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Vegetation structure and species composition of habitat types Goniothalamus macrophyllus (Blume) Hook.f. and Thomson in Lowland Forest, Kuningan Regency, West Java

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Abstract. Goniothalamus macrophyllus is a forest product that grows in lowland forests and has the potential as a medicinal plant that has not been fully utilized. The purpose of this study was to determine the vegetation structure and species composition in the area where Goniothalamus macrophyllus grows naturally. Determination of the research location using purposive sampling method. Furthermore, the sampling method in this study was encounter - sampling. in the lowland forests of Kuningan Regency, West Java. Goniothalamus macrophyllus was found at an altitude of 432 - 1,273 m above sea level, with a stand composition of 108 species of seedling plants, 125 species of saplings, 98 species of poles and 105 species of trees. The highest dominance at seedling level is Coffea spp, sapling level is Decapermum paniculatum, pole level is Villebrunea rubenscens, and tree level is Villebrunea rubenscens.

1. Introduction

Forests are rich in biodiversity, both wildlife and plants. The diversity of biological resources in the forest is not only limited to woody plant species, but is also covered by a variety of ground cover/undergrowth which has high species diversity [1]. The understorey is a type of basic vegetation found under forest stands, except for tree saplings. Lower plants include grasses, herbs, shrubs and ferns [2]. The genus Goniothalamus is a member of the Annonaceae family which includes about 115 species of aromatic trees and shrubs, scattered in Asia and Australia [3]. Goniothalamus has several species and among them are scattered in Thailand, Malaysia and Kalimantan [4] The genus Goniothalamus has 50-100 species found from Southeast Asia, Malaysia, to northern tropical Australia [5]. According to [6], Goniothalamus is a forest product that has potential as a medicinal plant that has not been fully utilized.

The composition of vegetation types is the arrangement and number of individuals contained in a plant community. One of the composition and structure of vegetation is influenced by factors of place to grow in the form of climate and soil conditions [7]. The presence of vegetation in an area will provide many benefits to the surrounding environment, vegetation in the watershed plays a very important role in the ecological system related to the catchment area in the hydrological cycle, climate control both locally and globally and the conservation of diversity, especially flora. and Wallacea fauna ([8]; [7]. Each type of plant basically requires certain environmental conditions and is specific in order to grow and develop properly. Certain environmental changes and variations will have an impact

on vegetation structure and species composition. According to [9] the presence of vegetation will have a positive impact on the balance of the ecosystem, it depends on the structure and composition of the vegetation that grows in the area.

2. Methodology

The research was conducted in lowland forest, Kuningan Regency, West Java Province. Determining the location of the research using purposive sampling method, this method is a method of determining the location of the research deliberately which is considered representative. Furthermore, the sampling method in this study was encounter - sampling. Plant data were collected through vegetation analysis based on the location or location of the study which had been determined based on the altitude and location where Goniothalamus macrophyllus was found. 9 sample plots were made in each location.

The size of the sub-plots for observation is determined according to the tree growth stage [10] as follows:

a. Sub plot size 2 m x 2 m for observation at seedling level (height <1.5 m);
b. Sub plot size 5 m x 5 m for stake level observations (height> 1.5 m - diameter <10 cm);
c. Sub plot size 10 m x 10 m for pile level observation (10 - 19 cm diameter); and
d. Sub plot size 20 m x 20 m for tree level observations (diameter ≥ 20 cm).

In each plot, a tree population data collection was carried out including the name of the species; measurement of diameter and height for each individual with a diameter of 10 cm and above (poles and trees); and the number of individual natural regeneration (seedlings and saplings).

3. Result and Discussion

Based on the results of vegetation analysis at an altitude of 432 - 1,273 m asl. In the lowland forests of Kuningan Regency, West Java, there were 108 species of seedling plants, 125 sapling species, 98 poles and 105 tree species. The highest number of species is generally found at an altitude of 1,175 m above sea level. and the smallest is found at an altitude of 884 m asl.

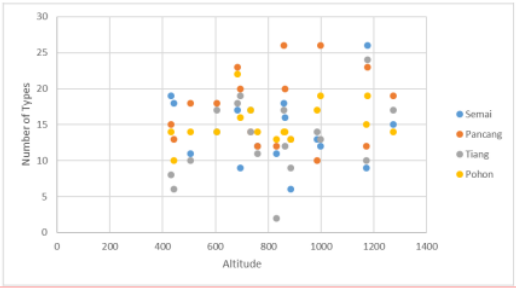

Figure 1. Recapitulation of the number of species based on the height of the place

The highest number of species at the seedling level is at an altitude of 1,273 m asl as many as 26 types, at the sapling level there are at a height of 859 m asl and 997 m asl as many as 26 types, at the pile level there are at an altitude of 1,175 m asl as many as 24 species, while at the tree level there are at an altitude of 683 m asl as many as 22 species. The lowest number of species was found at an altitude of 831 m asl as many as 2 species. Based on [11] research on lowland forest in Gunung Tilu, Kuningan Regency, the most common types are Euphorbiaceae and Moraceae family, 13 and 12 species each, 158 species of pole, 137 species of stake and 141 species of seedlings, other research in the Park National Mount Ciremai The number of understorey species was found as many as 39 species from 50 plots with a total of 147 individuals, the most common species found was Clidemia hirta (L.) D. Don. [12].

3.1 Individual density and plant dominance

a. Seedling

Based on the observation of seedling levels in the 153 sample plots in the study area, there were 108 species of seedling plants based on 5 (five) species with the highest INP value in sequence (Table 2.).

Table 1. Density and INP at seedling rates in lowland forests of Kuningan Regency

No	Altitude (m asl)	Number of Types	Total Density (Ind/ha)	Dominant Type	Density (Ind/ha)	INP (%)
1	432	19	19.444	*Syzygium lineatum*	5.000	43,57
2	442	18	13.611	*Goniothalamus macrophyllus*	1.666	25,58
3	506	11	19.722	*Aphanamiscis* sp.	4.722	41,33
4	605	14	16.944	*Coffea* spp.	3.888	40,34
5	683	17	34.722	*Coffea* spp.	12.777	56,31
6	695	9	45.555	*Coffea* spp.	32.222	141,46
7	732	17	28.055	Ki Hayam	8.055	44,34
8	760	12	28.611	*Coffea spp.*	20.000	94,90
9	831	11	8.611	*Murraya paniculata*	1.666	42,88
10	859	18	22.222	*Goniothalamus macrophyllus*	1.944	20,51
11	864	16	24.722	*Ficus involucrata*	8.055	53,27
12	884	6	22.500	*Coffea* spp.	11.388	80,03
13	984	13	10.277	*Helicia attenuata*	1.666	37,27
14	997	12	27.777	*Ficus involucrata*	10.833	59
15	1171	9	18.888	*Helicia attenuata*	8.611	83,09
16	1175	26	46.111	*Goniothalamus macrophyllus*	8.888	29,28
17	1273	15	27.777	*Helicia attenuata*	6.388	41,52

The highest INP value at the seedling level is Coffea spp. with a value of 141.46% at an altitude of 695 m above sea level, while the lowest INP value was G. macrophyllus with a value of 20.51% at an altitude of 859 m asl. G. macrophyllus at seedling level is dominant at an altitude of 442 m asl, 859 m asl, and 1,175 m asl. with respective values of 25.58%, 20.51%, and 29.28%. G. macrophyllus seedlings can be seen in Figure 2.

Figure 2. Seedling of Goniothalamus macrophyllus

b. Sapling

Based on the results of observations on 153 sample plots in the research location, there were 125 species of saplings based on 5 (five) species with the highest INP value respectively (Table 2).

Table 2. Density and INP sapling level in lowland forest in Kuningan Regency

No	Altitude (m asl)	Number of Types	Total Density(Ind/ha)	Dominant Type	Density (Ind/ha)	INP (%)
1	432	15	933	*Decapermum paniculatum*	222	47,62
2	442	13	800	*Platea excelsa*	177	47,22
3	506	18	1.111	*Syzygium lineatum*	133	25,04

No	Altitude (m asl)	Number of Types	Total Density(Ind/ha)	Dominant Type	Density (Ind/ha)	INP (%)
4	605	18	1.244	*Coffea* spp.	177	29,10
5	683	23	2.355	*Coffea* spp.	355	32,49
6	695	20	1.911	*Coffea* spp.	444	46,51
7	732	14	1.244	*Michocarpus sundaicus*	222	36,04
8	760	12	1.277	*Coffea* spp.	355	41,43
9	831	12	933	*Villebrunea rubenscens*	177	38,10
10	859	26	1.911	Ki Surawung	177	18,83
11	864	20	2.400	*Goniothalamus macrophyllus*	444	26,21
12	884	13	1.066	*Coffea* spp	222	44,64
13	984	10	755	*Aphanamiscis* sp.	133	36,40
14	997	26	1.644	*Goniothalamus macrophyllus*	355	44,48
15	1171	12	888	*Medinilla speciosa*	177	41,05
16	1175	23	2.133	*Goniothalamus macrophyllus*	355	33,69
17	1273	19	1.333	*Cratoxylon clandestinum*	177	27,13

The highest INP value at the sapling level is Decapermum paniculatum with a value of 47.62% at an altitude of 432 m asl., While the lowest INP value is Ki Surawung with a value of 18.83% at an altitude of 859 m asl. G. macrophyllus at dominant sapling level at an altitude of 864 m asl., 997 m asl., And 1,175 m asl. with respective values of 26.21%, 44.48%, and 33.69%. sapling of G. macrophyllus can be seen in Figure 3.

Figure 3. Sapling of Goniothalamus macrophyllus

c. Pole

Based on the observation at the pole level in the 153 sample plots at the research location, there were 98 species of pole level plants based on 5 (five) species with the highest IVI value respectively (Table 3).

Table 3. Density of poles and INP in lowland forest in Kuningan Regency

No	Altitude (m asl)	Number of Types	Total Density (Ind/ha)	Dominant Type	Density (Ind/ha)	INP (%)
1	432	8	355	*Syzygium lineatum*	144	105,21
2	442	6	177	*Baccaurea javanica*	55	97,80
3	506	10	233	*Villebrunea rubenscens*	77	91,46
4	605	17	277	*Micromelum pubescens*	11	51,11
5	683	18	300	*Coffea* spp.	66	50,91
6	695	19	444	*Coffea* spp.	155	81,11
7	732	14	255	*Michocarpus sundaicus*	33	44,48
8	760	11	422	*Swietenia macrophylla*	155	99,67
9	831	2	455	*Villebrunea rubenscens*	400	248,83
10	859	17	633	*Eurea javanica*	233	100,91

No	Altitude (m asl)	Number of Types	Total Density (Ind/ha)	Dominant Type	Density (Ind/ha)	INP (%)
11	864	12	466	*Eurea javanica*	88	59,36
12	884	9	177	*Coffea* spp.	77	117,80
13	984	14	355	*Antidesma montanum*	122	89,89
14	997	13	400	Kalapa Ciung	88	60,23
15	1171	10	244	*Medinilla speciosa*	77	69,30
16	1175	24	644	*Cratoxylon clandestinum*	133	57,94
17	1273	17	455	*Cratoxylon clandestinum*	100	66,17

The highest INP value at the pole level was Villebrunea rubenscens with a value of 248.83%, while the lowest INP value was Maesopsis eminii with a value of 7.05. At the pole level G. macrophyllus did not dominate. Poles of G. macrophyllus can be seen in Figure 4.

Figure 4. Poles of Goniothalamus macrophyllus

d. Trees

Based on the observation at the pole level in the 153 sample plots in the research location, there were 105 tree species based on 5 species with the highest INP value in sequence (Table 4).

Table 4. Density and INP of trees in the lowland forests of Kuningan Regency

No	Altitude (m asl)	Number of Types	Total Density (Ind/ha)	Dominant Type	Density (Ind/ha)	INP (%)
1	432	14	80	*Artocarpus elasticus*	11	79,68
2	442	10	52	*Ficus elastic*	5	84,70
3	506	14	86	*Villebrunea rubenscens*	30	86,68
4	605	14	91	*Lithocarpus pallidus*	19	76,02
5	683	22	102	*Aleurites moluccanus*	8	46,53
6	695	16	888	*Payana acuminate*	194	52,25
7	732	17	100	*Ficus elastic*	5	39,74
8	760	14	91	*Dysoxylum parasiticum*	22	57,58
9	831	13	116	*Villebrunea rubenscens*	58	119,72
10	859	14	172	*Peronema canescens*	47	78,93
11	864	14	150	*Eurea javanica*	52	80,34
12	884	13	63	*Sterculia coccinea*	8	73,11
13	984	17	75	*Ficus involucrata*	11	56,96
14	997	19	138	*Castanopsis argentea*	250	58,90
15	1171	15	88	*Castanopsis argentea*	27	93,12
16	1175	19	152	*Melaleuca* sp.	36	83,41
17	1273	14	83	*Cratoxylon clandestinum*	16	58,49

The highest INP value at the tree level was Villebrunea rubenscens with a value of 119.72%, while the lowest INP value was Ficus elastica with a value of 39.74%. G. macrophyllus was not found at the tree level. G. macrophyllus is a shrub, shrub or small tree that can grow up to 8 meters [13]. Other

studies have also demonstrated that seedlings are the most common growth stage relative to saplings, poles, and trees for G. macrophyllus [14], and this age structure pattern in common in plants. Also, it is important to note the very low proportion of poles relative to seedlings and saplings in which among all sampling sites, poles were only detected at two locations, one at 997 m in elevation and the other at 1,175 m [15].

The structure and composition of plant vegetation are influenced by other interacting ecosystem components, so that vegetation that grows naturally is the result of the interaction of various environmental factors. The vegetation structure is an organization of individuals in space that forms a stand [16]. Meanwhile, forest composition is the types of constituents that occupy vegetation in a place [17]. Moraceae is one of the dominant families in the forest area of Gunung Tilu, Kuningan Regency which is one of the lowland forests [11]. While in the rehabilitation zone of Mount Ciremai National Park shows that Kaliandra dominates germination because trees today are found in many research sites, both in the bush and in pine stands [18].

4. Conclusion

This study aims to look at the plants that grow and dominate the natural habitat of Goniothalamus macrophyllus. Determination of the research location using purposive sampling method. Furthermore, the sampling method in this study was encounter - sampling. in the lowland forests of Kuningan Regency, West Java. Goniothalamus macrophyllus was found at an altitude of 432 - 1,273 m above sea level, with a stand composition of 108 species of seedling plants, 125 species of saplings, 98 species of poles and 105 species of trees. The highest dominance at seedling level is Coffea spp, sapling level is Decapermum paniculatum, pole level is Villebrunea rubenscens, and tree level is Villebrunea rubenscens.

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