The variety of tree degree which have the highest INP in the riparian Boyong river namely *Leucaena glauca for* 48,96. Switenia Mahagoni for 46,99. *Albazziafalcataria for 40,57*. Kinds of strata treewhich has the lowest INP namely *Euphoria longana*for 0,30. *Terminalis cattapa* for 2,02. *Psidium guajava* for 3,04. Kinds of tree strata which has the highest INP means it has the highest role in those ecosystem. Diversity index from the entire study area in Boyong river riparian has the value 1,80. The result of the calculation shows that the tree vegetation strata on the watershed Boyong river has the high level of diversity.

Based on Todum (Wiwin, 2010) diversity index plant community composer on one place is the interaction result from several factor one of them is heterogenity of space, the formed community plants highly influenced by the existing environment. The more heterogen and complex an environment, the higher diversity index of community will be.

The measured abiotic factor from the three study area are as follows; 1) pH on the three study area start from 5-6 with median 5. Air humidity from 52-70% with the median 61%. Air temperature ranges 24-33$^0$C with the median 28$^0$C. Soil temperature ranges 26-32$^0$C with median 28$^0$C. Besides the measured abiotic factor, there's a measured nutrient like Cation Exchange Capacity (CEC) ), N (Nitrogen), P (Fosfor), and K (Kalium) which is different in every study area. The A study area has the total measured CEC 12,24 me/100 g. The total measured N nutrient is 0,28%. The total measured P nutrient is 0,02%. The total measured K nutrient is 0,03%. The B study area has the total measured CEC for 11,26 me/100 g. The total measured N nutrient is 0,18%. The total measured K nutrient is 0,01%. The total measured K nutrient is 0,06%. Study Area C area has the total measured CEC 7,73 me/100 g. The total measured N nutrient is 0,09%. The total measured P nutrient is 0,01%. The total measured K nutrient is 0,06%.

The result of this research could be used as a learning resource, if this biology research finding appropriate with the applied biology education curriculum. Djohar (Suhardi, 2012) stated that an object or a occasion being a learning source should fulfill the requirement as follows; the clarity of its potential, the suitability with the learning purpose, the clarity of its target, the clarity of information revealed, the clarity of its exploration guidance, the clarity of its expected result. Based on those requirement, this research finding could be used as the Senior High School Grade X Biology learning resource on the biodiversity ecosystem level learning material.

## 4 Conclusion

Based on the result finding and its discussion, it could be concluded that

1. Kinds of tree vegetation strata found in Boyong Riparian river are 22 kinds
   a. The types of tree vegetation strata in Boyong river riparian which has the most important role based on its important index value are as follows; *Leucaena glauca, Swietenia mahagoni,dan Albazzia falcataria*
   b. Diversity means index of tree vegetation strata from the entire study area of Boyong river riparian is 1,80
2. Based on cluster analysis test result, the abiotic environment factor which related to the grouping pattern of tree vegetation strata are as follows; air humidity, air temperature, soil temperature, and Cation Exchange Capacity (CEC). Meanwhile, the abiotic environment factor which doesn't have relation with grouping pattern of tree vegetation strata are as follows; soil pH, N (Nitrogen) nutrient, P (Fosfor), and K (Kalium) soil.
3. Based on the proses and the result finding, the analysis of tree vegetation strata in Boyong riparian area, Yogyakarta has a big potential as a biology learning

resource on Senior High School Students Grade X on the biodiversity ecosystem level learning material

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## 6 Lampiran

Appendix 1. Research Location Map

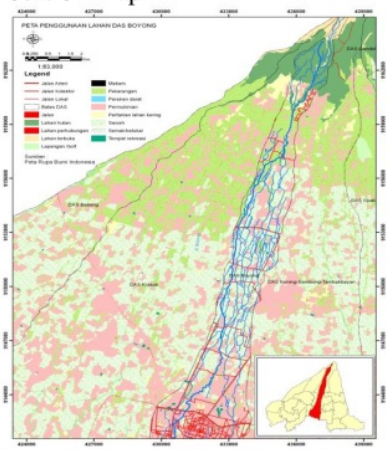


Figure 1. Research Location Map

Obtained from: Pusat Pelayanan Informasi Kebumian (PPIK) UGM Yogyakarta.

Appendix 2. Peletakan Stand


Figure 2. Google Map Peletakan Stand on the three study area A, B, dan C

Appendix 3. Research Location Picture

Figure 3. Top Area Picture

Figure 4. Middle Area Picture

Figure 5. The end of Area Picture

# Appendix 3. Species Picture in Boyong River Riparian

Gambar 1.. *Swieteniamahagoni* Gambar2.. *Tectonagrandis*

Gambar 3. *Mangiferaindica* Gambar 4.. *Artocarpuscommunis*

Gambar 5.. *Hibiscus tiliaceus* Gambar 6.. *Gliricidiasepium*

Gambar 7.. *Gnetumgnemon* Gambar 8.. *Albazziafalcataria*

Gambar 9.. *Leucaenaglauca* Gambar 10/. *Cocosnucifera*

Gambar 11. *Psidiumguajava* Gambar 12. *Artocarpusintegra*

Gambar 13.. *Aleuritesmoluccana*Gambar 14.. *Muntingiacalabura*

Gambar 15.*Terminaliscattapa*Gambar 16. *Sterculiaurens*

Gambar 17 .. *Morindacitrifolia*Gambar 18.. *Anacardiumoccidentale*

Gambar 19.. *Euphoria longana*Gambar 20.. *Polyalthialongifolia*

Gambar 21 .. *Pometiapinnata*Gambar 22.. *Perseagratissima*

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