

Potential of Type and Benefit Piperaceae for Communities in Tangkahan Forest Area

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Abstract

Indonesia has a diversity of plants in highland areas such as hillsides or forests. One example of plant diversity in the highlands or in the hills of the Tangkahan Forest is the various types of Piperaceae. Piperaceae theoretically consists of 13 genera and an estimated number of $\pm 2,658$ species. This study aims to examine and analyze of potential of type and benefit Piperaceae for communities in Tangkahan Forest area. This type of research is descriptive research. This research technique is an observation technique. This research was conducted in March to February 2022. Sampling of Piperaceae was carried out by purposive sampling method by making a line transect of 1600 m long. The data collected in this study in the form of primary data and secondary data. Results of research in the Tangkahan Forest area, 16 species of Piperaceae were found with 2 genera namely Peperomia and Piper, of which 16 species have 3 habitus including herbs, shrubs and lianas spread from an altitude. The study on the utilization of Piperaceae noted that there were 5 species used as ornamental plants, 6 species used as ingredients for medicinal herbs, 2 species used for economic purposes and the other species whose potential use was unknown.

Keywords

Piperaceae; Tangkahan Forest; Species



I. Introduction

Indonesia has a diversity of plants in highland areas such as hillsides or forests. One example of plant diversity in the highlands or in the hills of the Tangkahan Forest is the various types of Piperaceae. Piperaceae theoretically consists of 13 genera and an estimated number of $\pm 2,658$ species. This plant has a very wide distribution area, in the tropics and subtropics from the lowlands to the highlands. A good natural habitat for Piperaceae is in a place that is moist and rich in humus (Tjitrosoepomo, 1994; Purnomo, 2000). Piperaceae is one of the families in the order Piperales which has habitus characteristics, some are trunked or tree-shaped, some are creeping and shrubs or shrubs, aromatic leaves, compound flowers arranged in strands (strand flowers), small, dry and hard fruit (classified as fruit stone).

The Tangkahan Forest area is a blend of natural forest in the Gunung Leutser National Park (TNGL) where this forest area is one of the lowland tropical rain forest areas in North Sumatra Province, Langkat Regency, Batang Serangan District, Namo Sialang Village. The Tangkahan Forest area is inhabited by the Karo Tribe. The local community (the Karo Tribe) generally have their daily work as traders, attracting local/foreign tourists visitors and as a distraction for research on plant diversity in the Tangkahan Forest area, one of which is Piperaceae. The Karo people use plants from the Piperacea group, including the types cultivated by the community, namely Piper aduncum (pepper) and Piper betle (green betel).

Piperaceae is widely used by the general public as traditional medicine, ritual material, a sign of honor in customs, economy and chewing or betel nut (Parsudi and Suparlan, 1983). Chewing is one of the cultures related to the social culture of the Indonesian people, especially the Karo people. At first the Karo people used betel as traditional medicine, traditional ceremonies and beliefs of the Karo people. Munawaroh and Yuzammi (2017), examples of Piperaceae that have been used by the community include Piper betle L. for socio-cultural activities, ingredients for traditional medicines and betel nut, Piper nigrum L. is used as a plant that can give flavor to food (seasoning).

This study aims to examine and analyze of Piperaceae plant species in Tangkahan Forest, Langkat Regency.

II. Research Method

This type of research is descriptive research. Research with descriptive type is a research method that seeks to describe and interpret objects as they are (Pandiangan et al., 2018). The researcher did not manipulate the variables and also did not control the research variables. This research technique is an observation technique. Observation technique is one way of collecting information about objects or events that are visible or can be detected with the five senses. This research was conducted in March to February 2022.

Sampling of Piperaceae was carried out by purposive sampling method by making a line transect of 1600 m long. On the 1600 m transect line, 40 plots were made measuring 20 m x 20 m with 20 m intervals and displayed in a zig zag manner on the transect line. The Piperaceae plants found in the observation plots were documented, the types and numbers were recorded, then collection was carried out where each collection was given a label containing the number, name, and date. The collected samples were arranged in folded newspapers, put in a 10 kg plastic bag and sprayed with 70% alcohol until wet. Soil samples were taken randomly by taking from several plots. Soil samples taken at a depth of 0-30 cm as much as 1 kg soil samples will be used for analysis of soil chemical properties in the laboratory.

The data collected in this study in the form of primary data and secondary data. Secondary data was obtained by studying literature from various literatures and by observing forest area managers.

III. Results and Discussion

3.1 Description of Piperaceae

Piperaceae are mostly herbaceous, sometimes in the form of woody plants, often climbing using adhesive roots (Tjitrosoepomo, 2009). The position of the leaves is opposite and opposite, single, flat edges, pinnate (curved) leaves. Flowers are arranged in compound flowers called pepper flowers (amentum), each small without flower decoration, unisexual or sissy with 1-10 stamens; the pistil consists of 1-6 pieces (mostly 3), the stigma bears 1 with 1 ovule that is erect at the base.

3.2 Region Description

a. Topography

Topographic conditions vary from flat for areas around the coast, wavy and hilly to mountainous for upstream areas, with an altitude between 0-1,200 m above sea level, with a coastline of 110 km. The northeastern part is along the coast of the Malacca Strait, the topography is relatively flat except for the hilly areas in the northeastern part of the Pematang Jaya and Gebang sub-districts. The area has an average height of 0-4 m above sea level,

covering the Districts of Pematang Jaya, Besitang, Pangkalan Susu, West Brandan, Sei Lelan, Babalan, Gebang, Tanjung Pura and Secanggang. The western part to the southwest is relatively flat to hilly with an altitude of 0-30 m above sea level. The area includes the Districts of Stabat, Binjai, Hinai, Wampu, Padang Tualang, Finish, Sawit Seberang, parts of Sei Lelan, Parts of Besitang, Parts of Kuala, and Parts of Sei Bingai. The area bordering Karo, Southeast Aceh and Gayo Lues is undulating to relatively steep mountains, with an altitude between 30 – 1200 m above sea level. The area is a protected forest in the Gunung Leuser National Park (TNGL). The sub-districts included in this area are mostly Besitang, Sei Lelan, Bahorok, Batang Serangan, Salapian, and Sei Bingai.

b. Types of soil in Langkat Regency

1. The plains along the coast consist of alluvial soil.
2. The lowlands consist of low glei humus, gray and plarosal hindromophiles.
3. Uplands and hills consist of red yellow podsolid soil.

c. The Rock Composition (geology) in Langkat Regency

1. Qh=Alluvium: Gravel, sand and clay;
2. Qpme=Medan Formation: Chunks of gravel, sand, silt and clay;
3. QTjr=Julu Rayeu Formation: alternating layered sandstone and mudstone;
4. Qvt=Toba tuff: Rhiodasite tuff, partially welded;
5. Qvbj=Unit of Binjai: Flow breccia in andesite to dacite;
6. Ppbl=Batumilmil Limestone Formation: Limestone and chert;
7. Pub=Bahorok Formation: Wakemalihan, slate, malihan quartz arenite, malihan siltstone, malihan conglomerate;
8. Tps=Seurela Formation: Rhythmic sandstone, mudstone and conglomerate;
9. Tuk=Keutapang Formation: alternating layered sandstone and mudstone;
10. Tmb=Baong Formation: Mudstone (some glauconite) and sandstone;
11. Tob=Bruksah Formation: Sandstone and conglomerate.

d. Climatology

Langkat Regency has an alkaline tropical climate, where throughout the year is a wet month (rainfall above 100 mm³/month) without any dry months, so it can be called almost uniform rain throughout the year, with the highest average rainfall for the last three years occurring in the month May is 300 mm³ and the lowest rainfall occurs in February, which is 116 mm. Based on the Schmidt-Ferguson¹ classification, the Langkat Regency area belongs to climate type A where the dry season occurs in February-March and the rainy season occurs from September to February. The average rainfall ranges from 1.00 to 3,000 mm per year. The minimum average temperature ranges from 230–250 C and the maximum average is 300 – 330 C, and the relative humidity is between 65%–75%.

e. Total Population

The population of Langkat Regency, based on data from the Department of Population and Civil Registration of Langkat Regency in 2012 was 1,271,454 people, consisting of 651,121 men and 620,333 women. The largest population is in the Stabat sub-district, which is 83,093 people, then the Finish sub-district is 70,035 people, while the sub-district with the smallest population is Pematang Jaya sub-district with a population of 13,102 people.

3.3 Types of Piperaceae in the Tangkahan Forest Area

Based on the results of research in the Tangkahan Forest area, 16 species of Piperaceae were found with 2 genera namely Peperomia and Piper, of which 16 species have 3 habitus including herbs, shrubs and lianas spread from an altitude of 108-215 m asl as shown in Table 1.

Table 1. Types of Piperaceae in the Tangkahan Forest Area

No.	Scientific Name	Number of Individuals	Altitude (m asl)	Habitus
1	Peperomia laevifolia L.	3	176	Herb
2	Piper aduncum L.	20	120-188	Shrub
3	Piper baccatum Blume	8	139-170	Liana
4	Piper betle L.	17	120-215	Liana
5	Piper caninum Blume	43	108-172	Liana
6	Piper clypeata	8	137-181	Liana
7	Piper flavimarginatum Blume	62	123-215	Liana
8	Piper lowong Blume	12	113-171	Liana
9	Piper maculaphyllum	27	123-188	Liana
10	Piper miniatum	55	108-188	Herb
11	Piper muricatum Blume	5	124	Liana
12	Piper pedicellatum	17	108-171	Herba
13	Piper porphyrophyllum	56	113-176	Liana
14	Piper sintenense	318	108-181	Liana
15	Piper stylosum Miq.	21	113-215	Herb
16	Piper 1	35	108-163	Liana

The results of the research on the ecology and potential of Piperaceae in the Tangkahan Forest area obtained 16 types of Piperaceae as listed in the table above. The results of the exploration showed as many as 16 species of Piperaceae with a total of 707 individuals, where from the results there were 2 genera, namely Peperomia 1 species and Piper 15 species. The highest number of individuals was found in Piper sintenense, namely 318 individuals, Piper miniatum was 55 individuals and the least Piper Bacatum was 8 individuals, Piper clypeata was 8 individuals, Piper muricatum was 5 individuals while Peperomia laevifolia was only 3 individuals. Many species are found because they have an even or good distribution pattern so that the growth process is very fast resulting in the number of species being found, one of which is due to environmental factors such as light, humidity, soil pH, canopy cover from surrounding trees and the level of competition from each species.

The results of Ahdatika's research (2008) in the Deleng Lancuk Natural Park area there are 8 species, of which 8 species have the same type, namely Piper caninum. Piper caninum has a total of 77 individuals while Piper caninum in Tangkahan Forest has a total of 43 individuals, so between these two areas there is a different distribution pattern due to environmental factors and distribution.

The results of research by Munawaroh (2009) regarding the diversity of Piperaceae and its potential in the Maninjau Nature Reserve area contained 19 species, of which 19 species had some similarities found in forest areas, including Piper Bacatum, Piper betle,

Piper aduncum, *Piper porphyrophyllum*, and *Piper flavomarginatum*, with each number of individuals being *Piper Bacatum* 366 individuals, *Piper betle* 52 individuals, *Piper aduncum* 8 individuals, *Piper porphyrophyllum* 27 individuals, and *Piper flavomarginatum* 51 individuals while in the Tangkahan Forest Area *Piper Bacatum* 8 individuals, *Piper betle* 17 individuals, *Piper aduncum* 20 individuals, *Piper porphyrophyllum* 55 individuals, and *Piper flavomarginatum* 62 individuals. So the highest number found in the Tangkahan forest area was *Piper flavomarginatum* and in the Nature Reserve area it was *Piper Bacatum*, this is because the level of population distribution of each species dominates the growth location.

The results of field research by biology students in the Tangkahan Forest area obtained 6 species, of these 6 species there is 1 of the same species, namely *Piper betle*.

At the research site can be divided into 3 categories of altitude, namely 110-150 m above sea level, 151-200 m above sea level, 201-250 m above sea level, from these three categories there are several dominant altitude samples, namely *Piper sintenense* with an altitude of 137-139 m above sea level, *Piper miniatum*, *Piper pedicellatum* and *Piper stylosum* at 157 m asl, *Piper caninum* at 124 m asl and *Piper flavimarginatum* at 145 m asl. The category of altitude 110-150 m above sea level contains 15 types of Piperaceae, at an altitude of 151-200 m above sea level there are 15 types of Piperaceae, at an altitude of 201-250 m above sea level there are 3 types of Piperaceae and an altitude of 176 m asl there is 1 type of *Peperomia*. The primary data has an altitude of 108 – 215 m above sea level.

The results of Munawaroh's research (2009) have the same species found, namely *Piper Bacatum*, *Piper betle*, *Piper aduncum*, *Piper porphyrophyllum*, and *Piper flavomarginatum* with each height, namely *Piper Bacatum* 139-400 m above sea level, *Piper betle* 123-340 m above sea level, *Piper aduncum* 120-300 m above sea level, *Piper porphyrophyllum* 200-240 m above sea level, *Piper flavomarginatum* 139-250 m above sea level while the Tangkahan Forest area has an altitude of *Piper Bacatum* 139-170 m above sea level, *Piper aduncum* 120-188 m above sea level, *Piper betle* 120- 215 m asl, *Piper porphyrophyllum* 113-176 m asl, *Piper flavomarginatum* 123-215 m asl. So the comparison of the same species also has the same height between these two areas, namely *Piper Bacatum* with an initial height of 139 meters above sea level and *Piper aduncum* 120 meters above sea level.

The types of Piperaceae collected for the Tangkahan Forest Area have a specific habitus, there are 4 types of herbaceous plants, namely *Piper miniatum*, *Piper pedicellatum*, *Piper stylosum* and *Peperomia laevifolia*. 1 species is a herbaceous plant, namely *Piper aduncum*. 11 species are lianas, namely *Piper caninum*, *Piper porphyrophyllum*, *Piper betle*, *Piper flavimarginatum*, *Piper maculaphyllum*, *Piper bacatum*, *Piper clypeata*, *Piper sintenense*, *Piper vacant*, *Piper muricatum*, *Piper* 1. found in shrubs, the percentage of plants based on their habitus can be seen in Figure 1 while the percentage in the genus is in Figure 2.

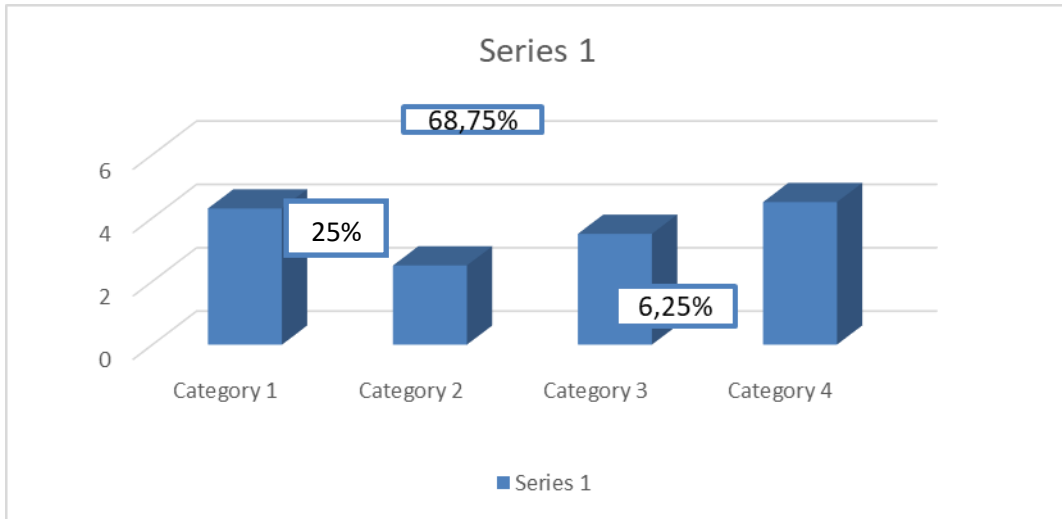


Figure 1. Percentage by Habitus

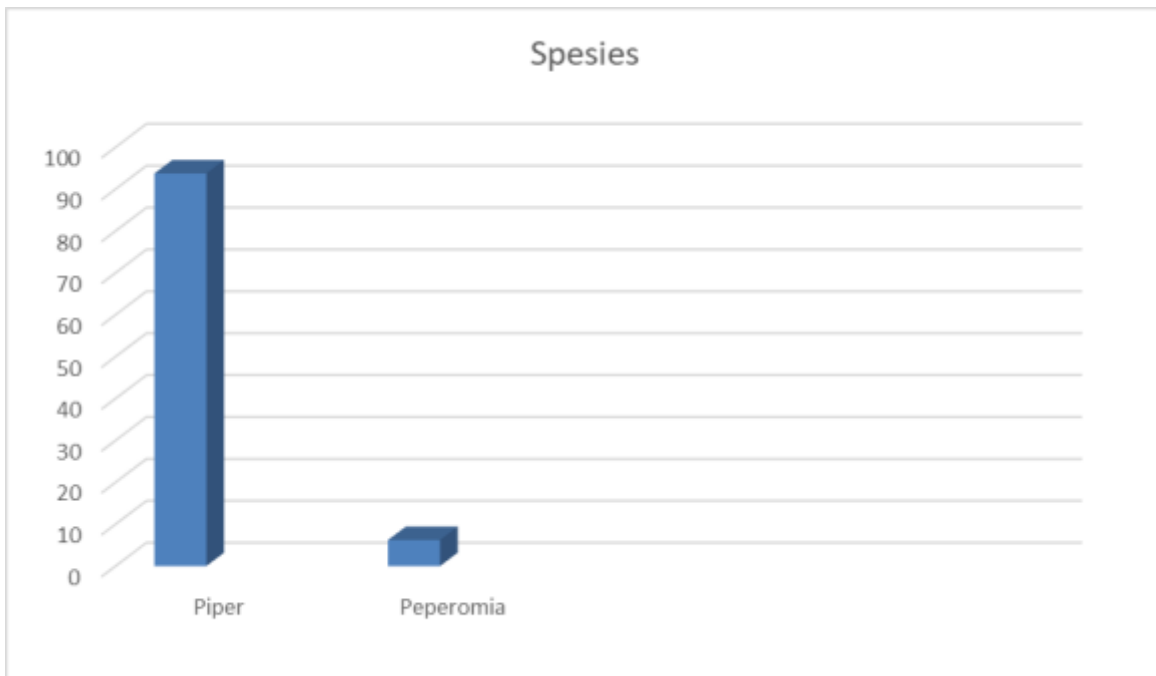


Figure 2. Percentage by Species

3.4 Benefit of Piperaceae

Piperaceae has long been known and used by the community as an ingredient in traditional medicine. Some examples of the use of species from the Piperaceae tribe are as follows:

- a. *Piper nigrum*: pepper (Indonesian), fruit for seasoning, ground grains or not, useful for cooking spices. The treatment of fruit depends on whether white or black pepper will be obtained (Tjitrosoepomo, 1993; Steenis, 2005).
- b. *Piper betle*: betel (Indonesian), as an antiseptic, or as a medicine: can cure eye diseases, eczema, bad breath, itchy skin, remove acne, bleeding gums, nosebleeds, bronchitis, coughs, canker sores, wounds, vaginal discharge, heart disease, syphilis, allergies/hives, diarrhea, toothache. Betel can also eliminate body odor caused by bacteria and fungi, heal wounds on the skin (Tjitrosoepomo, 1993; Steenis, 2005).
- c. *Piper cubeba*: cubeb (Indonesia), this cubeb is mainly cultivated as a medicinal plant (Tjitrosoepomo, 1993; Steenis, 2005).
- d. *Piper sarmentosum*: Javanese chili (Indonesia), the root of this plant is efficacious for laxative urine, and gallstones.
- e. *Piper retrofractum*: Javanese chili (Indonesia), can be used as a medicinal plant. Can cure various types of diseases, such as: stomach cramps, vomiting, flatulence, heartburn, dysentery, diarrhea, difficulty defecating, headache, toothache, cough, fever, runny nose, impotence, difficulty giving birth, neurastinia, blood pressure low, impaired digestion, rheumatism, not pregnant, cold uterus, weak body, stroke and so on (Tjitrosoepomo, 1993; Steenis, 2005).

3.5 Benefit Piperaceae for Communities

The study on the utilization of Piperaceae noted that there were 5 species used as ornamental plants, 6 species used as ingredients for medicinal herbs, 2 species used for economic purposes and the other species whose potential use was unknown. According to information obtained from community interviews, the Piperaceae species in the Tangkahan Forest area have the benefits listed in Table 2.

Table 2. Benefit Piperaceae at Namo Sialang Village

No.	Scientific Name	Parts Used	How to Use	Utility
1	<i>Peperomia laevifolia</i>	-	-	-
2	<i>Piper aduncum</i>	Leaf	The leaves are brewed, drunk, kneaded and rubbed on the sick place	Wound healing, stop vomiting, improve digestion, antiseptic and reduce nausea
3	<i>Piper bacatum</i>	Leaf Plant	The leaves are brewed, drunk, kneaded and rubbed on the neck Plant in front of the house	Cough medicine Decorative plants
4	<i>Piper betle</i>	Leaf Plant Fruit	The leaves are boiled and drunk Plant in front of the house Chewable fruit	Canker sores, coughs, toothaches, wounds and gums Decorative plants Economic value

5	Piper caninum	Leaf Fruit Plant	Boiled mash Plant in front of the house	Medicinal plants Insecticide raw material or economic value Decorative plants
6	Piper clypeata	-	-	-
7	Piper flavimarginatum	Plant	Planted in front of the house	Decorative plants
8	Piper lowong	-	-	-
9	Piper maculaphyllum	-	-	-
10	Piper miniatum	Leaf	Kneaded or ground	Medicinal plants
11	Piper muricatum	-	-	-
12	Piper pedicellatum	Leaf	Boiled	Medicinal plants
13	Piper porphyrophyllum	Plant	Planted in front of the house	Decorative plants
14	Piper sintenense	-	-	-
15	Piper stylosum	-	-	-
16	Piper 1	-	-	-

From Table 2, Piperaceae which have the potential as medicinal plants and ornamental plants used by local communities of the 16 species that are used are 8 species while the other 8 species are not yet known for their potential use. There are 4 types of potential ornamental plants, namely (Piper bacatum, Piper flavimarginatum, Piper betle, Piper porphyrophyllum) while 6 types of potential medicinal plants are (Piper miniatum, Piper pedicellatum, Piper caninum, Piper aduncum, Piper betle, Piper Bacatum), of the 8 species that have potential utilization, there are 2 types that have benefits as medicinal plants and ornamental plants, namely Piper betle, Piper Bacatum. Munawaroh (2009) in West Sumatra about Piperaceae is almost the same in use in Tangkahan, only there are some that are not the same.

The use of the Piperaceae species by the Namo Silang village community is divided into several potentials such as traditional medicine, ornamental plants, and the economic value of the community. Based on the results of the study, the percentages of the utilization of Piperaceae species are as follows: 13% economic value, 31% ornamental plants, 6% traditional medicine and ornamental plants, 13% ornamental plants, medicinal and economic value and 37% traditional medicine. cinal and economic value and 37% traditional medicine.

IV. Conclusion

Results of research in the Tangkahan Forest area, 16 species of Piperaceae were found with 2 genera namely Peperomia and Piper, of which 16 species have 3 habitus including herbs, shrubs and lianas spread from an altitude. The study on the utilization of Piperaceae noted that there were 5 species used as ornamental plants, 6 species used as ingredients for medicinal herbs, 2 species used for economic purposes and the other species whose potential use was unknown.

Suggestions in research are as follows:

1. It is necessary to increase knowledge through classical and non-classical learning to the local community as a basis for increasing competence so that there is a change in the treatment of knowledge degradation.
2. Further research is needed to increase the number of Piperaceae found in the Tangkahan forest area and provide information to the local community that Piperaceae has thousands of species in the tropical rain forest area that can be utilized.

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