

Conference Paper

The Diversity of *Nepenthes* spp. in Multipurpose Forest, Green Campus Area of University of Palangka Raya, Central Kalimantan, Indonesia

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ABSTRACT

The Multipurpose Forest Area located at the University of Palangka Raya is a peatland forest area in which there are many types of plants, one of which is the pitcher plant (*Nepenthes* spp.). *Nepenthes* is a genus of insectivorous plant and generally lives in nutrient-poor soils. This study aimed to determine the diversity of pitcher plants (*Nepenthes* spp.) in the Multipurpose Forest area of the University of Palangka Raya. This research is descriptive - quantitative research using 10 box plots with a size of 5×5m for data collection. The results showed that 17 species of *Nepenthes* were found at the study site with a diversity index of 2.41 in the medium category. The species found included *N. gracilis*, *N. tobaica*, *N. distillatoria*, *N. gracilis* Red, *N. reinwardtiana*, *N. mirabilis*, *N. rafflesiana*, *N. maxima*, *N. smilesii*, *N. devin*, *N. domei*, *N. gracilis* Korth, *N. harsuta*, *N. hamiguitanensis*, *N. vogelii*, *N. khasiana*, and *N. Alata*. *N. gracilis* Red is the most dominant species with 123 individuals found and has a dominance index value (D) of 27.21%.

Keywords: Diversity index, green campus area, *Nepenthes* spp., multipurpose forest

Introduction

The Multipurpose Forest Area located at the University of Palangka Raya (UPR) is a peat forest area in which there are various types of plants, one of which is the pitcher plant (*Nepenthes* spp.). *Nepenthes* has a habitat range from open places, poor in nutrients, to places with high humidity in the range of 70-95%. *Nepenthes* can live in lowland tropical rain forests, mountain forests, savanna, swamps, and peat forests (Clarke, 2001). *Nepenthes* is an understory that can prey on insects (*insectivorous species/pitcherplan*) so it is classified as a carnivorous plant (Mardhiana et al., 2012). Predation of these insects is a way for *Nepenthes* to overcome the lack of nutrients from the soil. This species can grow as a liana or grow terrestrially (Mansur, 2012). *Nepenthes* apart from being an ornamental plant too believed to be a medicine, where the liquid contained in the young pouch that is still closed can be used as an eye medicine, cough medicine, and treat burns (Mulyani, 2006).

Nepenthes has fairly high diversity, there are 103 species of *Nepenthes* that have been identified and published in the world (Firstantinovi & Karjono, 2006). In Indonesia, there are approximately 64 species of *Nepenthes*. Kalimantan Island is the center of the spread of *Nepenthes* with a diversity of 29 species (Anwar et al., 2007). The population of semar bags in nature is predicted to continue to decline from year to year. Conversion of forest land for residential development, agriculture, and plantations is something that must be done along with the increasing population. Decreasing habitat of *Nepenthes* in nature (Mansur, 2006). Therefore, it is *species* necessary to carry out an inventory of the *existing Nepenthes*, because of the threat of land conversion, it is necessary to carry out *in-situ*. cultivation outside their natural habitat. P This

How to cite:

Araina, E., Mashabhi, S., Adam, C., & Fahrina, R. (2022). The diversity of *Nepenthes* spp. in multipurpose forest, green campus area of University of Palangka Raya, Central Kalimantan, Indonesia. 2nd Basic and Applied Science Conference (BASC) 2022. NST Proceedings. pages 74-79. doi: 10.11594/ nstp.2022.2511

study aims to determine the diversity of pitcher plant (*Nepenthes* spp.) in the Multipurpose Forest area of the University of Palangka Raya.

Material and Methods

Research site

This research was conducted in a Multipurpose Forest area located at the University of Palangka Raya, Jalan Yos Sudarso, Menteng Village, Jekan Raya District, Palangka Raya City, Central Kalimantan, Indonesia

Sampling techniques

This research is descriptive - quantitative research. The sampling technique was carried out in the forest area of the Palangka Raya University Campus, with plot mapping at the sampling location. There are 10 plots with a size of 5x5 meters. Sampling is done by tracing the entire sampling area that has been determined in stages. Observations and identification were carried out at the time of determining the location for sampling, in taking direct observation data in the field by observing and collecting data in the form and number of seamar bags in each plot, and identification was assisted by using a guide to identifying the types of seamar bags and related journals.

Data analysis

Data were analyzed by the Mix method (quantitative and qualitative). Data Analysis In describing the abundance of vegetation according to Kusmana (1997) a plant community requires three important parameters, namely density, frequency, and dominance. Qualitative analysis was conducted to describe the types of plants, quantitative analysis was carried out to explain the diversity and structure of plant vegetation. Plant diversity is carried out by looking for density, frequency, dominance, Important Value Index (INP), and diversity index. The diversity index was analyzed using the Shan-non-Wiener Index (H').

Results and Discussion

Result

Based on observations, it is shown that there are 17 types of *Nepenthes* which are presented in Table 1.

Table 1. *Nepenthes* spp species found

NO.	<i>Nepenthes</i> species	Total <i>Nepenthes</i> species
1	<i>Nepenthes gracilis</i>	25
2	<i>Nepenthes tobaica</i>	28
3	<i>Nepenthes distillatoria</i>	27
4	<i>Nepenthes gracilis</i> Red	123
5	<i>Nepenthes reinwardtiana</i>	34
6	<i>Nepenthes mirabilis</i>	57
7	<i>Nepenthes rafflesiana</i>	6
8	<i>Nepenthes maxima</i>	6
9	<i>Nepenthes smilei</i>	4
10	<i>Nepenthes devin</i>	40
11	<i>Nepenthes domei</i>	14
12	<i>Nepenthes gracilis</i> Korth	15
13	<i>Nepenthes harsuta</i>	29

To be continued...

14	<i>Nepenthes hamiguitanensis</i>	2
15	<i>Nepenthes vogelii</i>	4
16	<i>Nepenthes khasiana</i>	21
17	<i>Nepenthes alata</i>	17
	Total	420

Table 2. Analysis of the dominance index of *Nepenthes* spp.

No.	<i>Nepenthes</i> species	Total <i>Nepenthes</i> species	Dominance (D)	DR (%)
1	<i>Nepenthes gracilis</i>	25	1	5,530973451
2	<i>Nepenthes tobaica</i>	28	1,12	6,194690265
3	<i>Nepenthes distillatoria</i>	27	1,08	5,973451327
4	<i>Nepenthes gracilis</i> Red	123	4,92	27,21238938
5	<i>Nepenthes reinwardtiana</i>	34	1,36	7,522123894
6	<i>Nepenthes mirabilis</i>	57	2,28	12,61061947
7	<i>Nepenthes rafflesiana</i>	6	0,24	1,327433628
8	<i>Nepenthes maxima</i>	6	0,24	1,327433628
9	<i>Nepenthes smilesii</i>	4	0,16	0,884955752
10	<i>Nepenthes devin</i>	40	1,6	8,849557522
11	<i>Nepenthes domei</i>	14	0,56	3,097345133
12	<i>Nepenthes gracilis</i> Korth	15	0,6	3,318584071
13	<i>Nepenthes harsuta</i>	29	1,16	6,415929204
14	<i>Nepenthes hamiguitanensis</i>	2	0,08	0,442477876
15	<i>Nepenthes vogelii</i>	4	0,16	0,884955752
16	<i>Nepenthes khasiana</i>	21	0,84	4,646017699
17	<i>Nepenthes alata</i>	17	0,68	3,761061947
	Total	452	18,08	100

*Nepenthes tobaica**Nepenthes rafflesiana**Nepenthes mirabilis*



Nepenthes alata



Nepenthes gracilis



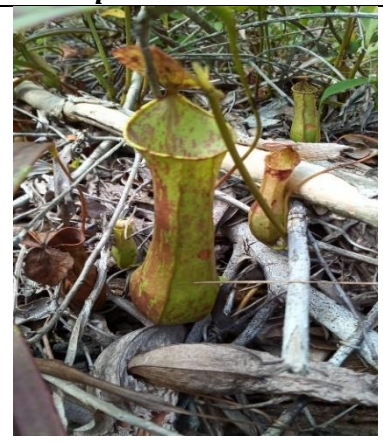
Nepenthes maxima



Nepenthes vogelii



Nepenthes hamiguitanensis



Nepenthes gracilis Korth



Nepenthes khasiana



Nepenthes hirsuta



Nepenthes devin



Figure 1. Species *Nepenthes* spp. found in the Multipurpose Forest Area of UPR

Discussions

Based on the observational data presented in Table 1, there are 17 *Nepenthes* with a total of 420 individuals found in the Multipurpose Forest area of the University of Palangka Raya, namely, *N. gracilis*, *N. tobaica*, *N. distillatoria*, *N. gracilis Red*, *N. reinwardtiana*, *N. mirabilis*, *N. rafflesiana*, *N. maxima*, *N. smilesii*, *N. devin*, *N. domei*, *N. gracilis Korth*, *N. hirsuta*, *N. hamiguitanensis*, *N. vogelii*, *N. Khasiana*, and *N. Alata*. The diversity of *Nepenthes* found is quite high, because *Nepenthes* is a plant that is easy to grow and develop well in environmental conditions that are not shaded and have sufficient sunlight. This is by the research location which is mostly an open area.

The form of plant vegetation usually varies and has a large number because it lives in colonies/groups so it has a diversity value that can grow and develop in areas that have soil temperatures and high soil acidity levels. This is in line with the large number of *Nepenthes* that can live in forests with acidic peat soils with pH values ranging from 3.00 to 4.00. The high and low of a plant community diversity index usually depend on the number of species and the number of individuals of each type (species richness). As explained by Indriyanto (2006) that species diversity can be used to express community structure. Species diversity can also be used to measure community stability, or the ability of a community to maintain itself stable despite disturbances to its components. Species diversity tends to be low in physically controlled ecosystems and high in biologically regulated ecosystems (Odum, 1993). The diversity *Nepenthes* is influenced by several environmental factors such as temperature, soil pH, soil moisture and light

intensity, this species diversity will be high if all of the above factors are met and the distribution and crossing occur well.

Based on data analysis, it was found that the dominant species was *Nepenthes gracilis* Red with a dominance index (D) of 27.2%, and the number found was 123 individuals. This is because this type of *Nepenthes* lives on thin peat soil in open areas that have very sufficient light intensity. Meanwhile, *Nepenthes*, the least *Nepenthes hemiguitanensis* with a dominance index of 0.44%, and the number found was 2 individuals. This type *Nepenthes* grows under a tree with a dense canopy and lacks sunlight intensity. The diversity of *Nepenthes* in the UPR Multipurpose Forest area has a diversity index (H') of 2.41%. The value in the diversity index criteria from Shannon, has moderate diversity criteria.

Conclusion

The results showed that 17 species of *Nepenthes* were found in the study area with a diversity index of 2.41 in the medium category. The species found included *N. gracilis*, *N. tobaica*, *N. distillatoria*, *N. gracilis* Red, *N. reinwardtiana*, *N. mirabilis*, *N. rafflesiana*, *N. maxima*, *N. smilesi*, *N. devin*, *N. domei*, *N. gracilis* Korth, *N. harsuta*, *N. hamiguitanensis*, *N. vogelii*, *N. Khasiana*, and *N. Alata*. *N. gracilis* Merah is the most dominant species with the number of individuals found as many as 123 individuals and has a dominance index value (D) of 27.21%.

Acknowledgment

There are no words that deserve to be said other than gratitude for the presence of Allah SWT. Thanks to His abundance and grace, the authors were able to complete the paper entitled "The Diversity of *Nepenthes* spp. in Multipurpose Forest, Green Campus Area of University of Palangka Raya, Central Kalimantan, Indonesia". On this happy occasion, the authors do not forget to thank, Yarsi University, as the organizer of the 2022 National Seminar on Basic and Applied Science Conference (BASC), Palangka Raya University, and all parties who have provided direction and thoughts in writing this paper.

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