



## TREE SPECIES DIVERSITY AT KEBON ROJO BLITAR CITY

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### ABSTRACT

*Kebon Rojo is one of the open green spaces in Blitar City. This area has a variety of vegetation, one of which is trees. The diversity of tree species in this area has not been recorded. This study aims to determine the diversity of tree species at Kebon Rojo. The method used is the Je method by recording and documenting the diversity of trees in this area. The level of diversity was calculated using the Shannon Wiener index. The results of this study revealed that there were 322 trees belonging to 26 families, 36 genera, 36 species. The Shannon Wiener Diversity Index was 3.5. This value indicates the diversity of tree species at Kebon Rojo was high.*

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## INTRODUCTION

Blitar City is one of the cities in East Java. It has an open green space (RTH) as an element of the city to anticipate the decline in air quality. The open green space has an ecological role, that is, as a microclimate regulator by controlling the city's air temperature. This can increase the comfort of urban people (Sulistiyana et al., 2017).

*Kebon Rojo* is one of the open green spaces in Blitar City . This area has a morning air temperature of 26.61-27.2 °C (Atmajayani, 2020). This cool temperature is due to the tree canopy in the green space. The diversity of trees also affects the heterogeneity of other organisms, such as mosses and lichens. Both act as air bioindicators (Sofiyana, 2011, 2014, 2021; Sofiyana & Sholihah, 2019a, 2019b).

The crucial information needed in managing an open green space is biodiversity. Trees can be used as a parameter of biodiversity in the ecosystem (Wahyudi et al., 2014). Tree diversity can be applied as a community-level indicator based on its biological

organization (Dini et al., 2019). In addition, diversity can also describe community structures. Community stability can also be measured by tree diversity (Saridan, 2012; Mawazin & Subiakto, 2013).

Information on tree diversity at *Kebon Rojo* remains scarce. The data has not been recorded properly. Data inventory on tree diversity at *Kebon Rojo* is still highly needed to update existing information and add information that has not been well documented. The purpose of this study was to obtain data on the diversity of tree species in Kebon Rojo.

## **MATERIALS AND METHODS**

This research was conducted at *Kebon Rojo*, Blitar City, from January to February 2022. The location of the site is displayed in Figure 1. Several instruments were used in this research, namely GPS, compass, camera, and stationery. The principal method for collecting the data was the cruise method. This method was done by collecting and recording all data in every corner of *Kebon Rojo*. We defined tree as woody plant with a single stem with diameter at breast height (dbh) of more than 10 cm and minimum of two meters in height, excluding tree and bamboo (Beech *et al.* 2017). Observation parameters, i.e. scientific names, local names, number of individuals, dbh, were recorded. The scientific name and taxa group referred to Angiosperm Phylogeny Group Classification (The Angiosperm Phylogeny Group 2016), the Plantist database (<http://theplantist.org/>) and the Powo science (<http://www.plantsoftheworldonline.org/>).

The results of the documentation cover the name of the species, genus, family, and region. The level of diversity was measured using the Shannon Wiener Index (Indriani et al., 2009). The formula used the Shannon-Wiener index is (Magurran 2004, Jørgensen 2010).

$$H' = - \sum \left( \frac{n_i}{N} \right) \ln \left( \frac{n_i}{N} \right)$$

Where,

H' : Shannon-Wiener Diversity Index

N<sub>i</sub> : Total of individuals for the species-i

N : Total of individual for all the species



Figure 1. Location of Kebon Rojo in Blitar City (<http://blitarkota.go.id/>).

## RESULTS AND DISCUSSION

The results of observations at *Kebon Rojo* reveal that there were 36 species belonging to 26 families (**Table 1**). The family with the most tree species is Fabaceae (44 trees) and Sapindaceae. (31 trees). Species from several families were grown for their fruit, for example Anacardiaceae (*Mangifera indica*), Malvaceae (*Theobroma cacao*), Moraceae (*Artocarpus heterophyllus*), Oxalidaceae (*Averrhoa carambola*), Sapindaceae (*Pometia pinnata* and *Dimocarpus longan*). The most abundant species in this area are *Spathodea campanulata* (16 trees), *Pometia pinnata* (15 trees), *Corypha utan* (14 trees), and *Albizia chinensis* (14 trees). The few species include *Hevea brasiliensis* (3 trees), *Artocarpus heterophyllus* (3 trees), *Mangifera indica* (4 trees), *Terminalia catappa* (4 trees), *Diospyros discolor* (4 trees), and *Handroanthus chrysotrichus* (5 trees).

**Table 1. Diversity of Tree Species in Kebon Rojo, Blitar**

No	Family	Genus	Species	Local Name	Σ
1	Anacardiaceae	<i>Mangifera</i>	<i>Mangifera indica</i>	Pohon Mangga	4
2	Annonaceae	<i>Cananga</i>	<i>Cananga odorata</i>	Pohon kenanga	10
3	Apocynaceae	<i>Cerbera</i>	<i>Cerbera manghas</i>	pohon bintaro	11
4	Arecaceae	<i>Corypha</i>	<i>Corypha utan</i>	Pohon Gebang	14
5	Bignoniaceae	<i>Spathodea</i>	<i>Spathodea campanulata</i>	Pohon Kecrutan	16
6	Bignoniaceae	<i>Handroanthus</i>	<i>Handroanthus chrysotrichus</i>	Pohon tabebuya rosea	5
7	Calophyllaceae	<i>Calophyllum</i>	<i>Calophyllum inophyllum</i>	pohon nyamplungan	10
8	Casuarinaceae	<i>Casuarina</i>	<i>Casuarina equisetifolia</i>	Pohon Legung	12
9	Clusiaceae	<i>Garcinia</i>	<i>Garcinia dulcis</i>	Pohon mundu	7
10	Combretaceae	<i>Terminalia</i>	<i>Terminalia catapa</i>	Pohon ketapang	4
11	Ebenaceae	<i>Diospyros</i>	<i>Diospyros discolor</i>	Pohon Beludru	4
12	Euphorbiaceae	<i>Aleurites</i>	<i>Aleurites moluccana</i>	Pohon Kemiri	7
13	Euphorbiaceae	<i>Hevea</i>	<i>Hevea brasiliensis</i>	Pohon Karet	3
14	Fabaceae	<i>Albizia</i>	<i>Albizia chinensis</i>	Pohon Sengor Tekik	14
15	Fabaceae	<i>Parkia</i>	<i>Parkia timoriana</i>	Pohon kendawung	13
16	Fabaceae	<i>Adenanthera</i>	<i>Adenanthera pavonia</i>	Pohon Segawe	8
17	Fabaceae	<i>Maniltoa</i>	<i>Maniltoa grandiflora</i>	Pohon Sapu Tangan	9
18	Lamiaceae	<i>Gmelina</i>	<i>Gmelina arborea</i>	Pohon Gmelina	12
19	Lamiaceae	<i>Tectona</i>	<i>Tectona grandis</i>	Pohon Jati	13
20	Lauraceae	<i>Litsea</i>	<i>Litsea chinensis</i>	Pohon adem ati	7
21	Lauraceae	<i>Cinnamomum</i>	<i>Cinnamomum burmanii</i>	Pohon kayu manis	6
22	Lecythidaceae	<i>Barringtonia</i>	<i>Barringtonia asiatica</i>	Pohon Keben	8
23	Lythraceae	<i>Lagerstroemia</i>	<i>Lagerstroemia indica</i>	Pohon Bungur	8
24	Magnoliaceae	<i>Michelia</i>	<i>Michelia alba</i>	Pohon kanthil	7
25	Malvaceae	<i>Theobroma</i>	<i>Theobroma cacao</i>	Pohon Kakao	8
26	Meliaceae	<i>Swietenia</i>	<i>Swietenia macrophylla</i>	Pohon Mahoni	13
27	Moraceae	<i>Artocarpus</i>	<i>Artocarpus heterophyllus</i>	Pohon Nangka	3
28	Moraceae	<i>Ficus</i>	<i>Ficus benjamina</i>	Pohon beringin	9
29	Myrtaceae	<i>Syzygium</i>	<i>Syzygium cumini</i>	Pohon Juweti	9
30	Oxalidaceae	<i>Averrhoa</i>	<i>Averrhoa carambola</i>	Pohon Belimbing	7
31	Phyllanthaceae	<i>Antidesma</i>	<i>Antidesma bunius</i>	Pohon Wuni	12
32	Rutaceae	<i>Murraya</i>	<i>Murraya paniculata</i>	pohon kemuning	10
33	Sapindaceae	<i>Pometia</i>	<i>Pometia pinnata</i>	pohon matoa	15
34	Sapindaceae	<i>Schleichera</i>	<i>Schleichera oleosa</i>	Pohon Kesambi	9
35	Sapindaceae	<i>Dimocarpus</i>	<i>Dimocarpus longan</i>	Pohon Kelengkeng	7
36	Verbenaceae	<i>Vitex</i>	<i>Vitex trifolia</i>	Pohon Legundi	8

*Spathodea campanulata* is a tree species that has good dust absorption capacity (Sutrisno et al., 2020). The capacity to absorb dust can reduce air pollutants and anticipate the impacts. In addition, *S. campanulata* trees are good habitats for birds. Groups of birds that use this tree include birds from the order Columbiformes (*Streptopelia chinensis*),

the order Coraciiformes (*Merops philippinus*), and the order Cuculiformes (*Cacomantis merulinus*) (Saputri et al., 2020).

*Pometia pinnata* is a tree species originating from Papua. *Kebon Rojo* has 15 trees of this type. This tree has a long life and has great potential as carbon storage (Hidayati, 2013). Hidayati (2013) stated that *Pometia pinnata* is one of the trees that has a high rate of CO<sub>2</sub> uptake. This potential is good for mitigating greenhouse gases or reducing the concentration of CO<sub>2</sub> in the atmosphere. Another frequent tree at *Kebon Rojo* is the *Corypha utan*. This tree, which is a member of *Corypha*, is quite large and has a fairly wide distribution (Partomihardjo & Naiola, 2009).

Based on the calculation of the Shannon Wiener Index ( $H' = 3.5$ ), *Kebon Rojo* has a high diversity of trees. This value is higher than the tree diversity in the open green spaces of Bandarlampung City ( $H' = 2,92$ ) (Setiawan et al., 2006), Yogyakarta City ( $H' = 3,29$ ) (Setiani, 2019) and Indramayu ( $H' = 3,16$ ) (Muhammad & Hendra, 2020). Although *Kebon Rojo* is an artificial open green space, it has various types of trees. Tree species diversity can be used as an indicator of health assessment and ecological systems (Safe'i et al., 2018; Sanjaya et al., 2021).

*Kebon Rojo* can be used as an educational forest area because it has various types of trees to observe. This finding is significant as it provides a basis for carrying out the preservation of various types of plants in Indonesia. Over time, it is hoped that there will be an increase in tree species diversity, which is beneficial for research and biological education in the community.

## CONCLUSION

The results of the study showed that there were 322 trees belonging to 26 families and 36 species. This diversity was fairly high, with a Shannon Wiener Index value of 3.5. The diversity of the tree species was dominated by *Spathodea campanulata*, *Pometia pinnata*, and *Albizia chinensis*.

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