

An ethnobotanical survey of indigenous knowledge on medicinal plants used by traditional healers of the Warmasen area, Raja Ampat, East Papua

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Abstract

Introduction: The publication of medicinal plants typical of the West Papua region is rare compared to those found in Java Island. Therefore, this study aims to obtain raw data on traditional medicines native to West Papua. The information collected was in the form of the local name, plant part used, method of manufacture, and administration to patients.

Methods: This research used a survey method through questionnaires and personal interviews, and the responses obtained were documented.

Results: The findings showed that plants typical of the West Papua region include *Merremia pellata*, *Ficus septicum*, *Piper beetle*, *Peperomia pellucida*, *Pluchea indica*, *Asystacia gangetica*, *Achillea milefolium*, *Orthosiphon aristatus*, *Abelmoschus Manihot*, *Morus alba*, *Portulaca oleracea*, *Kleinhovia hospita*, *Ipomoea pes-caprae*, and *Piper caducibracteum*. It was found that ethnobotanical studies contribute to the development of modern herbal-based medicine.

Conclusion: The fourteen typical Papuan plants are different from those found on Java island to a limited extent.

Keywords: ethnobotanical indigenous knowledge of traditional

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I. Introduction

Traditional medicine is the knowledge, skill, or practice based on theory, beliefs, and authentic experiences of various cultures used in maintaining and improving health. And also contribute greatly to preventing, diagnosing, and treating physical and mental conditions (World Health Organization, 2019).

In the health law of the Republic of Indonesia no. 36 of 2009, it is mentioned that traditional medicine is an ingredient or herb of elements in the form of minerals, plant, or animal extracts (galenic). It is also a mixture of ingredients that have been traditionally used for treatment and applied under the prevailing norms in society (MoH, 2009).

In general, Traditional Indonesian Medicine is referred to as Herbal Medicine made from natural ingredients, such as plant materials including roots, bark, flowers, seeds, leaves, and fruits. Animal ingredients, such as honey, milk, and eggs are also commonly used in Indonesia to maintain health (Suswardany et al., 2017).

Traditional Indonesian medicine has been widely accepted by the residents ranging from rural to urban. Even for some developing countries, including Indonesia, traditional medicine has been utilized in health services, especially in the first strata (World Health Organization, 2019).

Indonesia has 17,000 large and small islands with a population of over 230 million, 400 ethnicities (ethnic and sub-ethnic), and a diversity of religions, beliefs, customs, more than 600 regional languages, with a variety of names and traditional medicines (MoH, 2007).

Indonesia is rich in a variety of medicinal plants which have not been explored. They are commonly obtained in Aceh and Papua, which is a long-distance tour, from one island to another, therefore, more research is needed (Lense et al., 2011).

Western New Guinea is part of Indonesia with the potential of various plant resources. Its island is one of the largest in the world, which is part of Papuasias. Besides Western New Guinea, the provinces of Papua still have few botanical records mostly related to the amount of flora (Maruzu & Mujahid, 2019)

Womersley and Supriatna reported that Western New Guinea has 20,000 to 25,000 high-level plant species (Womersley et al., 1977).

RISTOJA (Medicinal plant research and herbal medicine) in 2012 and 2017, recorded 2,929 therapeutic plants, of which 983 species are medicinal, and out of this, there are 444 unidentified, as most of

them do not have a generative part. In contrast, as many as 529 medicinal plants are identified to the species level (2.1% of the total flora of Papua and West Papua) (Maruzy & Mujahid, 2019).

Therefore, it is necessary to explore Indonesian medicinal plants for as long as five days in Kampung Warmasen, Meos Mansar District, Raja Ampat, and West Papua. Warmasen Village is an isolated area far from the city, and its residents still believe in traditional medicine because of the limited official government and private health facilities.

This exploration digs up a lot of information on medicinal plants and their daily use in the local communities of West Papua. Moreover, the residents are interested in indicating the medicinal plants often use in their daily health maintenance to cure diseases.

II. Material and Method

Material

a. Study area

The study area in Warmasen village, Waisai City, is one of the Districts in Raja Ampat Regency, Provinsi West Papua (Figure 1). Raja Ampat regency consists of 24 sub-districts, four towns, and 117 villages. The 2017 census recorded a population of 36,818 covering an area of 2,773.74 km² and 13/km² community. Waisai city has four towns and no villages.

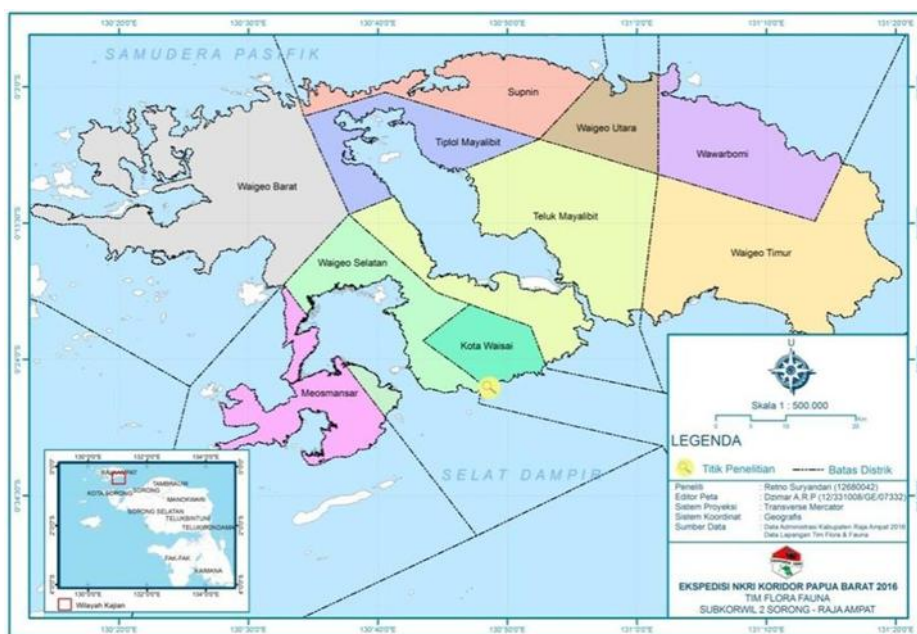


Figure 1. Map of Raja Ampat Regency, West Papua Province

West Papua (also called West Irian) is one of the provinces on the Papua Island, located between 0° - 4°S and 124° - 132°E, and covering an area of 97,024.37 km². It has the following territorial boundaries: Pacific Ocean (North), Banda Sea and Maluku province (West), and Papua Province (East). Raja Ampat Regency is Indonesia's future tourist destination because it is famous for its unique nature, frequented by foreign and domestic tourists.

Warmasen is one of the villages located in Waisai District of Meosmansar City, Raja Ampat Regency with natural biological resources. The island's indigenous people are ethnic Biak, Mayan, and Ondoloren, which are known for their simple living. Warmasen is famous for the tradition of eating betel nut seeds to strengthen their fraternity.

The kampung Warmasen's residents utilize medicinal plants in treating various diseases. They are also known to use the various diversity of natural resources (SDA) around them.

The use of plants in traditional medicine varies quite well from one to another. Most of the plants studied are introspective or cultivated. The high number of introduced drugs also shows the high interaction of Warmasen villagers with the communities outside West Papua.

This area was chosen based on the consideration of the least publicity about the use of native plants for the treatment of tribes located in Raja Ampat. During this period, the treatment techniques utilized by large tribes, such as the Asmat, Dani, Mooi, and Arfak tribes were identified and known.

It turns out that people in Warmasen village more often use and cultivate medicinal plants by boiling. It

is easiest to do when compared to the method of processing directly or boisterously because both techniques have to go through several stages in the procedure. Manufacturing by boiling is also the most widely used method in some other areas of Papua.

b. Plant Data Collection

The exploration of Indonesian medicinal plants was conducted in the Raja Ampat Regency of West Papua Province, within 5 (five) days. In the first phase, licensing management was carried out at the Raja Ampat District Government Environment Office.

The head of the Meosmansar District granted permission and gave directions on people that often use medicinal plants to cure diseases in their daily health maintenance. On the recommendation, coordination and interviews were conducted within the community.

The medicinal plants used were directly obtained from the land (planting site) as specimens, as well as carrying out exploration to the Warmasen village. After this, licensing management was conducted to retrieve the plants from West Papua to Java island through the quarantine process at the airport.

c. Plant Collection

Plant specimens were collected in special containers and taken to the Herbal Laboratory of Materia Medica Batu for identification.

d. Determination of plants

Some of the plants found in the field were immediately identified, while the remaining was by literature reviews. Then stored in The Herbal Laboratory of Medical Batu, East Java, Indonesia.

III. Method

This research used a survey method for sourcing information from respondents, using questionnaires as instruments for data collection and in-depth interviews.

Traditional healers also collected data by purposive sampling from people with symptoms and diseases. The procedures include how to set up and use the plants for treatment, applying local wisdom in the management and utilization of medicinal species from the environment.

All library reviews were compiled in the Herbal Laboratory of Materia Medical Batu, East Java, Indonesia. Online and offline literature searches were conducted for collecting reviews and discussions. Data analysis used descriptive qualitative methods, comparing data from the field with online and offline literature.

IV. Results

The number of indigenous people interviewed in this research area was three, aged 60 and older. The number of traditional herb-based treatments was not much and were aging. Besides, about five indigenous respondents were interviewed around the village. In table I, it was observed that 14 plants were obtained from 9 families of medicinal species in Warmasen village. The largest are Piperaceae (3), Convolvulaceae (2), Malvaceae (2), Asteraceae (1), Moraceae (2), Ortulacaceae (1), Acanthaceae (1), Scrophulariaceae (1), and Lamiaceae (1).

The most commonly used part of the plant are the leaves (52, 1%), while the other parts are fewer (Table II). Certain features of the plant are also used in combination with other species. This is because the leaf part is elementary and always available, its retrieval and utilization are relatively easy and straightforward. Besides, the efficacy of leaves is hereditary more in terms of healing than other parts of the plant.

Some medicinal plants used in West Papua are similar to those in Java Island, while those found in Raja Ampat Regency are very different and typical. The specimens obtained were taken to the Herbal Laboratory of Materia Medical Batu owned by the Government of East Java Province.

Some of the findings of plants typical of the West Papua region obtained were 1) tali susu (*Merremia peltata*), 2) sirih popar (*Ficus septicum* Burm), 3) sirih makan (*Piper betle*. L), 4) daun bisul (*Peperomia pellucida*), 5) leaves abortion content (*Pluchea indica*) 6) daun siloam / Israel (*Asystacia gangetica*), 7) daun yarrow (*Achillea millefolium*), 8) kumis kucing variant Raja Ampat (*Orthosiphon aristatus* var. Raja Ampat), 9) gedi merah (*Abelmoschus manihot* L), 10) uram ongkor / daun Buaya (*Morus alba* L), 11) krokot (*Portulaca oleracea* L), 12) pubasa pantai (*Kleinhovia hospita*), 13) daun katang-katang (*Ipomoea pes-caprae*), 14) sirih hutan (*Piper caducibracteum* C.DC).

Table 1. Types of medicinal plants used as folk remedies in the village Warmasen Waisai city district and Meosmansar Raja Ampat regency

	Lokal name	Latin name	Family	Usage
1	Tali susu	<i>Merremia peltate (L)</i>	Convolvulaceae	The sap is anti-diarrhea
2	Sirih popar	<i>Ficus septicum Burm.F</i>	Moraceae	The leaves are for bawasir, sprained wounds
3	Sirih makan	<i>Piper betle. L</i>	Piperaceae	The leaves are antibiotic, and cleanser of a woman's vital organs
4	Daun bisul atau daun sirih Cina	<i>Peperomia pellucida</i>	Piperaceae	The leaves are for ulcers
5	Daun penggugur kandungan atau daun beluntas	<i>Pluchea indica</i>	Asteraceae	The leaves for abortion
6	Rumput Israel	<i>Asytacia gangetica</i>	Acanthaceae	The leaves are for diabetes mellitus, snake bites, bruises, and pain
7	Daun yarrow	<i>Achillea milefolium</i>	Scrophulariaceae	The Leaves are antibiotic
8	Kumis kucing varian Raja Ampat	<i>Orthosipon aristatus var. raja ampat</i>	Lamiaceae	The leaves are for gout, cold, hemorrhoids, and low back pain
9	Daun gedi merah	<i>Abelmoschus Manihot L</i>	Malvaceae	The leaves are for hypertension, hyperkholesterol, diabetes, and Ulcers
10	Uram onkor atau daun buaya	<i>Morus alba L</i>	Moraceae	The leaves and stems are for post partus cleaning uterus
11	Krokot	<i>Portulaca oleracea L</i>	Portulacaceae	The leaves are for acute diarrhea, dysentery, and appendicitis
12	Pubasa pantai atau Paliasa	<i>Kleinhovia hospita</i>	Malvaceae	The skin and stems are for Intoxication and toothache
13	Daun katang-katang	<i>Ipomoea pes-caprae (L) Sweet</i>	Convolvulaceae	The leaves are for digestive, seizures, and abdominal pain
14	Sirih hutan	<i>Piper caducibracteum C. DC</i>	Piperaceae	The leaves are for tight juice, deodorant, vaginal discharge in women, sprue, toothache, and inflammation of the mouth

The Warmasen community collects the raw materials through different methods, namely picking, revoking, and eroding. While the production process includes boiling, pounding, squeezing, heating or burning, and eroding/shredding. The treatment method is divided into two, namely outside and serious diseases. External conditions, such as skin, burns, abdominal pain, etc. are usually treated by being smeared, taped, or bathed. Severe illnesses, such as chest pain, malaria, poisoning, etc. are carried out treatment by drinking.

In table II, the most commonly used part of the plant is the leaf's shape, followed by the seeds, stems and leaves, fruit, stems, and finally, the sap. The most commonly used form available is decoction (90%), beverages (8%), and juices (1%).

Table 2. Description of The Percentage of Plant Parts and methods used.

Description	%
The part of the plant Used Fruit	7.0
Stem	0.5

	Stem & leave	7.9
	Seed	32.2
	leave	52.1
	Latex	0.3
Manufacture Method	Juice	1.0
	Decoction	90.0
	Beverages	8.0
	Etc	1.0

Table 3. Image of medicinal plants used as folk remedies in kampung Warmasen Waisai city district and Meosmansar Raja Ampat regency not found in Java island.

No	Latin name	Efficacy & Preparation Methods	Habitus
1	<i>Merremia peltate L</i>	Sap: as an anti-diarrhea (drink as much as 1/3 to 1/2 glass) and hunger restrainer	Perdu Plant
2	<i>Ficus septicum Burm.F</i>	Leaves: restore the position of the pile (drink the decoction leaves) and heal the sprained wound (outer use: heated + plus oil, wrapped on the sprained part)	Perdu plant, 30 mdpl
3	<i>Piper betle. L</i>	Leaves: as a natural antibiotic for cleaning feminine organs	Perdu plant
4	<i>Peperomia pellucida</i>	Leaves: heal ulcers. (outer use: kneaded leaves + oil + forged)	Perdu plant, 30 mdpl
5	<i>Pluchea Indica</i>	Leaves: used to abort womb	Perdu plant, 30 mdpl
6	<i>Asytacia gangetica</i>	Leaves: cure diabetes (3, 5, or 7 sheets of boiled leaves in 3 glasses to 1/2 glass, Drink 2x daily), neutralize snake toxin, for bruised ballplayers, and for pain-relieve.	Perdu plant, 33 mdpl
7	<i>Achillea milefolium</i>	Leaves: as an antibiotic (cures several diseases: headache, hives, etc.)	Perdu plant, 35 mdpl
8	<i>Orthosipon aristatus var. raja ampat</i>	Leaves: heals gout, colds, constipation, and low back pain	Perdu plant, 34 mdpl
9	<i>Abelmoschus Manihot L</i>	Leaves: lower high blood pressure, cholesterol, ulcers, and diabetes	Perdu plant, 40 mdpl
10	<i>Morus alba L</i>	Leaves and stems: used for mothers after childbirth (drink boiling water). However, when used for a long time, cause dryness	Perdu plant, 47 mdpl
11	<i>Portulaca oleracea</i>	Leaves: Untuk dysentery drugs, treat acute diarrhea, and appendicitis	Perdu plant
12	<i>Kleinhovia hospita</i>	Bark: boiled and drink to cure poisoning, boiling water + salt and made into mouthwash to cure toothache, and used for postpartum mothers (filthy blood)	Perdu plant, 23 mdpl
13	<i>Ipomoea pes-caprae (L) Sweet</i>	Leaves: As a stomach wash or natural laxative, treat ingestion or seizures, as well as abdominal pain	Perdu plant, 15 mdpl
14	<i>Piper caducibracteum C. DC</i>	Leaves: for body odour removal, tight vagina juice, whitishness, maintaining the health of the female genitals, thrush mouthwash, mouth inflammation, and tooth ache.	Perdu plant

V. Discussion

Research on medicinal plants in the Warmasen area of West Papua produces about 14 popular plants that are often used by local people in the area (Table 3).

Merremia peltate is a tropical plant whose sap is taken for anti-diarrheal and skin wounds. Other regions in other parts of Indonesia call it "Aka Lambuang". The sap and tubers of this plant can also be for helminthic or laxative remedies.

Boiled *Merremia peltate* leaves can overcome ulcers, infections, and appendicitis, tubers can be for a laxative, and in the form of decoction can be for purgative, abdominal muscle pain, dysentery. As cosmetics, the leaves are for washing hair and for hair growth as well as preventing hair loss.

Ficus septicum or Sirih popar is a shrub or small tree in bushland throughout Indonesia. *Ficus septicum* sap is obtained on the roots, twigs, leaves, and fruits and is used to overcome poisoning and gastrointestinal pain. *Ficus septicum* has different regional names in Indonesia, namely: awar-awar (Java, Bali),

Bar-abar (Madura), Sirih Popar (Ambon), Daussala (Bugis), Tobo-Tobo (Makassar), Tagalolo (Minahasa, Ternate), Ki cCyat (Sunda).

Piper betle is one of the native plants of Indonesia that grows penetrated or leaned on the trunk of other trees and the leaves and fruits are used by chewing Together gambir, pinang, tobacco, and lime. Other functions in other areas are fever medicine, wounds, eye infections, anti-bacterial, anti-oxidant, anti-inflammatory, immunomodulatory, and a food preservative because it has anti-microbial properties.

Peperomia pellucid or boil leaves are weed plants, containing many alkaloids, tannins, potassium oxalate, fats, and essential oils. This plant is spicy and cool. The part of the plant used as medicine is the whole part of the plant, has an analgesic effect, anti-inflammatory and anti-biotic. Another function of this plant is to overcome acne, inflammation of the skin, abscesses, burns, bruises, aches, urinary tract disorders, rheumatism, kidneys, fever, abdominal pain, uric acid, and anti-spasmodic. How to use is to take a handful of plants to taste then washed clean, boil with 2.5 glasses of water until shrinking 2 glasses, filtered, then taken twice a day.

Pluchea indica or beluntas leaves are many-branched shrubs, smooth-brushed and soft-haired, often used as fence plants. Indonesia has various local names: beluntas (Malay), beluntasbaruntas (Sundanese), luntas (Java), baluntas (Madura), lamutasa (Makassar), lenabou (Timor). The parts of the plant used are the leaves and roots. In West Papua, it leaves for abortion, but in other areas, it is used to overcome diabetes mellitus, tumours, hypertension, brain tonic, hemorrhoids, lumbago, vaginal discharge, lumbago, ulcer, tuberculosis, inflammation. It is currently popular as an anti-obesity drug.

Asytacia gangetica is a semi-wild ornamental plant, often found on the roadside, shrubs, fields, and forests. Papua people use this plant to overcome diabetes mellitus, snakebite, bruises, and pain. While people outside Papua are used as medicine for asthma, rheumatism, dry cough, digestion, anti-inflammatory, antihypertensive, anti-arthritis, and anti-viral.

Achillea millefolium or yarrow leaves in west Papua are used as anti-infection, while outside West Papua is used to overcome wounds and in the form of extracts are widely used in the field of cosmetics as skin cleansers, bath soaps, hand lotions, and hair.

Orthosiphon aristatus var Raja Ampat is a typical plant of Indonesia and Malaysia and is one of the variants in West Papua. This plant has several properties such as anti-diuretic, improve kidney function, urinary tract infections, vaginal discharge, and cough. How to use is dried leaves, at first, soaked in boiling water for about 3 minutes then silenced briefly and then drunk warmly. Another function of this cat's moustache is to overcome hypertension because it has the content of MRC (methylripariochromene A) that serves to relax muscles and enlarge blood vessels.

Abelmoschus Manihot leaves are used by the people of West Papua as a remedy for hypertension, hyper cholesterol, and stomach acid. How to use it by boiling it without any seasoning then drunk. *Abelmoschus* leaves or gedi leaves in North Sulawesi are processed as food ingredients and are a typical vegetable known as Yondok.

Morus alba is a plant native to northern China but can grow in tropical and subtropical climates. This plant is known by the name of Murbei, is a fast-growing plant with, short life and height of about 10-20 m. This plant grows well above 100 meters above sea level and is quite solar. This plant is also a silk team because it is the living place of silkworms.

Portulaca oleracea or krokot is a plant that lives in sandy and clay areas. Despite the lack of water, this plant can live. Krokot is one of the weeds in seasonal cultivation. This plant can be consumed as a dish or medicine and also as an ornamental plant. Indonesian people use it as a heat-lowering drug, lowering pain, urine decay, anti-toxic, sedative, blood sugar lowering, anti-scorbutic, strengthening the heart.

Kleinhovia hospita or known by another name Paliasa or Pubasa beach in addition to West Papua is also very popular on the island of Sulawesi because it is often used to overcome hepatitis, hypertension, diabetes, and hyper cholesterol. Researcher found the presence of scopoletin, which is a coumarin group derivate that has antihypertensive, anti-inflammatory, anti-allergic properties. The leaves used are freshly picked young leaves.

Ipomoea pes caprae or horse tread is a type of creeping plant found on sandy beaches. This plant blooms like a trumpet. When the leaves and stems are broken will come out white sap. This plant is often used to deal with rheumatism, hemorrhoids, swollen gums, toothache, inflammation, diarrhea, migraines. Empirically helping to treat residents or tourists who have been stung by jellyfish or sea urchins when playing by the beach. How to use it through leaves kneaded and affixed to the part that is sick or swollen.

Piper caducibracteum C.DC is a genus of the piper is an herbaceous plant, found in forests, yard houses, fields, or forests. People use it as a substitute for betel by chewing. The part of the plant that the leaves use. Some areas have different names: sirih utan, sirih sirih, kandati (Maluku), A melaum albar (Ambon).

VI. Conclusion

The fourteen typical Papuan plants are different from those found on Java island to a limited extent,

and most of them are either introspective or cultivated.

The commonly used part of this plant is the leaves (52,1 %), while the others are seeds, stems, leaves, fruit, and sap. This is because the leaf part is very easy to find and always available, also, the pickup and utilization are relatively simple.

These plants have essential properties and are used in treating various diseases. Moreover, there are formulations used as a poison and utilized by the Warmasen community for magic purposes (supernatural). However, this occult knowledge is only specifically given or passed down to males. Therefore, in the treatment of nonmedically related diseases using medicinal herbs, there is no abstinence or prohibition in its presentation.

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