

Inventory of Understory Plants in Dusung and Its Benefits In Waeheru Village, Ambon City

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Abstract – This study aims to find out the dominant and useful types of underplants as biopharmaceutical ingredients. This study uses a vegetation analysis method by purposive sampling using a sample plot measuring 1m x 1m. The results of the study showed that in the dusung in Waeheru Village, 32 types of understory plants were found consisting of 3 types of ferns, 24 types of wide leaves, 4 types of grass and 1 type of puzzle from 23 tribes. Of the 32 types of undergrowth, 21 types of plants were found to be efficacious as biopharmaceutical ingredients (herbal medicines), 4 types were useful as fruit producers, alternative foodstuffs, wood and building materials; Meanwhile, 5 types are not yet known for their efficacy and benefits. The dominant plants are *Selaginella wildenowii* SDR 8.44, *Axonopus compressus* SDR 8.06 and *Sphagneticola triloba* SDR 7.33. Based on the community coefficient value, the plant communities compared are not the same because the community coefficient value is 23.84%.

Keywords – Underlying plants, Dusung, Benefits.

INTRODUCTION

In people's lives, there are a number of socio-cultural values or traditions that regulate the relationship between society and its natural environment. This socio-cultural value is a manifestation of local wisdom and traditional knowledge of the community in maintaining harmony and harmony between community members and their natural environment as well as regulating community behavior in utilizing and preserving natural resources. One form of local wisdom found in the people of Central Maluku in terms of farmland management is known as "*dusung*".

Dusung is defined as a land that is cultivated and owned by a family group (*Mata Rumah*), where on this land there are various or similar long-lived plants/plants combined with annual plants (Tjoa et al., 2010). Dusung is also a natural resource management system in a handful of land owned by combining agricultural, forestry, livestock and settlement commodities.

The uniqueness and special characteristics of dusung are greatly influenced by the socio-cultural conditions of the community, agroclimate, the soil where plants grow which eventually form a typical agroecosystem of each island in Maluku. In line with this, Indrawan et al, (2007) stated that areas with complex geology (e.g. islands) in Eastern Indonesia produce soil conditions with clear boundaries that encourage the formation of communities and species that adapt to each soil type. The combination of plant types/plants found in *dusung* is characterized by the existence of several types of land use that are formed in each agroecosystem, starting from the simplest composition to the most complex composition.

Undergrowth is vegetation that is under forest stands or tree communities, except for tree saplings. Bottom plants can be in the form of herbs, grasses, shrubs, tekian and ferns (Nikmah et al., 2016). Bottom plants are often identified with weeds which

are considered as detrimental, less useful and disturbing crops, can compete with cultivated staple crops in terms of nutrient absorption, water, CO₂ and growing place (Madubun, et al. 2023). In addition, undergrowth has several beneficial characteristics, namely; can reduce surface water flow so that it can prevent erosion, has annual, bienial and perenial life cycles so that it is very good as a ground cover plant and can be used as a medicine (Fernandes and D. Agency, 2016).

Medicinal plants are all types of plants/plants that are known and believed to have medicinal properties due to the content of secondary metabolites contained by the plant/plant (Setyowati et al., 2009). It is estimated that there are around 30,000 types of plants found in tropical rainforests, and 1,260 types have medicinal properties and have been used by the Indonesian people as herbal medicines.

MATERIALS AND METHODS

This research was carried out in Waeheru Village, Baguala District, Ambon City, Maluku Province. This research was conducted on January 2023. The tools used in this study include writing utensils, cameras, compasses, machetes, roller meters, GPS, plant identification toolsto identify plant types, ovens, digital scales to weigh weeds that have been dried. The materials used include plastic bags, label paper, newsprint, duct tape, google maps and raffia ropes.

Research Implementation

Observation and analysis of undergrowth plants by the purposive square method was carried out on a sample plot of 1m x 1m to determine the types of plants. Plants near the ground level in the sample plot were removed, then put into plastic bags and labeled according to the observation plot. Next, the type is identified and put into newsprint and labeled according to the observation square, then baked at 80°C for 24 hours to obtain dry weight.

Data Collection Techniques

The data obtained are primary data and secondary data. Primary data was obtained from the inventory of lower plant species including: density, frequency and dry weight. Meanwhile, secondary data in the form of the general state of the research area was obtained from the Maluku Provincial Statistics Agency (BPS).

Data Analysis

The data were analyzed in a quantitative descriptive manner. The values of density, frequency, dominance and important value index (INP) are calculated based on the formula according to Cox (1985) as follows:

$$\text{Density (D)} = \frac{\text{Number of Individuals}}{\text{Sample Area}}$$

$$\text{Relative Density (RD)} = \frac{\text{Density of a Type}}{\text{Density of All Types}} \times 100$$

$$\text{Frequency (F)} = \frac{\text{Number of tiles found of a type}}{\text{Number of all sample tiles}}$$

$$\text{Relative Frequency (RF)} = \frac{(\text{Frequency of a Type})}{\text{Frequency of all types}} \times 100$$

$$\text{Important Value Index (IVI)} = \text{RD} + \text{RF}$$

To compare two understory communities, a formula based on Tjitrosoedirdjo, et al. (1984) is used as follows:

Remarks: C = community coefficient, W = smallest number of communities compared, a = total community one and b = total community two.

RESULTS AND DISCUSSION

1. General Circumstances of the Research Location

Administratively, Wacheru Village is located in Ambon City, Teluk Ambon District, Maluku Province, has an area of 6.0 km² with a population of 11,206 people. Located between 9598300 – 9601900 (128° 12' 27 27.399" - 128° 14' 4.73" E (East Longitude) the boundaries of the wlayah are as follows: North with Petuanan Negeri Hitu, South with Teluk Ambon Dalam, West with Petuanan Hunuth Village and, East with Petuanan Nania Village.

Wacheru Village has a tropical marine climate that is very strongly influenced by the Banda Sea. During the period of April – September there is quite high rainfall and vice versa in the period of October – March there is a dry season (Laimeheriwa, 2014). The average daily temperature ranges from 25.3° C, (July and August), 27.8° C (November), and the annual value is 26.6° C. Minimum air relative *humidity* ranges from 81% (February) to 89% (June-July).

2. Geology

Wacheru Village has the following geology or parent material; Coastal and river alluvium formations in the form of sand, clay, gravel, clay and blocks are on a slope of 0 – 3%, and limestone formations are in spots associated with loose materials in choppy and hilly areas with a slope of 8 – 45%.

3. Land Cover and Land Use

The soil types in the village of Wacheru are Litosol (Orthens), Regosol (Psamments), Aluvial (Flevents), Organosol (Hemists), and Kambisol (Udepts) (National Soil Classification System (BBPPSLP) 2014 and Taxonomy Key 2014).

Land cover land use in Wacheru village based on toposequence transect observation found that land cover and land use are as follows; *Ewang* (secondary forest), shrubs, mixed gardens, settlements, vegetable gardens, *dusung*, sago, nipah and mangroves.

4. Composition and Structure of Underplants

The results of observation of undergrowth in *dusung* in Wacheru village found 32 types of plants from 23 tribes (table 1). Based on the summed dominance ratio (SDR) value, plant species such as *Selaginella wildonowii* of the Selaginellaceae tribe, *Axonopus compresus* of the Poaceae tribe, *Sphagneticola triloba* of the Asteraceae tribe and *Imperata cylendrica* of the Poaceae tribe; dominate the *dusung* area in Wacheru village. The dominance of these four types of plants is due to the fact that these types are classified as grasses and grasses that are tolerant of low air humidity and high air temperature, acidic soil pH, and how to reproduce both vegetatively and generably.

Based on the important value index (INP), plant species such as *Selaginella wildonowii* of the Selaginellaceae tribe, *Axonopus compresus* of the Poaceae tribe, *Sphagneticola triloba* of the Asteraceae tribe, *Piper decumannum* of the Piperaceae tribe, *Imperata cylendrica* of the Poaceae tribe. This important value index provides an overview of the role of the five types of plants in the *dhung* ecosystem. The SDR and INP values can then be used to assess the presence of a type of plant in an area and can show the ability to adapt to habitat and wide tolerance to environmental conditions.

Table 1. Plant Type, Morphology, Life Cycle, Type (weed), SDR, IVI, Biopharma Benefit.

No.	Kind (Plant Name)	Morphology	Life Cycle	Type*) (weeds)	SDR	IVI	Biopharma and Benefit
1.	<i>Selaginella doederleinii</i> (Selaginellaceae)	Nails	Annual		8,44	16,87	Traditionally this plant can be used to treat: Sore throat, fever, kidneys, stop bleeding, anti-cancer, prevent urinary tract infections (UTIs) and help heal broken bones
2.	<i>Selaginella plana</i> Heron (Selaginellaceae)	Nails	Annual		4,03	8,07	This tumbuh can be used to treat heart disease, malaria, wounds, cleanse the blood, stomach pain, reduce fever, as a postpartum tonic, anti-cancer, microbial and anti-biofilm
3.	<i>Piper decumanum</i> (Piperaceae)	Wide Leaf	Annual		5,68	11,37	To nourish Bengka, Nosebleeds, rich in chemical content of saponins, flavonoids, polyphenols, essential oils, this plant also has anti-percussive, anti-inflammatory properties
4.	<i>Clorodenrum minahassae</i> (Lamiaceae)	Wide Leaf	Annual		2,57	5,14	Plants have efficacy including as a dietary supplement, natural antioxidant, anti-bacterial, lowering cholesterol, and maintaining eye health.
5.	<i>Imperata cylendrica</i> (Poaceae)	Grass	Annual	A	5,87	11,73	Efficacious for anti-inflammatory, maintaining digestive health, lowering blood pressure, maintaining

							health (heart, bones, liver) overcoming nosebleeds, overcoming vaginal discharge
6.	<i>Mimosa pudica</i> (Fabaceae)	Grass	Annual	A	2,94	5,87	Efficacious to prevent diabetes, anti-inflammatory, anti-oxidant, anti-bacterial, anti-seizure, anti-cholesterol, anti-depressant, healthy digestion and liver
7.	<i>Chromolaena odorata</i> (Asteraceae)	Wide Leaf	Annual	E	4,04	8,08	Efficacious for wound healing, anti-inflammatory, anti-microbial, anti-oxidant, anti-diabetic, anti-cancer, contains alkaloids, flavonoids, essential oils, phenolics, saponins, tannins and terpenoids
8.	<i>Oxalis barrelieri</i> Oxalidaceae	Grass	Annual		2,02	4,04	Containing the basic ingredient of hand sanitizer, this plant extract with a concentration of 30% is effective as an anti-bacterial <i>S. aureus</i> and <i>E. coli</i> . It can treat diarrhea, wounds, urinary tract infections, chronic hepatitis, promote menstruation, reduce fever, lower blood pressure, inflammation of the kidneys and liver and respiratory tract, prevent Flu
9.	Galici	Grass	Annual		1,84	3,67	
10.	<i>Ficus septica</i>	Wide Leaf	Annual		1,65	3,31	

	(Moraceae)						
11.	<i>Alstonia scholaris</i> (Apocynaceae)	Wide Leaf	Annual		1,84	3,67	Anti-inflammatory, anti-bacterial, anti-cancer, anti-oxidant, anti-diabetes, anti-hypertension. Building materials
12.	<i>Cecropia pachystachya</i> (Apocynaceae)	Wide Leaf	Annual		1,84	3,67	
13.	<i>Bouea macrophylla</i> (Anacardiaceae)	Wide Leaf	Annual	Tan. Fruit	3,67	7,34	Fruit, Firewood and building materials
14.	Haleki	Wide Leaf	Annual		2,20	4,41	
15.	<i>Pterocarpus indicus</i> (Fabacea)	Wide Leaf	Annual		2,39	4,77	Wood, building materials
16.	<i>Lancium domesticum</i> (Meliaceae)	Wide Leaf	Annual	Tan. Fruit	3,12	6,24	Fruit, Firewood
17.	<i>Cerbera manghas</i> (Apocynaceae)	Wide Leaf	Annual		2,02	4,41	Firewood
18.	<i>Zyzygium aquaeum</i> (Myrtaceae)	Wide Leaf	Annual	Tan. Fruit	2,39	4,77	Fruit, firewood
19.	<i>Premna integrifolia</i> (Verbanaceae)	Wide Leaf	Annual		1,84	3,67	Wound healing, anti-bacterial, anti-oxidant, anti-inflammatory, anti-diabetic, hepatoprotective, anti-arthritis, anti-obesity, antiparasitic
20.	<i>Prunus cerasus</i> (Mungtingiaceae)	Wide Leaf	Annual		1,84	3,67	Lowers blood pressure, reduces inflammation, improves cognitive function, maintains heart health, increases muscle endurance, soothes, protects against free radicals, prevents diabetes

21.	<i>Clidemia hyrta</i> (Melastomataceae)	Wide Leaf	Annual shrubs	B	2,39	4,77	Heals burns, ulcers and wounds, inhibits bacterial growth, lowers cholesterol, beauty mask base
22.	<i>Pandanus sp</i> (Pandanaceae)	Wide Leaf	Annual		1,84	3,67	Diuretics (urinary breakdown), treating jaundice, liver disorders, male flowers can be used as fragrance ingredients, anti-inflammatory, anti-biotic, analgesic or anti-pain, treating diarrhea, diabetes and antipyretic
23.	<i>Cyperus songinoleutus</i> (Cyperaceae)	Puzzle	Annual	C	2,20	4,41	Maintain digestion, treat skin diseases, treat eye pain, normalize breast disorders during menstruation and maintain body temperature, lose weight, control cholesterol, improve brain function
24.	<i>Pitygrana colomelanus</i> (Pteridaceae)	Nail	Annual		2,02	4,04	
25.	<i>Dioscorea hispida</i> (Discoreaceae)	Wide Leaf	Annual		2,39	4,77	Energy sources, mineral sources, alternative food sources, herbal medicinal ingredients, anti-bacterial, raw materials for birth control pills
26.	<i>Micania micrantha</i> Asteraceae	Wide Leaf	Annual		2,39	4,77	Wound healing, antioxidant, antimicrobial, antiinflammatory, anti-dermatophyte, treating fever, body

							pain, can help heal cataracts, infections and inflammation of the eyes
27.	<i>Alpina sp</i> (Zingiberaceae)	Wide Leaf	Annual		1,84	3,67	
28.	<i>Spondias pinnata</i> (Anacardiaceae)	Wide Leaf	Annual	Tan. Fruit	1,84	3,67	Antioxidants, immune system support, indigestion, skin diseases, culinary applications
29.	<i>Sphagneticola triloba</i> (Asteraceae)	Wide Leaf	Annual	Tan. Decorate	7,33	14,66	Treats wounds, flu and colds, heat and fever, hives, treats hepatitis, gout, uric cramps, arthritis, promotes digestion and urination
30.	<i>Axonopus compressus</i> (Poaceae)	Grass	Annual		8,06	16,13	Treats flu and diabetes
31.	<i>Thespesia populnea</i> (Malvaceae)	Wide Leaf	Annual		2,94	5,87	Very significant anti-malarial activity, treating skin diseases
32.	<i>Deris eleptica</i> (Fabaceae)	Wide Leaf	Annual		2,57	5,14	Treats, itching, leprosy, ulcers, wounds, skin diseases, as a blood tonic and antique anker.

Description: *) Type A = very dangerous weed, B = dangerous weed,

C = less harmful weeds

5. Community Coefficient Values

Based on the coefficient value of the plants that were compared, it was found that the understory plant community in dusung in Wacheru village was different, this was because the coefficient value compared was only 23.84 %, while a community was declared the same if the coefficient value was 70% (Tjitrosoedirdjo et al., 1984).

CONCLUSION

1. 32 types of understory plants were found consisting of 3 types of ferns, 24 types of broad-leaved leaves, 4 types of grass and 1 type of puzzle from 23 tribes. Of the 32 types of undergrowth, 21 types of plants were found to be efficacious as biopharmaceutical ingredients (herbal medicines), 4 types were useful as fruit producers, alternative foods, wood and building materials; Meanwhile, 5 types are not yet known for their efficacy and benefits.
2. The dominant underplants in *Dusung* in Waeheru village are *Selaginella wildenowii* SDR 8.44, *Axonopus compresus* SDR 8.06 and *Sphagneticola triloba* SDR 7.33.
3. The understory communities that were compared were not the same because the coefficient value obtained was less than 70%.

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