POPULATIONS OF MEDICINAL TREE SPECIES

IN THE HABITAT 0F *PTEROPUS VAMPYRUS*

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POPULATIONS OF MEDICINAL TREE SPECIES IN THE HABITAT 0F PTEROPUS VAMPYRUS. Tree species in the habitat of *Pteropus vampyrus* in the Situ Lengkong Panjalu Nature Reserve have potential as medicinal plants. The purpose of this study was to determine the population of tree species that have medicinal properties in the habitat of *Pteropus vampyrus*. The method used is a grid line placed by Purposive Sampling based on the highest encounter. The results of the study found 9 species of trees classified into 7 families with a total of 132 individuals. The species that become important trees with the highest Important Index values are *Dysoxilum densiflorum* 151.28%, *Dysoxylum parasiticum* 42.22%, and *Actinodphane* sp 27,00% and the species diversity index in this region is included in the medium category with a value 1.51.

Keywords:Nature Reserve, Population, *Pteropus vampyrus*, Situ Lengkong, Tree

POPULASI SPESIES POHON OBAT DI HABITAT 0F PTEROPUS VAMPYRUS. Jenis pohon pada habitat *Pteropus vampyrus* di Cagar Alam Situ Lengkong Panjalu memiliki potensi tumbuhan yang beran sebagai tanaman obat. Tujuan dari penelitian ini adalah untuk mengetahui populasi spesies pohon yang memiliki khasiat obat pada habitat *Pteropus vampyrus*. Metode yang digunakan adalah garis grid yang ditempatkan oleh Purposive Sampling berdasarkan pertemuan tertinggi. Hasil penelitian menemukan 9 jenis pohon diklasifikasikan menjadi 7 famili dengan total 132 individu. Jenis yang menjadi pohon penting dengan nilai Indeks Penting tertinggi adalah *Dysoxilum densiflorum* 151,28%, *Dysoxylum parasiticum* 42,22%, dan *Actinodphane* sp 27,00% dan indeks keanekaragaman jenis di wilayah ini termasuk dalam kategori sedang dengan nilai 1,51.

Kata kunci: Cagar Alam, Pohon, Populasi, *Pteropus vampyrus*, Situ Lengkong

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# INTRODUCTION[[1]](#footnote-1)

Pteropus vampyrus has an important role for the ecosystem, namely as a seed spreader and tree pollinator in tropical rainforests (Tsang et al, 2018; Mohd-Azlan et al, 2022). This species has an important role in maintaining and maintaining forests and species diversity because in their lifestyle both eating, drinking, sleeping, and mating occur on trees in the forest (Hengjan et al, 2017; Hengjan et al, 2018; Soegiharto et al, 2019).

Situ Lengkong Panjalu, Ciamis Regency is a Nature Reserve Area that has a high diversity of plant species (Pardian, 2023). Based on the research of Rachman and Hani (2017) Situ Lengkong Panjalu Nature Reserve has plant species at the tree level with a high important value index (INP) among them are Dysoxylum densiflorum Miq, Litsea cassiaefolia, and Eugenia fastigiata Miq which is the natural habitat of Pteropus vampyrus bats (Rachman and Hani, 2017). Meanwhile, in the research of Soegiharto et al (2019) the trees that are the habitat of Pteropus vampyrus in the Bogor Botanical Garden are Ficus drupacea, Dipterocarpus cornutus, Pterocarpus indicus, Syzygium syzygioides, Pterodotus alata, and Shorea leprosula.

Plants basically have a lot of potential in their use in addition to being materials for human needs and as a source of energy, plants also have been used as a source of traditional medicine (Widiyastuti et al, 2017). The potential of trees as a source of medicinal raw materials is also quite high, based on research by Ismail et al (2022) the habitus of trees in the Karangsari Research Station of Mount Ciremai National Park has a percentage of 16% of the total identified as having medicinal properties. So based on the above problems, it is necessary to conduct research on the diversity of medicinal plant species at the tree level in the habitat of Pteropus vampyrus..

# MATERIAL AND METHOD

## **Study Site**

The research was conducted in the Situ Lengkong Panjalu area, more precisely on Nusa Gede Island which is in the middle of the area (Figure 1).



Figure 1. Research Location Map

## **Methods**

Tree data collection was carried out using the grid method with a sample plot size of 20 x 20 meters. The sampling intensity used was 5% of the total area of Nusa Gede Island, namely 92.5 ha with a total of 12 sample plots (Figure 2). Sample plots were placed by purposive sampling based on the highest rate of encounter with Pteropus vampyrus located into four routes according to the direction of the wind : north, south, west, and east (Alfiyasin et al, 2018; Prasatya et al, 2022).

20 Meter

20 Meter

100 Meter

**Sample Plot**

## Figure 2. Grid Method

## **Analysis**

Tree data collection is classified based on horizontal structure and vertical structure, namely tree diameter and height (Ismail et al, 2019) (Table 1). Data analysis carried out included the Important Value Index (IVI), Species Diversity Index (H') at the tree level.

Table 1. Classification of Tree Diameter and Height Classes (Ismail et al, 2019)

|  |  |  |
| --- | --- | --- |
| Diameter (cm) | Height (m) | Class |
| 10-20 | >30 | A |
| 21-30 | 20-30 | B |
| 30-40 | 4-20 | C |
| 41-50 | 1-4 | D |
| >50 | <1 | E |

# RESULT AND DISCUSSION

## **Population of Medicinal Tree Species**

Based on observations in the Situ Lengkong Panjalu Area which is the habitat of Pteropus vampyrus, 9 species of trees from 7 families were found with a total of 132 individuals (Table 2). The type with the largest number of individuals is Dysoxilum densiflorum as many as 75 individuals and Dysoxylum parasiticum as many as 15 individuals.

The families with the most types are Lauraceae and Meliaceae with each type found totaling 2 types. Lauraceae is a family with abundant and economically valuable species (Wang et al, 2020). Several studies explain the Lauraceae family has benefits as medicine (Ismail et al, 2019), wood building materials, fruit sources, and ornamental plants (Tamin et al, 2018). Then Meliaceae is a family that has about 600 species spread in tropical, subtropical, and temperate regions (Christenhusz et al, 2016). This family has pharmacological activities such as antiplasmodial, antimicrobial, antiproliferative (Kemayou et al, 2021).

Table 2. Population of Medicinal Tree Species

|  |  |  |
| --- | --- | --- |
| Type Name | Family | Total Individual |
| *Magnolia champaca* | Magnoliaceae | 4 |
| *Sterculia coccinea* | Sterculiaceae | 9 |
| *Actinodphane* sp | Lauraceae | 9 |
| [*Rhodamnia c*](http://www.eol.org/pages/5460538) *Jack* | Myrtaceaeyang | 6 |
| *Podocarpus blumei* | Podocarpaceae | 3 |
| *Dysoxilum densiflorum* | Meliaceae | 75 |
| *Endiandra rubescens* | Lauraceae | 9 |
| *Dysoxylum parasiticum* | Meliaceae | 15 |
| *Artocarpus Elasticus* | Moraceae | 2 |
| TOTAL | | 132 |

Based on Table 1, tree species in the habitat of Ptropus vampyrus have medicinal benefits. Based on research by Sahoo et al (2022) shows that Magnolia champaca essential oil can be applied as medicine because it has pharmacological effects. Some of the pharmacological effects include antoxidants, antitoxcity (Jayakodi and Shanmugam, 2020) and antiinflammatory (Maghfiroh et al, 2021). Then Sterculia coccinea has pharmacological activities such as antioxidants, antidiarrheals, antihypoglycemics, and anticytotoxic (Lamia et al, 2020), other types are Actinodphane sp. such as antioxidants, antiinflamantory (Hakimi et al, 2016), antimicrobial (Chung et al, 2020), and anticytotoxic (Uddin et al, 2020).

Rhodamnia cinerea Jack is a plant that is widely used by the community. This plant is used for treatment such as postpartum treatment, antidiarrheal, and abdominal pain (Sopianti and Sulasmi 2020). Podocarpus blumei species also have blumenol compounds that have inhibitory activity against free radicals (Zhang et al, 2017; Wang et al, 2018). Then Dysoxilum densiflorum, this type is the most found in the study site and based on several studies has pharmacological activity including Antimicroba, sitotoksik (Mardiana and Indradi, 2019).

Then the type of Endiandra rubescens based on the research of Widiyarti et al (2019) has pharmacological effects, namely antioxidants and anticytotoxy. Another type, Dysoxylum parasiticum, contains compounds that function as antimalarials, antitumors, antimicrobials, anti-inflammatory, and anticytotoxins (Mayanti et al, 2017) and Artocarpus Elasticus types have pharmacological activities such as antioxidants (Lin et al, 2009), anticytotoxins (Ko et al, 2005), and Anticancer (Bailly, 2021).

## **Structure Horizontal and Vertical**

The horizontal structure of trees that have medicinal potential based on their type varies greatly. horizontal structure based on tree diameter on structure A (10-20 cm) there are 2 types, namely Dysoxilum densiflorum and Dysoxylum parasiticum. Then in structure B (21-30 cm) there are 4 types, namely Magnolia champaca, Dysoxilum densiflorum, Endiandra rubescens, and Dysoxylum parasiticum. The next structure, namely structure C (31-40 cm), recorded there are 7 types of Magnolia champaca, Sterculia coccinea, Actinodphane sp, Dysoxilum densiflorum, Endiandra rubescens, Dysoxylum parasiticum, and Artocarpus Elasticus. Structure D with a diemeter of 41-50 cm totaling 7 types including Magnolia champaca, Sterculia coccinea, Actinodphane sp, Rhodamnia cinerea Jack, Podocarpus blumei, Dysoxilum densiflorum, and Endiandra rubescens. Then the last structure, namely structure E (>50 cm) amounted to the same as structures C and D, namely 7 types of which are Sterculia coccinea, Actinodphane sp, Rhodamnia cinerea Jack, Podocarpus blumei, Dysoxilum densiflorum, Endiandra rubescens, and Dysoxylum parasiticum (Figure 3).

Based on Figure 3 it is found that structure A has a number of 2 individuals, structure B 33 individuals, structure C 35 individuals, structure D 21 individuals, and structure E 41 individuals. Trees with the largest number of diameter classes are found in the diameter class E, which is >50 cm. This indicates that the vegetation succession in the Natural Reserve Lengkong Panjalu has suffered damage. Increasing numbers of trees with large diameters indicate that the vegetation succession conditions in the area have been damaged. (Nursanti dkk, 2018). It's caused by the presence of Pteropus vampyrus that performs activity in the tree buds causing the tree to suffer damage to death. (Rachman dan Hani, 2017).

Figure 3. Distribution of diameter classes Based on Species of Medicinal Tree

The Vertical structure Medicinal trees are found only in high grade A, which has a height ranging from > 30 meters (Figure 4). Based on research by Istomo et al (2021) that this indicates that the succession of vegetation has climaxed, this situation is caused by the abundant population of pteropus vampyrus in the Situ Lengkong Panjalu Nature Reserve so that it damages trees in other high classes (Rachman and Hani, 2017). This makes it necessary to manage the population of Pteropus vampyrus to reduce tree damage.

Figure 4. Distribution of high classes Based on Species of Medicinal Tree

## **Important Value Indeks and Index of Diversity**

The species that are important trees in the Situ Lengkong Panjalu Nature Reserve with the highest Important Values Index (IVI) are Dysoxilum densiflorum (IVI = 151.28%), Dysoxylum parasiticum (IVI = 42.22%), and Actinodphane sp (27,00%) (Figure 5). Others, based on research by Safitri et al (2020) that tree density is one of the factors that affect the presence of bats. The Important Value Index is in line with the density of a tree, in this study the types of Dysoxilum densiflorum, Gordonia excelsa, and Dysoxylum parasiticum have the highest density compared to other types. Based on this, it indicates that these three types are often found Pteropus vampyrus. In addition, the research location has a temperature ranging from 22.5 – 25.8 oC with air humidity of 93% – 99% making it a suitable habitat for Pteropus vampyrus.

Figure 5. Important Value Index (IVI) of Medicinal Tree Species

The Index of Diversity of Tree Species with medicinal properties in the habitat of Pteropus vampyrus based on the results of the analysis conducted showed a value of 1.51 which was included in the medium category. This is thought to be because Pteropus vampyrus in activities both eating, reproduction, perching and sleeping is carried out on certain types of trees (Hengjan et al, 2018). In addition, the number of human activities in the area which is a natural tourism is thought to affect the diversity of species in this region. In another location, based on research by Ismail et al (2023), the Diversity Index of medicinal plant species at various growth levels in the Bukit Mayana Forest Area where there is a fairly high human activity shows a moderate category. This is in line with the research of Tudjuka et al (2014) that changes in forest conditions are influenced by external factors.

# conclusion

The habitat tree type Pteropus vampyrus that is found in the area of Lengkong Panjalu has 9 species that have medicinal properties because of its pharmacological activity with the species Dysoxilum densiflorum as a species which has the highest value of important index and index of diversity of the medium species. The horizontal structure based on the diameter class shows variation with the largest number of individuals on the E structure and the vertical structure based upon the tree height shows uniformity on the A structure.

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1. [↑](#footnote-ref-1)