Global Forest Journal
Journal homepage: https://talenta.usu.ac.id/gfj

Exploration of medicinal plants in Telaga Village Langkat District North Sumatra Province, Indonesia

Rahmawaty[1,2*], Janter Bronson Samosir[1], Rizky Amalia[1], Sintike Frastika[1], Abdul Rauf[1,3], Ridwanti Batubara[1], Mohd Hasmadi Ismail[4], Seca Gandaseca[5]
[1]*Faculty of Forestry, Universitas Sumatera Utara, Kampus 2 USU Kuala Bekala, Pancur Batu, Deli Serdang, North Sumatra, Indonesia*
[2]*Natural Resources and Environmental Management Study Program, Postgraduate School, Universitas Sumatera Utara, Kampus USU Padang Bulan, Medan 20155, North Sumatra, Indonesia*
[3]*Faculty of Agriculture, USU*
[4]*Department of Forestry Sciences and Biodiversity, Faculty of Forestry and Environment, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia.*
[5]*School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA Jalan Ilmu 1/1, 40450 UiTM Shah Alam, Selangor Darul Ehsan, Malaysia*
[*]Corresponding Author: rahmawaty@usu.ac.id

ARTICLE INFO
Article history:
Received 27 February 2024
Revised 27 December 2024
Accepted 23 January 2025
Available online 30 January 2025

E-ISSN: 3024-9309

How to cite:
Rahmawaty, J. B. Samosir, R. Amalia, S. Frastika, A. Rauf, R. Batubara, M. H. Ismail, S. Gandaseca. "Exploration of medicinal plants in Telaga Village Langkat District North Sumatra Province, Indonesia," *Global Forest Journal*, vol. 03, no. 01, January 2025.

http://doi.org/10.32734/gfj.v3i01.15783

ABSTRACT
Medicinal plants in North Sumatra Province are found in various locations, including agroforestry areas, where they are either cultivated or grow naturally. This study aimed to identify medicinal plants in the agroforestry lands of Telaga Village, Langkat District, North Sumatra Province, Indonesia. A survey method was employed, involving the establishment of 16 plots to collect data on medicinal plants. The results revealed 199 individual medicinal plants, representing 35 species across 20 families. The most prevalent species was *Clidemia hirta* (Senduduk bulu), with 61 individual plants, followed by *Imperata cylindrical* (Ilalang) with 17 individuals, *Zingiber zerumbet* (Lempuyang) with 14 individuals, and *Hedyotis corimbosa* (Merah mata) with 14 individuals. The diversity index for herbs and poles was categorized as moderate, while the index for trees and saplings was also moderate. This information on medicinal plant species is crucial, highlighting the need for further development and conservation efforts to preserve and sustainably utilize these plant species in Telaga Village.
Keyword: Agroforestry, Medicinal Plants, Telaga Village, Senduduk Bulu

1. Introduction
Medicinal plants are a significant aspect of biodiversity in Indonesia, with many of them having been recognized and used by local communities for centuries. It is estimated that Indonesia's forests harbour around 940 species of medicinal plants, approximately 78% of which are still sourced directly from the forest [1]. Physicians, or medical experts, utilize these plants as raw materials for creating medicinal remedies [2]. Medicinal plants are generally categorized into three groups: potential medicinal plants, modern medicinal plants, and traditional medicinal plants [3]. Potential medicinal plants are those believed to contain bioactive compounds with medicinal properties, although their efficacy has not yet been scientifically validated for use in traditional medicine [4-5].

Traditional medicinal plants are plant species known for their medicinal properties, which have long been used as ingredients in traditional medicine [3]. Modern medicinal plants, on the other hand, are those that have been scientifically validated to contain bioactive compounds with therapeutic effects, and their use is supported by medical evidence [3-5].

Medicinal plants are present in community lands, and the cultivated areas of Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia, hold potential for such plants. However, no prior research on medicinal plants has been conducted in this area. This study aims to explore the various types of medicinal plants found beneath the vegetation in Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia. Telaga Village has unique qualities that make it an interesting research location, such as biodiversity, supportive natural conditions, and the potential for developing new medicines that are globally beneficial. This village offers unique opportunities that cannot be found in other villages in Indonesia or even in the world because it is a buffer area for the Gunung Leuser National Park. Therefore, research on medicinal plants in Telaga Village is not only relevant for Indonesia but also important for global contributions to the development of natural medicines and the preservation of world biodiversity.

2. Method

This study was carried out in Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia (Figure 1).

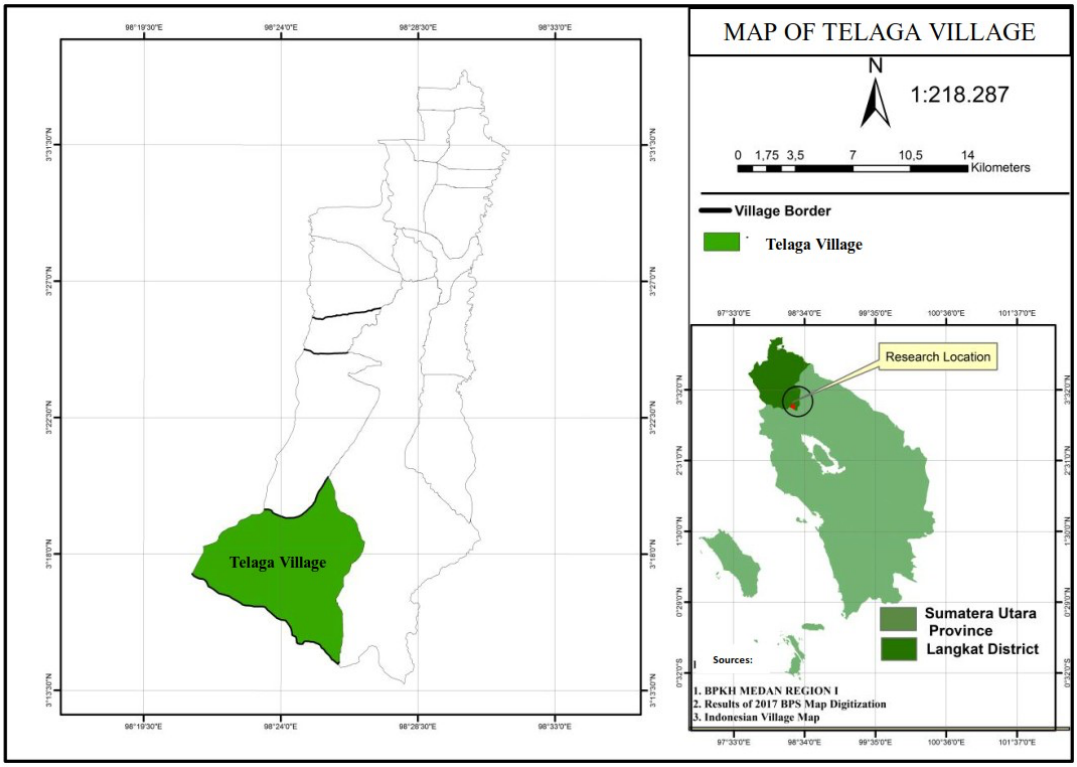

Figure 1. Map of Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia

The survey method was employed by establishing 16 plots to gather field data. Medicinal plants were sampled using a plot sampling approach, where plots were created along pathways in community lands that were representative of the entire study area and likely to support the growth of medicinal plants. The total area of community land in Telaga Village is approximately 6.4 hectares, and the sampling intensity was set at 10% of this land area [6-8]. Each lane was marked with a 20 x 20-meter plot for trees, within which a 10 x 10-meter plot was designated for poles, a 5 x 5-meter plot for saplings, and a 2 x 2-meter plot for medicinal plants, resulting in a total of 16 sample plots. A global positioning system (GPS) was used to record the coordinates of the medicinal plants [6-11]. The local names of the medicinal plants were identified through the knowledge of the local community, while scientific names were determined using herbaria, photographs, and reference materials [12-15].

3. Results and Discussion

The study identified 199 individual plants, comprising 35 species and 20 families. The medicinal plants discovered were primarily herbs. The dominant species was *Clidemia hirta* (Senduduk bulu) with 61 individual plants. This result aligns with findings from a study on the distribution of medicinal plants in the arboretum at the University of North Sumatra [16]. The second most common plant in the area was *Imperata cylindrical* (Ilalang) with 17 individual plants, followed by *Zingiber zerumbet* (Lempuyang) and *Hedyotis corimbosa* (Merah mata), each with 14 individual plants. The details of the various medicinal plant species are presented in Table 1 and Figure 2.

Table 1. Number of medicinal plant species in Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia.

No	Species Name	Family Name	Scientific Name	Number of species	Rde	RF	IVI	H'
1	Bening-bening	Malvaceae	*Sida rhombifolia*	5	2.51	1.64	4.15	
2	Suntil-suntil	Verbenaceae	*Stachytarpheta jamaicensis*	5	2.51	3.28	5.79	
3	Tanduk rebuah	Euphorbiaceae	*Phyllanthus niruri*	13	6.53	3.28	9.81	
4	Kalibambang	Poaceae	*Saccharum officinarum*	1	0.50	1.64	2.14	
5	Merah mata	Rubiaceae	*Hedyotis corimbosa*	14	7.04	8.20	15.23	
6	Senduduk bulu	Melastomataceae	*Clidemia hirta*	61	30.65	19.67	50.33	
7	Tengkua	Asteraceae	*Emilia sonchifolia*	1	0.50	1.64	2.14	
8	Kunyit	Zingiberaceae	*Curcuma longa*	2	1.01	3.28	4.28	
9	Tegi-tegi	Euphorbiaceae	*Euphorbia hirta*	3	1.51	1.64	3.15	
10	Pakis	Dryopteridaceae	*Polystichum setiferum*	3	1.51	1.64	3.15	
11	Ilalang	Poaceae	*Imperata cylindrical*	17	8.54	1.64	10.18	
12	Pus-pus	Hypoxidaceae	*Curculigo latifolia*	2	1.01	1.64	2.64	
13	Pesul	Menispermaceae	*Cyclea barbata*	1	0.50	1.64	2.14	
14	Rata bunga	Poaceae	*Eleusine indica*	7	3.52	1.64	5.16	
15	Lempuyang	Zingiberaceae	*Zingiber zerumbet*	14	7.04	3.28	10.31	
16	Bancir	Asteraceae	*Acmella oleracea*	11	5.53	6.56	12.09	
17	Pijer keling	Acanthaceae	*Strobilanthes crispa*	2	1.01	1.64	2.64	
18	Jahe	Zingiberaceae	*Zingiber officinale*	2	1.01	3.28	4.28	
19	Cekala	Zingiberaceae	*Nicolaia speciosa*	1	0.50	1.64	2.14	
20	Sambung nyawa	Asteraceae	*Gynura procumbens*	1	0.50	1.64	2.14	
21	Jerango	Acoraceae	*Acarus calamus*	1	0.50	1.64	2.14	
22	Daun bakung	Liliaceae	*Lilium*	1	0.50	1.64	2.14	
23	akar wangi	Poaceae	*Chrysopogon zizanioides*	8	4.02	4.92	8.94	
24	Sampun	Solanaceae	*Solanum verbacifolium*	3	1.51	1.64	3.15	
25	Laza	Myrtaceae	*Syzygium polyanthum*	2	1.01	1.64	2.64	
26	Cirampas pide	Asteraceae	*Spilanthes acmela*	1	0.50	1.64	2.14	
27	Temulawak	Zingiberaceae	*Curcuma zanthorrhiza*	1	0.50	1.64	2.14	
28	Salagundi	Lamiaceae	*Vitex trifolia*	1	0.50	1.64	2.14	
29	Sampelulut	Cucurbitaceae	*Luffa aegyptiaca*	5	2.51	3.28	5.79	
30	Perdit	Zingiberaceae	*Kaemferia undulate*	1	0.50	1.64	2.14	
31	asar-asar	Selaginellaceae	*Selaginella deoderleinii*	3	1.51	1.64	3.15	
32	Cecepen	Asteraceae	*Ageratum conyzoides*	2	1.01	1.64	2.64	
33	temu-temu	Zingiberaceae	*Boesenbergia rotunda*	2	1.01	1.64	2.64	
34	Dulpak	Asteraceae	*Blumea balsamifera*	1	0.50	1.64	2.14	
35	Bunga sapa	Apocynaceae	*Catharanthus roseus*	1	0.50	1.64	2.14	
			Total	199	100	100	200	2.40

Note: The relative frequency (RF), the relative density (RDe), the important value index (IVI)

(a) (b) (c)

Figure 2. Medicinal plants in Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia: a. senduduk bulu (*Clidemia hirta*), b. ilalang (*Imperata cylindrica*), c. lempuyang (*Zingiber zerumbet*)

The diversity index value was rated as moderate (2.40), indicating that Telaga Village has potential for the sustainable use of medicinal plants. The local community in Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia, has long utilized medicinal plants, with traditional knowledge about these plants being passed down through generations. The parts of the plants used for medicinal purposes include the roots, stems, fruits, and leaves [1, 2, 16]. These findings align with a study conducted at the Universitas Sumatera Utara Arboretum, which also explored the distribution of medicinal plants [16].

In the study site, 48 individual trees, 43 poles, and 25 saplings were found (Table 2,3,4). At tree stage, *Hevea brasiliensis* was the dominant plant (15 individual plant), followed by *Archidendron pauciflorum* (12 individual plant), and *Aleurites moluccanus* (8 individual plant). The Diameter of tree ranged from 27 cm to 33 cm. The diversity index value was categorized as moderate (1.65). A list of the different tree species is shown in Table 2.

Table 2. Number of tree species in Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia

No	Tree species	Family Name	Scientific Name	Number of tree species	RDe	FR	RDo	IVI	H'
1	Karet	Euphorbiaceae	*Hevea brasiliensis*	15	31.25	12.00	8.56	51.81	
2	Jengkol	Fabaceae	*Archidendron pauciflorum*	12	25.00	27.99	11.43	64.43	
3	Mahoni	Meliaceae	*Swietenia mahagoni*	2	4.17	8.00	11.74	23.90	
4	Sengon	Fabaceae	*Albizia chinensis*	2	4.17	8.00	6.54	18.70	
5	Alpukat	Lauraceae	*Persea americana*	1	2.08	4.00	9.05	15.13	
6	Mangga	Anacardiaceae	*Mangifera indica*	4	8.33	12.00	9.61	29.94	
7	Kemiri	Euphorbiaceae	*Aleurites moluccanus*	8	16.67	12.00	8.29	36.95	
8	Durian	Malvaceae	*Durio zibethinus*	2	4.17	8.00	11.74	23.90	
9	Pete	Fabaceae	*Parkia speciosa*	1	2.08	4.00	12.32	18.40	
10	Kayu manis	Lauraceae	*Cinnamomum burmanii*	1	2.08	4.00	10.73	16.81	
			Total	48	100	100	100	300	1.65

Note: The relative frequency (RF), the relative density (RDe), the relative dominance (RDo), the important value index (IVI)

Table 3. Numbers of poles in Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia

No	Name of species	Family Name	Scientific Name	Number of species	RDe	FR	RDo	IVI	H'
1	Karet	Euphorbiaceae	*Hevea brasiliensis*	15	34.88	17.86	7.87	60.61	
2	Coklat	Malvaceae	*Theobroma cacao L.*	5	11.63	14.29	10.33	36.24	
3	Mangga	Anacardiaceae	*Mangifera indica*	2	4.65	7.14	8.36	20.15	
4	Durian	Malvaceae	*Durio zibethinus*	3	6.98	10.71	9.29	26.98	
5	alpukat	Lauraceae	*Persea americana*	1	2.33	3.57	6.19	12.08	
6	Jengkol	Fabaceae	*Archidendron pauciflorum*	2	4.65	7.14	9.56	21.36	
7	Kemiri	Euphorbiaceae	*Aleurites moluccanus*	1	2.33	3.57	9.98	15.88	
8	Kayu manis	Lauraceae	*Cinnamomum burmanii*	3	6.98	10.71	9.29	26.98	
9	Pinang	Arecaceae	*Areca catechu*	8	18.60	14.29	10.14	43.03	
10	Nangka	Moraceae	*Artocarpus heterophyllus*	1	2.33	3.57	11.76	17.65	
11	Jeruk	Rutaceae	*Citrus aurantiifolia*	2	4.65	7.14	7.23	19.03	
			Total	43	100	100	100	300	1.99

Note: The relative frequency (RF), the relative density (RDe), the relative dominance (RDo), the important value index (IVI)

Table 4. Numbers of saplings in Telaga Village, Sei Bingai Sub-district, Langkat District, North Sumatra Province, Indonesia

No	Name of species	Family Name	Scientific Name	Number of species	RDe	FR	IVI	H'
1	Jengkol	Fabaceae	*Archidendron pauciflorum*	1	4	7.72	11.72	
2	Durian	Malvaceae	*Durio zibethinus*	1	4	7.72	11.72	
3	Pisang	Musaceae	*Musa paradisiaca*	14	56	46.30	102.30	
4	Rimbang	Solanaceae	*Solanum torvum*	6	24	15.43	39.43	
5	Nangka	Moraceae	*Artocarpus heterophyllus*	1	4	7.72	11.72	
6	Cengkeh	Myrtaceae	*Syzygium aromaticum*	1	4	7.72	11.72	
7	Jeruk nipis	Rutaceae	*Citrus aurantiifolia*	1	4	7.72	11.72	
			Total	25	100	100	200	1.31

Note: The relative frequency (RF), the relative density (RDe), the important value index (IVI)

The study noted the presence of 48 individual trees, 43 poles, and 25 saplings in the area. These figures imply that the area is home to a diverse age structure in its plant community, suggesting that regeneration processes are occurring, although not all plants are at the mature stage (tree level). The presence of a mix of tree, pole, and sapling stages indicates ongoing ecological processes and suggests the potential for future growth and species sustainability.

4. Conclusion

A total of 35 species of medicinal plants from 20 families were identified in Telaga Village. The diversity index values for medicinal plants (herbs), trees, saplings, and poles were classified as moderate, indicating that there is a reasonably balanced distribution of species within the community. However, the community is not highly diverse, meaning some species might still dominate, but overall, there is no single species that overwhelmingly dominates the area. Conservation and sustainable management of medicinal plants and ecosystems is very important to maintain biodiversity and ensure the sustainability of society's natural resources in the future.

Acknowledgments

We would like to express our gratitude to Universitas Sumatera Utara (USU) for their financial support through the USU "Talenta" funding (No. 2590/UN5.1.R/PPM/2018), as well as to The Inafor Organizing Committee 2019 for facilitating the presentation of this work on 27 August 2019 in Bogor. Our thanks also go to the students from the Faculty of Forestry, USU (Tike, Idian, Jon, Eral, and Debi) for their assistance.

References

[1] Nugroho I. A. "National workshop on Indonesian medicinal plants (Lokakarya nasional tumbuhan obat Indonesia)," Asian Pacific Forest Genetic Resources Programme Collaboration on Research and Development Center for Increasing Forest Productivity (Kerjasama Pusat Penelitian dan Pengembangan Peningkatan Produktivitas Hutan) *APFORGEN News Letter*, vol. 2, no. 2, pp. 1-2. 2010

[2] Dewoto H. R. "Development of traditional Indonesian medicine into fitopharmaca," (Pengembangan obat tradisional Indonesia menjadi fitofarmaka) *Indonesian Medical Magazine*, vol. 57, no. 7, pp. 201-211. 2007.

[3] Rahayu M, Siti S, Diah S. and Suhardjono P. "Traditional use of medicinal plants by local people on Wawonii Island, Southeast Sulawesi (Pemanfaatan tumbuhan obat secara tradisional oleh masyarakat lokal di Pulau Wawonii, Sulawesi Tenggara)," *Biodiversitas*, vol. 7, no. 3, pp. 245-250. 2006.

[4] Zuhud EAM and Hikmat A. "Indonesian tropical forest as a warehouse for natural medicine for the nation's independent health (Hutan tropika Indonesia sebagai gudang obat bahan alam bagi kesehatan mandiri bangsa)," *Bunga Rampai Biofarmaka Kehutanan Indonesia Pusat Penelitian dan Pengembangan Hutan Tanaman Bogor*, pp.17-27. 2009.

[5] Zuhud EAM. "The potential of Indonesia's tropical forests as a buffer for natural medicine for the health of the nation (Potensi hutan tropika Indonesia sebagai penyangga bahan obat alam untuk kesehatan bangsa)," Available from http://www.researchgate.net./publication/267857735. 2009.

[6] Rahmawaty, Sembiring I.E.P., Batubara R. and Patana P. "Mapping of tree damage classification in the Western Part of Medan City green belts using geographic information system," *IOP Conference Series: Earth and Environmental Science*, vol. 1755-1315, p. 166. 2018.

[7] Rahmawaty, Patana P and Latifah S. "Spatial analysis on distribution of green belt to reduce impacts of climate change in Medan City, North Sumatra," *Malays. Appl. Biol.* vol. 46, no. 2, pp. 67–76. 2017.

[8] Rahmawaty, Sitorus NA and Rauf A. "Distribution, above-ground biomass and carbon stock of the vegetation in Taman Beringin Urban Forest, Medan City, North Sumatra, Indonesia," *Malaysian Forester*, vol. 80, no. 1, pp. 73-84. 2017.

[9] Rahmawaty, Siregar NC and Rauf A. "Land suitability for Tectona grandis; case study in Arboretum Kwala Bekala, Sumatera Utara University (Kesesuaian lahan tanaman jati; studi kasus di Arboretum Kwala Bekala, Universitas Sumatera Utara)," *Jurnal Penelitian Ekosistem Dipterocarpa* vol. 2, no. 2, pp. 73-82. 2016.

[10] Rahmawaty, Sari EK, Syofyan A and Rauf A. "Integrated geographic information system and global positioning system for mapping of forest plants in supporting natural resources protection," *Procedia Chemistry* vol. 14, pp. 334-342. 2015.

[11] Rahmawaty, Villanueva TR and Carandang MG. *Participatory land use allocation, case study in Besitang Watershed, Langkat, North Sumatera, Indonesia*, Lambert Academic Publishing, German, p. 200. 2011.

[12] Dalimartha S. *Atlas of Indonesian medicinal plants IX (Atlas tumbuhan obat Indonesia IX)*, Penerbit Pustaka Pembangunan Swadaya Nusantara, Jakarta, p. 170. 2008.

[13] Hutapea JR, Soeharso, Sutjipto, Djumidi S, Sugeng W, Yuli and Sihotong, *Indonesian medicinal plant inventory Volume III (Inventaris tanaman obat Indonesia Jilid III)*, Departemen Kesehatan RI, Jakarta, 1994.

[14] Heyne K. *Useful Indonesian plants (translation) Book I-IV (Tumbuhan berguna Indonesia (terjemahan) Buku I-IV)*, Badan Litbang Kehutanan Departemen Kehutanan RI, Jakarta, 1987.

[15] Departemen Kesehatan RI, Inventory of Indonesian medicinal plants III (Inventaris tanaman obat Indonesia III) Available: http://terbitan.litbang.depkes.go.id/penerbitan/index.php/lpb/catalog/book/36. 1994.

[16] Rahmawaty, Samosir JB, Batubara R and Rauf A. "Diversity and distribution of medicinal plants in the Universitas Sumatera Utara Arboretum of Deli Serdang, North Sumatra, Indonesia," *Biodiversitas* vol. 20, pp. 1457-1465. 2019.