

# Medicinal plants used by the indigenous Ati tribe in Tobias Fornier, Antique, Philippines

CECILIA S. CORDERO<sup>1,2,\*</sup>, GRECEBIO JONATHAN D. ALEJANDRO<sup>1,3</sup>

<sup>1</sup>The Graduate School, University of Santo Tomas, España Boulevard, 1015 Manila, Philippines.

Tel.+63-2-34061611, \*email: cecilia.cordero@sdca.edu.ph

<sup>2</sup>Biology Department, School of Health Science Professions, St. Dominic College of Asia, Aguinaldo Highway, 4102 City of Bacoor, Cavite, Philippines

<sup>3</sup>College of Science and Research Center for the Natural and Applied Sciences, University of Santo Tomas, España Boulevard, 1015 Manila, Philippines

Manuscript received: 30 November 2020. Revision accepted: 5 January 2021.

**Abstract.** *Cordero CS, Alejandro GJD. 2021. Medicinal plants used by the indigenous Ati tribe in Tobias Fornier, Antique, Philippines. Biodiversitas 22: 521-536.* This study documented the medicinal plants used by the indigenous Ati tribe in Sitio Pantad, Brgy. Igalawagan, Tobias Fornier, Antique. Semi-structured interviews were conducted with the tribal chieftain, council of elders, herb doctors, and other members of the tribe who have indigenous knowledge of using medicinal plants in traditional medicine. The Use Value, Informant Consensus Factor, and Fidelity Level were used to determine the plants' importance. A total of 108 plant species distributed in 97 genera and 44 families were used by the Ati to treat 67 diseases in 12 categories. The family Fabaceae was best represented with 15 species, followed by Lamiaceae with 12 species, and Asteraceae, Euphorbiaceae, and Poaceae with 5 species each. The most frequently used part was the leaf and the most common method of preparation and administration was decoction that was taken orally. One of the most culturally important medicinal plants was *Euphorbia hirta* L. with the highest use value (0.59) for treating visual problems, dengue, typhoid fever, and headache. The result of this study serves as an ethnobotanical base for drug research and formulation, as well as creating the needed awareness for preserving ethnomedicine as a safe and effective alternative means in the health care delivery system.

**Keywords:** Antique, Ati, indigenous knowledge, medicinal plants, Philippines

## INTRODUCTION

The Philippines is one of the 17 megadiverse countries that harbor more than 75% of world's flora and fauna (CBD 2019). The country ranks eighth on the world's list of endemic plants and reptiles and fifth in birds and mammals (Ong et al. 2002). In terms of cultural diversity, it has more than 14 million indigenous peoples in 110 groups occupying approximately 45% of the national land territory (NEDA 2017).

In Western Visayas, one of the major groups of indigenous peoples being recognized by the National Commission on Indigenous Peoples (NCIP) is the Negritos, locally known as "Ati". The Ati are the aborigines of the Philippines comprising about 25-34 tribal groups living in the major islands of the country and known in various names (Headland 1987; Padilla 2013). They have short stature, dark skin, curly hair, flattened nose, and their bodies are covered with thick hairs. They can be found in Northeast Mindanao, Samar, Central Negros, Central Panay, a few small islands north of Panay, North-Central Palawan, few isolated points in Southern Luzon, mountains of Bataan, and Zambales (Worcester 1913). In Panay Island, most of them wander by bands in the mountainous areas of the region and engaged in gradual clearing of the forest. Subsequently, they adopted a semi-sedentary life and work as farm laborers in the lowlands (Beyer 1917). They speak Inati, Kiniray-a, and Hiligaynon dialects, and some can speak and understand Filipino and English.

Unfortunately, Inati is a threatened language and there are only few thousand people who used it (Eberhard et al. 2020).

One of the most disadvantaged, marginalized, and poorest communities in the country are the indigenous peoples (IPs), who are mostly living in remote areas around the archipelago (UNDP 2010). Due to their isolated location, poverty, and lack or absence of access to basic health services, most of them rely on herbal medicines to address their primary health care needs instead of seeking assistance from licensed medical practitioners (PCHRD 2013). The Ati in Panay is known as gatherers, peddlers, traders, and sellers of medicinal plants to the communities in the towns, cities, and nearby islands (de la Peña 2009; Zayas 2008). Though they are known as the source of medicinal plant products, limited studies have been published about the medicinal plants they used in traditional medicine. Some medicinal plants were mentioned in the anthropological studies conducted in the Ati community in Janiuay, Iloilo (Rahmann and Maceda 1958), and in some barangays in Hamtic, Tibiao, and Dao, Antique (Rahmann and Maceda 1962). An ethnopharmacological study on 46 plants was conducted in the Ati resettlement in Barotac Viejo, Iloilo (Madulid et al. 1989), and recently a comprehensive listing in Malay, Aklan (Cordero et al. 2020). There is no updated and detailed documentation focused on the medicinal plants used by the Ati in the province of Antique.

Antique is a seahorse-shaped province straddled in the

western coastal part of the Panay Island in Western Visayas. It is bounded by the province of Capiz in the North, Cuyo East Pass in the west, Panay Gulf in the south, and a rugged of 35 mountain chains in the west that borders the province from Iloilo and Aklan (Fornier 1998). The province derived its name from "hantic-hantic" referring to a large species of ant ubiquitous in the province. It is also known as the "Home of the Sacadas" due to most of the laborers work in sugarcane plantations in Negros Occidental. It has a total land area of 252,201 hectares (ha), 53% (133,566 ha) classified as A & D while 47% (118,635 ha) classified as forestland, and it has the highest forest at 28% (72,022.25 ha) among the six provinces in Panay Island (DENR 2019). The province is home to more than 9,000 Ati scattered in six municipalities (NCIP 2019).

The rapid land degradation, accelerated forest destructions, loss of biological diversity, access to modern medicine, exposure to modern culture, mobility, and displacement of communities may affect the traditional knowledge of the indigenous peoples as well as the variety of the medicinal plants present in their area. Traditional practices used by the IPs were handed to the next generation normally in oral forms. The continuing loss of traditional knowledge is due to the absence of verbal communication to the next generation (Longuefosse and Nossin 1996). It is therefore urgent to document these data before it is totally forgotten. The present study aims to

document the ethnobotanical knowledge on the medicinal plants used by the indigenous Ati tribe in Sitio Pantad, Brgy. Igalawagan, Tobias Fornier, Antique.

## MATERIALS AND METHODS

### Study area

The study was conducted in Sitio Pantad, Brgy. Igalawagan, Tobias Fornier (formerly Dao) Antique (Figure 1). The Ati community is situated in a property donated by a priest as a settlement for wandering and landless Ati families. The community was officially recommended by the Chief Division Officer of the NCIP Aklan/Antique Community Service Center (ACSC). The tribe has preserved cultural integrity and still practices their indigenous customs and traditions. Certification Precondition was issued by the NCIP-Region VI/VII and the researchers satisfactorily complied with the requirements by the NCIP Administration Order 1, Series of 2012 also known as "The Indigenous Knowledge Systems and Practices (IKSPs) and Customary Laws (CLs) Research Documentation Guidelines of 2012". Wildlife gratuitous permit was also acquired from the Department of Environment and Natural Resources (DENR) Region VI prior to the conduct of the study.



**Figure 1.** Location of the study site shaded in red: A. Panay Island in Visayas region of the Philippine archipelago, B. Municipality of Tobias Fornier in the Province of Antique, Panay Island, indicated Brgy. Igalawagan (white dot)

### Data collection

A semi-structured questionnaire, ethically reviewed and approved by the (Ethics Review Committee of the University of Santo Tomas-Graduate School (GS-2017-PN 146) was used to interview the informants. The documentation of the medicinal plants was conducted using a purposive sampling and the key informants were determined during one of the community consultative meetings with the NCIP officers and legal counsel. The informants were composed of the tribal chieftain, council of elders, herb doctors, and other members of the tribe who have indigenous knowledge of using medicinal plants in treating and addressing health problems and conditions. There were 22 informants (>10% of the Ati population in Sitio Pantad). They were interviewed at their own convenience in their community in February and April 2019. They were asked for their personal information and the medicinal plants they used when they experienced any health-related problems or conditions. Plant part used, mode of preparation, and administration were also recorded during the interviews. A focus group discussion was also conducted for the verification of the acquired data among the informants.

### Plant collection and identification

Collection of medicinal plant samples were carried out with the help of the informants, herb doctors, and other members of the tribe that was knowledgeable on the identification and location of the medicinal plants. Medicinal plants were photographed for documentation purposes. The voucher specimens were prepared using five branches with preferably reproductive parts (flowers and fruits), poisoned, pressed, and dried. The pressed and dried medicinal plants were mounted on herbarium sheets with proper documentation labels. The herbarium specimens were deposited in the Herbarium of the Northwestern University Luzon (HNUL) and in the University of Santo Tomas Herbarium (USTH). Identification of the collected medicinal plants was done using different online databases such as Co's Digital Flora of the Philippines and PhytoImages (Pelser et al. 2011), Stuartxchange (<http://www.stuartxchange.org>), and Plants of the World Online (POWO 2019), then verified by Mr. Danilo Tandang, a botanist at the Philippine National Museum Herbarium. For the validation of the family and scientific names, The Plant List (The Plant List 2013), Tropicos (2019), and World Flora Online (WFO 2019) were used.

### Data analyses

There were three values calculated to quantify the importance of medicinal plants: use value (UV), informant consensus factor (ICF), and fidelity level (FL). The UV was used to assess the relative importance of the medicinal plants using the formula:  $UV=U/N$ , where U is the number of users report cited by each informant for a particular species, and N is the total number of informant (Phillips and Gentry 1994). When an informant cited a medicinal plant as being used for any healthcare purpose or disease, it is considered as one use-report. Plants with one use report were not computed for the UV. On the other hand, ICF was

used to determine the culturally important and potentially effective medicinal plant species using the formula:  $ICF=(N_{ur}-N_t)/(N_{ur}-1)$ , where  $N_{ur}$  is the number of useful reports in each disease category, and  $N_t$  is the number of species used (Heinrich et al. 1998). The result ranges from 0 to 1, and the value closest to 1 indicates that few medicinal plant species were being used by the informants in the same category, while a value close to 0 indicates that there were many medicinal plant species used to treat a disease or illness in the same category. The disease categories were adapted from the International Classification of Diseases (ICD-11 Mortality and Morbidity Statistics) by the World Health Organization (WHO 2020). Lastly, FL was used to evaluate the percentage of the most preferred medicinal plant species for a particular category using the formula:  $FL=(N_p/N) \times 100$ . Where,  $N_p$  is the number of informants who cited the use of a particular medicinal plant species for the same category of disease, and N is the total number of informants who cited the plant species for any other use or purpose (Friedman et al. 1986). A high value indicates that a medicinal plant was considered the most preferred species by the informants for a particular category, and low value indicates that many species were used in the same category.

## RESULTS AND DISCUSSION

### Medicinal plant habit and characteristics

A total of 108 medicinal plant species distributed in 97 genera and 44 families were used by the Ati tribe to address 67 diseases or purposes in 12 different categories. The family Fabaceae (Leguminosae) was best represented with 15 medicinal plant species, followed by Lamiaceae with 12 species, and Asteraceae, Euphorbiaceae, and Poaceae with 5 species each (Figure 2). The detailed list of the documented medicinal plants used by the Ati tribe was summarized in Table 1. The scientific names, family, and local names of the plants were included along with the part used, disease or purpose, mode of preparation, and form of administration.

The medicinal plants documented and collected were diverse and composed of herbs (39%), trees (32%), shrubs (22%), and climbers (7%) (Figure 3). Most of the medicinal plants were collected in the wild. The plants were found growing along the trail in the mountains, along the dry riverbed, and as weeds in the rice fields. The cultivated ones were grown as ornamentals, crops, vegetables, and for medicinal purposes by the Ati in their community.

### Plant part used and mode of preparation and administration

Fifteen different medicinal plant parts were used by the Ati tribe to address their health conditions and problems. The most frequently used parts were the leaf (40%), followed by root (17%), stem (12%), and bark (8%). Fruit, latex, seed, rhizome, flower, whole plant, tuber, petiole, bulb, adventitious roots, and shoots were also used but less

frequently (Figure 4). Leaves were applied as fresh, heated, crushed, pounded, and boiled depending on the disease or illness to be addressed. Sometimes sugar or mother's breastmilk was mixed with the leaf extract to be taken by the infants and children to mask or reduce the taste of bitterness. In some instances, salt was added to the poultice before treatment. Roots were usually boiled and the decoction was taken orally. Sometimes it is infused in coconut (*Cocos nucifera* L.) oil and applied topically or dried and placed in a small pouch to serve as an amulet (*karmen-karmen*) for infants and babies. Stems were usually boiled, infused in coconut oil, soaked in warm water, and its extract was consumed orally. Fruits were normally eaten as fresh, processed into oil or vinegar, boiled, heated, and applied directly.

The most common methods of preparation and administration were drinking decoction (28%), applying plant part/s directly on the affected area (17%), and crushing or pounding and applying or rubbing extract (16%), bathing or washing decoction (8%), and soaking in water to drink (7%) (Figure 5). Applying the latex onto the affected area or instillation into the eyes; burning plant parts for incense and ash; eating, chewing, and drinking water or juice from fruits; infusing in oil, vinegar, and gin; and processing into oil or vinegar were also practiced. Plants were also used as an amulet, bracelet, necklace, and a warning sign (plant part hung at the window).

Decoction was done by boiling seven fresh leaves or other plant parts such as fruits, roots, and barks in three glasses of water for five minutes, cooled down, and taken orally. It was usually prepared from a single medicinal plant or in mixture (polyherbal) with other plants (usually 3, 5, or 7 different plant species). For bathing, decoction was done by boiling the mixture of medicinal plants in a large pot half-filled with water for five minutes and cooled down by adding tap water. The Ati tribe was accustomed to use *pito-pito* (*pito* means seven) different medicinal plants or plant parts for the preparation of the remedy. For example, in the postpartum care recovery, seven different medicinal plants were boiled for the preparation of the treatment, and for measles or chickenpox, seven seeds of *Vigna radiata* (L.) R. Wilczek was used (Table 1). Sometimes three or five (odd numbers) different plants or plant parts were also used in treating diseases or illness.

#### Use value

The use-value was used to determine the relative importance of the medicinal plants as indicated with high use reports. Medicinal plants with highest UV were *Euphorbia hirta* L. (0.59), followed by *Jatropha curcas* L. (0.55), and *Spondias purpurea* L., *Tabernaemontana pandacaqui* Lam., and *Chrysophyllum cainito* L. and *Hyptis suaveolens* (L.) Poit. with 0.50 value each. *E. hirta* was used in three categories and was frequently used for treating visual problems, typhoid fever, dengue, and headache. For eye problems such as sore eyes, conjunctivitis, cataract, and blurry vision, latex from the stem was dropped into the affected eye/s. For dengue, typhoid fever, and headache it was prepared by boiling alone or with *Mimosa pudica* L., and the decoction was

taken orally or applied as sponge bath. *E. hirta* grows as weeds everywhere in the community and readily available when needed. *J. curcas* was used in four categories and known to suppress headache, nausea, oral thrush, tooth decay, and fracture. Leaves were applied on the forehead, or forehead and stomach area for headache and nausea. For fracture, fresh leaves or fresh or heated barks were applied to the affected area. Latex from the petiole was dropped into the tongue for oral thrush, and for tooth decay, the latex was applied in cotton and inserted into the affected tooth. *S. purpurea* was used in one category for the treatment of oral thrush in infants and children. The inner bark was scraped, and the extract was dropped into the tongue. *T. pandacaqui* was used in one category for the treatment of skin problems such as boil, pus, and other skin diseases. Latex from the stem was applied directly on the affected area. *C. cainito* was used in four categories and commonly known to treat cough, diarrhea, stomachache, pulmonary problems, and anthelmintic. Leaves, stem, roots, or barks were boiled alone or with *Syzygium cumini* (L.) Skeels and *Pithecellobium dulce* (Roxb.) Benth., and the decoction was taken orally. Leaves were also applied to the back of the body for pulmonary problems. *H. suaveolens* was used in two categories for the treatment of diarrhea, stomachache, bloated stomach, and athlete's foot. Heated leaves were crushed and applied on the stomach for stomachache bloated stomach, and diarrhea. In some case, pounded leaves were wrapped in banana leaf with seven rice grains then heated over the flame and applied on the stomach. Sometimes roots were boiled and the decoction was taken orally. For athlete's foot, leaves were crushed and the extract was rubbed on the affected area. Medicinal plants with the highest use value were frequently used by the Ati tribe in traditional medicine and can be found growing near their community and were available when they needed it.

#### Informant consensus factor

A total of 67 diseases or purposes in 12 categories were documented in this study (Table 2). The ICF value was based on the number of use reports and the number of medicinal plant species used in each category. The results range from 0.43 to 1.00 and the highest value was in category 6: mental, behavioral, or neurodevelopmental disorders. The reported disease was mental disorder and the frequently used plant was *Donax canniformis* (G.Forst.) K.Schum. by applying leaves on the forehead or bathing leaves decoction. Though the ICF value was high in category 6 (1.00), only few informants cited the use of *D. canniformis*. The second highest value (0.77) was in category 1: certain infectious or parasitic diseases and the documented disease or purpose were anti-rabies, anti-tetanus, anthelmintic, athlete's foot, chickenpox, dengue, typhus, typhoid fever, measles, oral thrush, ringworm, snake bite, and tinea versicolor treatment. *S. purpurea* was frequently used plant and was widely used to cure oral thrush. The third highest value (0.74) was in category 9: diseases of the visual system and *E. hirta* was frequently used medicinal plant species for treating visual problems. The lowest ICF value was in category 11: Diseases of the circulatory system with edema as a reported disease and *Crinum* sp. L. was the frequently used species.

**Table 1.** Medicinal plants used by the indigenous Ati tribe in Sitio Pantad, Brgy. Igalawagan, Tobias Fornier, Antique, Philippines

Scientific name	Accession number	Family name	Local name	Use value <sup>a</sup>	Plant part used <sup>b</sup>	Disease or purpose	Preparation and administration
<i>Justicia gendarussa</i> Burm.f.	HNUL0020567	Acanthaceae	Bunlaw	0.09	Lf	Postpartum care and recovery	Boil with <i>Glochidion</i> sp., <i>Bambusa</i> sp. or with <i>Canarium</i> sp., <i>P. pentandrum</i> , and <i>C. citratus</i> then drink 1 glass of decoction and bath the rest
<i>Pseuderanthemum carruthersii</i> (Seem.) Guillaumin	HNUL0020596	Acanthaceae	Pasaw	0.23	Lf	Headache	Apply on the forehead; Boil and bath decoction
					Lf	Postpartum care and recovery	Boil and bath decoction
<i>Acorus calamus</i> L.	HNUL0020599	Acoraceae	Labigan	0.14	Rh	Headache, <i>hiwit</i> (sorcery)	Drink decoction
					Rh		
<i>Crinum</i> sp. L.	HNUL0020595	Amaryllidaceae	Bakong/ bakom	0.14	Bu	Boil	Grate and apply
					Bu	Edema	Heat sliced bulb and apply
<i>Spondias purpurea</i> L. <i>Annona muricata</i> L.	HNUL0020571	Anacardiaceae	Sergwelas	0.5	Bk	Oral thrush	Scrape inner bark and drop extract on the child's tongue
	HNUL0020580	Annonaceae	Babana	0.32	Lf, Fr	Cuts, wounds	Apply crushed leaves
<i>Alstonia scholaris</i> (L.) R.Br.	HNUL0020546	Apocynaceae	Bitá	0.45	Bk	Stomach ulcer, intestinal cleansing	Drink decoction of young fruit or leaves
					Bk	Urinary tract infection (UTI)	Boil alone or with <i>H. riparia</i> , <i>I. cylindrica</i> , <i>E. philippinensis</i> , and <i>L. speciosa</i> and drink decoction
					Lf	Cough, cancer	Drink decoction
<i>Catharanthus roseus</i> (L.) G.Don	HNUL0020606	Apocynaceae	Pandanggera/ Rosas de baybayon	0.41	Bk	Stomachache, UTI, abortifacient	Drink decoction; pound dried bark then add in warm water and drink
					Rt	Dizziness, gas pain	Soak in water and drink
<i>Parameria laevigata</i> (Juss.) Moldenke	HNUL0020548	Apocynaceae	Tagulaway	0.41	Rt, St, Lx	Cuts/wounds, skin disease	Infuse slice dried root alone or with <i>C. cinereum</i> in <i>C. nucifera</i> 's oil then apply; Burn stem and apply the ash; Apply latex directly
					Rt	Vomiting blood	Boil with <i>Ardisia</i> sp. and drink decoction
<i>Tabernaemontana pandacaqui</i> Lam.	HNUL0020543	Apocynaceae	Alibotbot	0.5	Lx	Pus, boil, skin diseases	Apply latex to the affected area
<i>Alocasia</i> cultivar (Schott) G.Don	HNUL0020601	Araceae	Badyang tapol	0.14	Lf	<i>Inaswang</i> (witchcraft)	Apply on the abdomen
					Tu	<i>Karmen-karmen</i> (amulet)	Slice dried tuber with <i>Uncaria</i> sp., <i>A. calamus</i> , <i>L. guineensis</i> , & <i>M. Pruriens</i> , put in a small pouch and pin in child's clothes
<i>Alocasia macrorrhizos</i> (L.) G.Don	HNUL0020594	Araceae	Badyang	0.23	Pt	Toothache	Burn the decaying petiole with husk of <i>C. nucifera</i> then wrap ash in a black cloth and rub on the face

<i>Areca catechu</i> L.	HNUL0020604	Arecaceae	Bunga	0.14	Sd	Stomachache, bloated stomach	Chew or pound with <i>P. betle</i> and <i>N. tabacum</i> then apply on the stomach
<i>Cocos nucifera</i> L.	HNUL0020609	Arecaceae	Niyog	0.23	Fl Fr Fr	Edema Urinary tract infection Cuts, wounds, cough, spasm	Process into vinegar then add <i>T. crispa</i> and apply Drink water from the fruit Process into oil then add <i>E. indica</i> , <i>Alpinia</i> sp., <i>P. laevigata</i> , & <i>A. flava</i> and apply
<i>Sansevieria trifasciata</i> Prain	HNUL0020597	Asparagaceae	Tigre-tigre	0.23	Fr Lf	Hair growth Cuts, Wounds; anti-tetanus	Process into oil then add <i>F. benjamina</i> and apply on the scalp Crush heated leaves and apply
<i>Artemisia vulgaris</i> L.	HNUL0020605	Asteraceae	Artemisia	0.27	Lf	Cough	Drink extract alone or with breastmilk for infants; rub extract on the throat or on the chest and back of the body
<i>Blumea balsamifera</i> (L.) DC.	HNUL0020522	Asteraceae	Alibhon	0.27	Lf, Rt	Gas pain Cough	Rub extract on the stomach Eat young leaves; crushed leaves and rub extract on the throat; drink root or leaf decoction
<i>Blumea lacera</i> (Burm.f.) DC.	HNUL0020526	Asteraceae	Dila-dila	0.32	Lf, Rt	Stomachache, gas pain	Apply leaves as poultice alone or with <i>Z. officinale</i> on the stomach; drink root decoction; wrap pounded leaves with bit of salt in banana's leaf then heat and apply on the stomach
<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	HNUL0020533	Asteraceae	Bungarngar/ Melda-melda	0.18	Lf Lf	Cuts, wounds Cuts, wounds	Apply crushed leaves Apply crushed leaves
<i>Cyanthillium cinereum</i> (L.) H.Rob	HNUL0020577	Asteraceae	Pali-pali	0.27	Rt	Cuts/wounds	Wrap pounded leaves in banana's leaf then heat and apply on the stomach Infused with <i>P. laevigata</i> in <i>C. nucifera</i> 's oil and apply
<i>Cordia dichotoma</i> G.Forst.	HNUL0020575	Boraginaceae	Anonang	0.18	Lf, Rt	Promote placenta and fetus development	Apply leaves on the abdomen; Drink root decoction
<i>Heliotropium indicum</i> L.	HNUL0020540	Boraginaceae	Kamra-kamra	0.09	Rt Lf	Diarrhea Cuts, wounds	Drink decoction Apply crushed leaves
<i>Ananas comosus</i> (L.) Merr.	HNUL0020598	Bromeliaceae	Pinya	0.32	Lf	Fever	Pound and rub extract on the body; soaked in water for sponge bath
<i>Canarium</i> sp. L.	HNUL0020542	Burseraceae	Salong	0.32	Lf Lx Lx	Hair loss Typhus Postpartum care and recovery Cough	Pound and rub extract on the head Pound and rub extract Boil latex with <i>Glochidion</i> sp. or bark with <i>P. pendandrum</i> , <i>C. maxima</i> & <i>C. citratus</i> then drink 1 glass and bath the rest Burn and mix ash with water and drink or wrap latex in banana leaf
<i>Carica papaya</i> L.	HNUL0020557	Caricaceae	Kapayas	0.32	Fr Fr Sd Lf	UTI, constipation Anti-rabies Stomachache Dengue, fever	Eat ripe fruit Rub latex Pound 7 dried seeds then soak in warm water and drink Boil then drink some decoction and sponge bath the rest
<i>Cheilocostus speciosus</i> (J.Koenig) C.D.Specht	HNUL0020551	Costaceae	Tabungyan	0.14	Rh St	Dizziness Relapse	Drink decoction Cut in half vertically then heat over the flame and apply on the forehead

<i>Momordica charantia</i> L.	HNUL0020574	Cucurbitaceae	Sampaliya	0.45	Lf Lf	Cough Meconium aspiration syndrome	Drink extract Crush heated leaves and damp extract on the infant's mouth
<i>Kyllinga odorata</i> Vahl	HNUL0020578	Cyperaceae	Butonsilyo	0.23	Lf Rt	Cuts, wounds Fever	Apply crushed leaves Boil alone or with <i>E. indica</i> & <i>D. triflorum</i> and drink decoction
<i>Euphorbia hirta</i> L.	HNUL0020537	Euphorbiaceae	Tawa-tawa	0.59	Lx  Wp	Sore eyes, conjunctivitis, cataract, blurry vision Dengue, typhoid fever, headache	Drop latex into the eyes Boil alone or with <i>M. pudica</i> drink decoction or apply as sponge bath
<i>Homonoia riparia</i> Lour.	HNUL0020538	Euphorbiaceae	Miyagos	0.36	Rt  Rt	Stomach ulcer, appendicitis, intestinal cleansing UTI, kidney stones	Boil alone or with <i>I. cylindrica</i> and drink decoction Boil alone or with <i>M. pudica</i> , <i>I. cylindrica</i> or <i>E. philippinensis</i> , <i>L. speciosa</i> , & <i>A. muricata</i> and drink decoction
<i>Jatropha curcas</i> L.	HNUL0020593	Euphorbiaceae	Kasla	0.55	Lf Lf Lf, Bk Lx	Headache Nausea Fracture Thrush, tooth decay	Apply on the forehead or forehead and stomach Apply on the stomach area Apply leaves; Apply fresh or heated bark Drop into the tongue; apply latex in cotton and insert in the affected tooth
<i>Melanolepis multiglandulosa</i> (Reinw. ex Blume) Rchb. & Zoll.	HNUL0020561	Euphorbiaceae	Alom	0.27	Lf Lf	Dizziness, headache Sore eyes	Apply on the forehead Drop extract into the eyes
<i>Ricinus communis</i> L.	HNUL0020591	Euphorbiaceae	Tangan-tangan	0.09	Lf	Migraine	Apply on the forehead
<i>Adenanthera pavonina</i> L.	HNUL0020586	Fabaceae	Uyangya	0.14	Lf	Cough	Pound then add sugar in extract and drink
<i>Archidendron clypearia</i> (Jack) I.C.Nielsen	HNUL0020525	Fabaceae	Pipi	0.14	Bk St	Dandruff Soap	Scrape bark and rub extract on the scalp Pound dried stem and use as soap
<i>Caesalpinia sappan</i> L.	HNUL0020582	Fabaceae	Sibukaw	0.27	St	Vomiting blood	Drink decoction; soak in water and drink
<i>Caesalpinia</i> sp. L.	HNUL0020520	Fabaceae	Sapinit	0.18	Lf Lf	Sore eyes Stomachache	Drop extract into the eyes Drink decoction
<i>Desmodium</i> sp. Desv.	HNUL0020531	Fabaceae	Ikog-ikog	0.32	Rt, St, Lf	Thrush	Use roots or stem as bracelet or necklace for infants and children; Rub leaf extract on the tongue
<i>Desmodium triflorum</i> (L.) DC.	HNUL0020530	Fabaceae	Himbis puyo	0.18	Wp	Fever	Boil alone or with <i>E. indica</i> & <i>K. odorata</i> and drink decoction
<i>Gliricidia sepium</i> (Jacq.) Walp.	HNUL0020579	Fabaceae	Madre Kakaw	0.32	Lf Lf Lf, St	Headache Postpartum bleeding Skin disease	Apply on the forehead Heat over the flame and seat on it Crush and apply leaf extract; scrape stem and apply extract
<i>Indigofera tinctoria</i> L.	HNUL0020573	Fabaceae	Tagum	0.27	Lf	Stomachache; Bloating stomach	Crush leaves alone or with <i>P. angulata</i> & <i>L. esculentum</i> and rub extract on the stomach; Wrap pounded leaves in banana's leaf then heat and apply on stomach
<i>Mimosa pudica</i> L.	HNUL0020547	Fabaceae	Huya-huya	0.23	Wp Rt Rt	Dengue Stones Vomiting blood	Boil with <i>E. hirta</i> and drink decoction Boil with <i>I. cylindrica</i> & <i>H. riparia</i> and drink decoction Boil with <i>E. indica</i> and drink decoction
<i>Mucuna pruriens</i> (L.) DC.	HNUL0020590	Fabaceae	Nipay	0.23	St Rt	Thrush <i>Karmen-karmen</i> (amulet)	Apply extract Slice dried roots with <i>Uncaria</i> sp., <i>A. calamus</i> , <i>L. guineensis</i> , & <i>Alocasia</i> cv., put in a small pouch and pin in child's clothes

<i>Pithecellobium dulce</i> (Roxb.) Benth.	HNUL0020618	Fabaceae	Kamunsil		St	Diarrhea	Boil with <i>S. cumini</i> & <i>C. cainito</i> and drink decoction
<i>Pterocarpus indicus</i> Willd.	HNUL0020621	Fabaceae	Naga		Lx	Toothache	Drop into the affected tooth
<i>Senna alata</i> (L.) Roxb.	HNUL0020583	Fabaceae	Palotsina	0.27	Lf	Tinea versicolor, ringworm	Pound and rub extract
<i>Tamarindus indica</i> L.	HNUL0020600	Fabaceae	Salamagi	0.14	Lf	Cough	Drink extract
<i>Vigna radiata</i> (L.) R. Wilczek	HNUL0020622	Fabaceae	Monggo	0.09	Sd	Measles, Chickenpox	Soak 7 seeds in water alone or with <i>A. bunius</i> and drink
<i>Cratogeomys sumatranum</i> (Jack) Blume	HNUL0020529	Hypericaceae	Kansilay	0.13	Rt, Lf	Postpartum care and recovery	Drink root decoction; apply leaves on the forehead
<i>Clerodendrum quadriloculare</i> (Blanco) Merr.	HNUL0020554	Lamiaceae	Salin-uwak	0.18	Lf	Headache	Apply on the forehead
<i>Hyptis capitata</i> Jacq.	HNUL0020536	Lamiaceae	Bulang-bulang/Gulang-gulang		Lf	Bloated stomach, constipation	Apply leaves as poultice on the stomach
<i>Hyptis suaveolens</i> (L.) Poit.	HNUL0020532	Lamiaceae	Luko-luko	0.5	Rt, Lf, Rt	Constipation Stomachache, diarrhea, bloated stomach	Drink root decoction Crush heated leaves and apply on the stomach; wrap pounded leaves in banana leaf with 7 rice grains heat over the flame and apply on the stomach; drink root decoction
<i>Gmelina arborea</i> Roxb.	HNUL0020558	Lamiaceae	Gimelina	0.36	Lf	Athlete's foot Headache	Crush and apply Apply on the forehead
<i>Gmelina elliptica</i> Sm.	HNUL0020553	Lamiaceae	Talungon	0.18	Fr	Boil	Cut in half then heat and apply
<i>Leucas zeylanica</i> (L.) W.T. Aiton	HNUL0020572	Lamiaceae	Pitsi-pitsi	0.14	Rt	Skin abscess Stomachache	Heat and apply Drink decoction
<i>Ocimum</i> sp. L.	HNUL0020568	Lamiaceae	Kulukulugo	0.18	Lf	Cough	Crush heated leaves and add salt then apply
<i>Plectranthus amboinicus</i> (Lour.) Spreng.	HNUL0020619	Lamiaceae	Oregano	0.27	Lf	Diarrhea Cough	Crush and rub extract on the stomach Crush heated leaves and rub extract on the back; crush in water and drink; crush and drink extract
<i>Plectranthus scutellarioides</i> (L.) R. Br.	HNUL0020620	Lamiaceae	Rapunaya	0.32	Lf	Cough	Crush and drink extract or rub extract on the throat and on the back of the body
<i>Premna odorata</i> Blanco	HNUL0020524	Lamiaceae	Lumabong	0.18	Lf	Fever Black eye Headache	Crush and rub extract on the forehead Crush and apply extract Apply on the forehead
<i>Vitex negundo</i> L.	HNUL0020570	Lamiaceae	Lagundi (kahoy)	0.45	St, Rt	Dizziness	Drink decoction
<i>Vitex trifolia</i> L.	HNUL0020541	Lamiaceae	Lagundi (kamang)	0.14	Lf, St	Cough Spasm	Drink leaf decoction; soak stem in warm water and drink Drink leaf decoction; infused stem in <i>C. nucifera</i> oil with <i>Z. officinale</i> & <i>C. citratus</i> and rub; infused stem with <i>N. tabacum</i> in <i>C. nucifera's</i> oil and rub
<i>Lagerstroemia speciosa</i> (L.) Pers.	HNUL0020518	Lythraceae	Banaba	0.36	Lf, Bk, Lf	Cough UTI, stomach ulcer, appendicitis; uterine problems; gallbladder problems, vomiting blood	Crush and rub extract Boil alone or with <i>H. riparia</i> , <i>I. cylindrica</i> , <i>E. philippinensis</i> & <i>L. speciosa</i> and drink decoction
					Lf	Headache	Apply on the forehead



<i>Ceiba pentandra</i> (L.) Gaertn.	HNUL0020562	Malvaceae	Duldol	0.27	Bk	Stomachache	Scrape bark and apply on the stomach area
					Lf	Headache	Apply on the stomach area or on the forehead
<i>Theobroma cacao</i> L.	HNUL0020588	Malvaceae	Kakaw	0.23	Fr	Burn	Scrape the endocarp and apply
<i>Donax canniformis</i> (G.Forst.) K.Schum.	HNUL0020550	Marantaceae	Banban	0.18	Lf	Mental disorder	Apply on the forehead or bath decoction
					Rt	Measles	Boil and apply as hot compress; drink decoction
<i>Swietenia mahogoni</i> L.	HNUL0020585	Meliaceae	Mahogany	0.27	Sd	Tooth decay	Insert in tooth cavity
					Sd	Stomachache, diarrhea	Soak in warm water and drink
					Sd	Abortifacient	Eat directly
<i>Arcangelisia flava</i> (L.) Merr.	HNUL0020603	Menispermaceae	Albutra	0.23	St, Rt	Gas pain	Infuse in alcoholic gin and drink; Drink root or stem decoction
					St	Postpartum care and recovery, stomachache	Boil and drink decoction
					St	Sore eyes	Soak in water and drop into the eyes
<i>Tinospora crispa</i> (L.) Hook. f. & Thomson	HNUL0020565	Menispermaceae	Manunggal	0.09	Lx	Tooth decay	Drop latex into the eyes or in the decaying tooth
					St	Edema in foot	Infused in <i>C. nucifera</i> 's vinegar and apply
					St	Skin disease	Boil and apply as wash
<i>Ficus benjamina</i> L.	HNUL0020581	Moraceae	Lunok	0.23	Ar	Hair growth	Soaked in water and bath; infused in <i>C. Nucifera</i> 's oil and apply on the scalp
					Ar, Bk	Fracture	Apply scraped bark or the adventitious roots
<i>Ficus nota</i> (Blanco) Merr.	HNUL0020592	Moraceae	Tabuyog	0.27	Bk, Rt	Enhance breast milk production	Scrape inner bark and drink extract; rub extract on the head and on the collarbone; drink bark or root decoction
<i>Ficus pseudopalma</i> Blanco	HNUL0020555	Moraceae	Salamnyog	0.14	Lf	Headache	Apply on the forehead
					St	Relapse	Drink decoction
<i>Ficus septica</i> Burm.f.	HNUL0020544	Moraceae	Lamnog	0.45	Lf	Headache	Apply on the forehead or on the stomach area alone or with <i>M. citrifolia</i>
					Lx	Snake bite	Apply leaf latex
					Lf	Postpartum care and recovery	Boil with <i>Glochodion</i> sp. and bath decoction
<i>Moringa oleifera</i> Lam.	HNUL0020613	Moringaceae	Balunggay	0.36	St	Stomachache	Drink decoction
					Lf	Cuts/wounds, skin disease	Crush and apply extract
					Lf	Sore eyes	Drop extract into the eyes
					Rt	Abortifacient	Drink decoction
<i>Musa x paradisiaca</i> L.	HNUL0020614	Musaceae	Saging tundal	0.14	Lf	Headache	Apply on the forehead
<i>Psidium guajava</i> L.	HNUL0020563	Myrtaceae	Bayabas	0.32	Lf	Vomiting blood	Chew young leaves
					Lf	Cuts/wounds, skin disease	Boil and apply as wash
					Lf	Diarrhea	Drink decoction
<i>Syzygium cumini</i> (L.) Skeels	HNUL0020569	Myrtaceae	Lumbay	0.36	Bk, Lf	Cough, diarrhea, stomachache	Boil alone or with <i>C. cainito</i> & <i>P. dulce</i> and drink decoction
<i>Piper betle</i> L.	HNUL0020617	Piperaceae	Buyo	0.27	Lf	Stomachache	Pound with <i>A. catechu</i> and apply on the stomach
					Lf	Cough	Rub extract on the throat and or on chest and back of the body
					Lf	Bloated stomach	Chew leaves and apply on the stomach

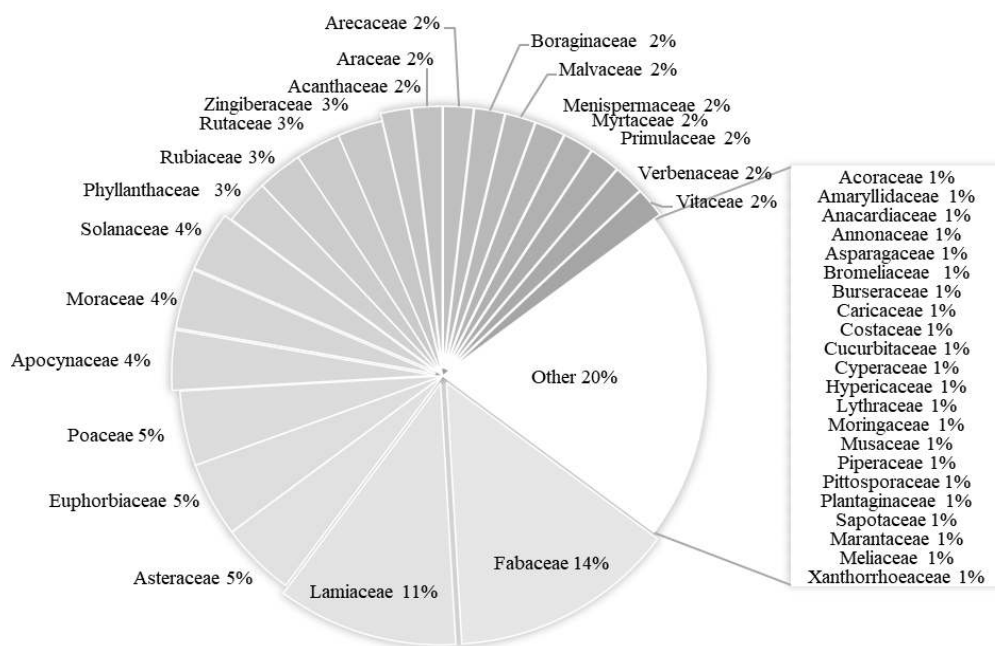
<i>Pittosporum pentandrum</i> (Blanco) Merr.	HNUL0020517	Pittosporaceae	Balingkawayan	0.36	Lf, Fl	Postpartum care and recovery	Boil with <i>Canarium</i> sp., <i>J. gendarussa</i> , <i>C. citratus</i> , <i>Glochidion</i> sp. & <i>Bambusa</i> sp. or with <i>C. maxima</i> and drink one glass then bath the rest
<i>Scoparia dulcis</i> L.	HNUL0020539	Plantaginaceae	Init-init		Rt	Fever	Drink decoction
<i>Antidesma buniis</i> (L.) Spreng.	HNUL0020576	Phyllanthaceae	Bugnay	0.36	Lf	Measles	Soak in water and drink; burn as incense; hang outside the door
					Lf	Chicken pox	Hang outside the door
					Bk	UTI	Drink decoction
<i>Bischofia javanica</i> Blume	HNUL0020559	Phyllanthaceae	To-og	0.18	Lf	Nausea, stomach ulcer	Apply on the back and/or forehead and stomach
<i>Glochidion</i> sp. J.R. Forst. & G. Forst.	HNUL0020527	Phyllanthaceae	Amarugna/Marugna	0.27	Lf, Rt	Postpartum care and recovery, fever	Drink roots or leaves decoction; Boil with <i>Canarium</i> sp., <i>P. pentandrum</i> , <i>J. gendarussa</i> , <i>C. citratus</i> & <i>Bambusa</i> sp. and drink one glass then bath the rest
<i>Bambusa</i> sp. Schreb.	HNUL0020560	Poaceae	Kawayan	0.18	Lf, Fl	Postpartum care and recovery; relapse	Drink decoction of flower; Boil with <i>Canarium</i> sp., <i>P. pentandrum</i> , <i>J. gendarussa</i> , <i>C. citratus</i> & <i>Glochidion</i> sp. and drink one glass then bath the rest
<i>Cymbopogon citratus</i> (DC.) Stapf	HNUL0020610	Poaceae	Tanglad	0.18	Lf	Postpartum care and recovery	Boil with <i>Canarium</i> sp., <i>P. pentandrum</i> , <i>J. gendarussa</i> , <i>C. citratus</i> , <i>Bambusa</i> sp. & <i>Glochidion</i> sp. or with <i>C. maxima</i> and drink 1 glass then bath the rest
<i>Eleusine indica</i> (L.) Gaertn.	HNUL0020584	Poaceae	Plagtiki	0.14	Rt	Cuts/wounds, stomachache, cough	Infused dried roots in <i>C. nucifera</i> 's oil with <i>P. laevigata</i> & <i>Alpinia</i> sp. then apply
					Rt	Cancer, UTI, vomiting blood, intestinal cleansing	Drink decoction
					Rt, Lf	Fever	Boil with <i>K. odorata</i> & <i>D. triflorum</i> and drink decoction
<i>Imperata cylindrica</i> (L.) Raeusch.	HNUL0020611	Poaceae	Kogon/Tubotubo	0.36	Sh	UTI, kidney stones, fever	Boil alone or with <i>H. riparia</i> , <i>M. pudica</i> and/or <i>E. philippinensis</i> , <i>L. speciosa</i> , <i>A. muricata</i> and drink decoction
<i>Oryza sativa</i> L.	HNUL0020616	Poaceae	Paray		Fr	Stomachache	Wrap 7 grains with <i>H. suaveolens</i> in banana leaf then heat over the flame and apply on the stomach
<i>Ardisia</i> sp. Sw.	HNUL0020528	Primulaceae	Tagpo	0.23	Bk, Rt	Diarrhea, vomiting blood	Drink decoction
<i>Embelia</i> sp. Burm.f.	HNUL0020556	Primulaceae	Salimawmaw	0.36	St	Cough	Drink water from the stem
					St	Sore eyes	Drop water from the stem into the eyes
					St	Spasm, edema	Sliced and infused in <i>C. nucifera</i> vinegar and rub on the affected area
<i>Nauclea orientalis</i> (L.) L.	HNUL0020534	Rubiaceae	Bangkal	0.23	Lf	Headache	Apply young leaves on the forehead
					St, Bk	Abortifacient	Drink decoction
<i>Morinda citrifolia</i> L.	HNUL0020521	Rubiaceae	Anino	0.18	Lf	Headache	Apply with <i>F. septica</i> on the forehead and stomach
					Fr	Cancer	Drink decoction
<i>Uncaria</i> sp. Schreb.	HNUL0020519	Rubiaceae	Bakan	0.23	St	<i>Inaswang</i> (witchcraft)	Burn as incense after giving birth; place under the stairs
					Rt	<i>Karmen-karmen</i> (amulet)	Slice dried roots with <i>M. pruriens</i> , <i>A. calamus</i> , <i>L. guineensis</i> , & <i>Alocasia</i> cv then put in a small pouch and pin in child's clothes
<i>Citrus maxima</i> (Burm.) Merr.	HNUL0020607	Rutaceae	Kabugaw	0.18	Lf	Postpartum care and recovery	Boil with <i>P. pentandrum</i> , <i>C. citratus</i> & <i>Canarium</i> sp. then drink one glass of decoction and bathe the rest
					Lf	Skin disease	Boil and apply as wash

<i>Zanthoxylum avicennae</i> (Lam.) DC.	HNUL0020587	Rutaceae	Salay	0.23	Bk, St Rt	Postpartum care and recovery, abortifacient Stomachache, heartburn, dizziness, postpartum care and recovery	Drink root decoction; pound stem then soak in hot water and drink Boil with <i>A. flava</i> , <i>Z. avicennae</i> & <i>Z. avicennae</i> and drink decoction
<i>Chrysophyllum cainito</i> L.	HNUL0020566	Sapotaceae	Star Apol	0.5	Bk Lf, St, Bk, Rt Lf Lf, Rt	Cough Diarrhea, stomachache Pulmonary problems Anthelmintic	Boil with <i>S. cumini</i> and drink decoction Boil alone or with bark of <i>S. cumini</i> & <i>P. dulce</i> and drink decoction Apply on the back Drink decoction
<i>Lycopersicon esculentum</i> Mill.	HNUL0020612	Solanaceae	Kamatis	0.14	Lf	Stomachache	Crushed alone or with <i>P. angulata</i> & <i>I. tinctoria</i> then rub extract
<i>Nicotiana tabacum</i> L.	HNUL0020615	Solanaceae	Tabako	0.14	Lf	Stomachache	Pound with <i>V. unguiculata</i> & <i>Alpinia</i> sp. and rub on the stomach area
<i>Physalis angulata</i> L.	HNUL0020564	Solanaceae	Asisi-o/Lupok-lupok	0.27	Lf Lf	Spasm Stomachache	Infused leaf vein with <i>V. trifolia</i> in <i>C. nucifera</i> 's oil and apply Crushed alone or with <i>L. esculentum</i> & <i>I. tinctoria</i> then rub extract
<i>Solanum melongena</i> L.	HNUL0020589	Solanaceae	Tarong	0.23	Lf Lf	Diarrhea Stomachache, <i>Inaswang</i> (witchcraft)	Apply heated leaves on the stomach Apply heated leaves on the stomach
<i>Lantana camara</i> L.	HNUL0020523	Verbenaceae	Hagonoy	0.14	Rt	Relapse	Drink decoction
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	HNUL0020545	Verbenaceae	Serisemento	0.18	Lf	Cuts/wounds, lump, black eye	Crush and apply extract
<i>Leea guineensis</i> G. Don	HNUL0020535	Vitaceae	Mamali	0.27	Lf Lf Rt	Fever Headache, dizziness <i>Karmen-karmen</i> (amulet)	Pound and rub extract on the body Apply on the forehead Slice dried roots with <i>Uncaria</i> sp., <i>A. calamus</i> , <i>M. pruriens</i> , & <i>Alocasia</i> cv then put in a small pouch and pin in child's clothes
<i>Tetrastigma</i> sp. Planch.	HNUL0020552	Vitaceae	Ilahas nga layas	0.09	Lf	Lump	Apply on the affected area
<i>Aloe vera</i> (L.) Burm.f.	HNUL0020602	Xanthorrhoeaceae	Alobera	0.09	Lf	Hair loss	Apply fleshy leaves on the scalp
<i>Alpinia</i> sp. Roxb.	HNUL0020516	Zingiberaceae	Karupi	0.45	Sd Sd	Skin disease Stomachache, gas pain	Infused in with <i>P. laevigata</i> in <i>C. nucifera</i> and apply on the affected area Pound or chew and apply on the stomach; Pound add warm water then drink; Pound with <i>V. unguiculata</i> & <i>N. tabacum</i> and rub on the stomach area
<i>Etingera philippinensis</i> (Ridl.) R.M.Sm.	HNUL0020549	Zingiberaceae	Tagbak	0.14	St	UTI, gallbladder problems	Boil with <i>E. philippinensis</i> , <i>I. cylindrica</i> , <i>H. riparia</i> , <i>L. speciosa</i> & <i>A. muricata</i> and drink decoction
<i>Zingiber officinale</i> Roscoe	HNUL0020623	Zingiberaceae	Luy-a	0.09	Rh	Stomachache, Gas pain	Mix with <i>B. lacera</i> and salt then apply on the stomach area

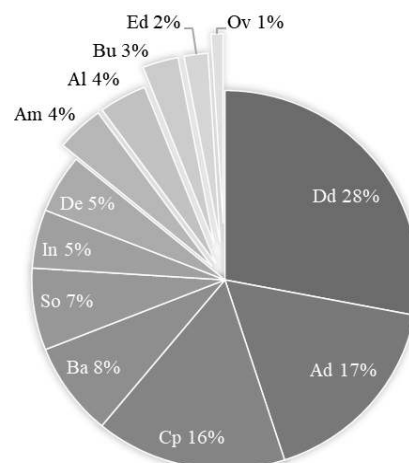
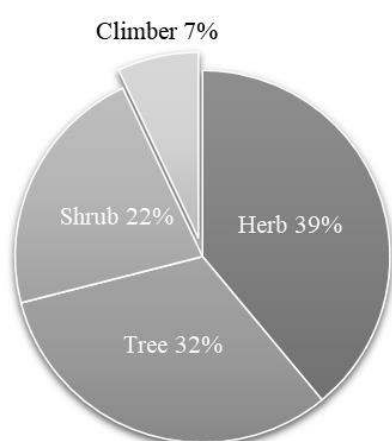
Note: <sup>a</sup>UV- computed for at least 2 use reports. <sup>b</sup>Plant part: Ar, aerial root; Bk, bark; Bu, bulb; Fl, flower; Fr, fruit; Lf, leaf; Lx, latex; Pt, petiole; Rh, rhizome; Rt, root; Sd, seed; St, stem; Sh, shoot; Tu, tuber; Wp, whole plant

**Table 2.** Disease category, Informant Consensus Factor (ICF), and Fidelity level (FL) of frequently used medicinal plant species

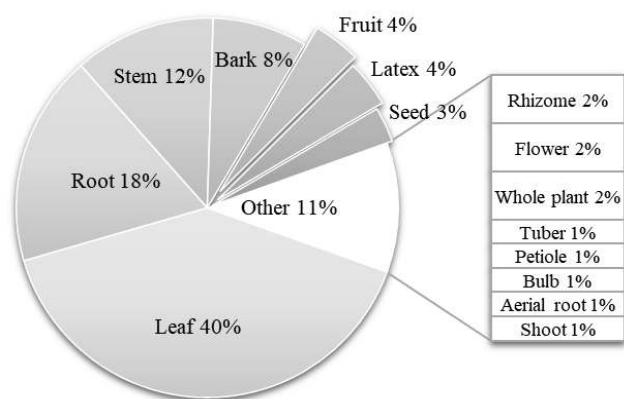
ICD-11	Category name	Reported diseases or purposes	No. of use report	No. of species	ICF	Frequently used medicinal plant	(%) FL
1	Certain infectious or parasitic diseases	Anti-rabies, anti-tetanus, anthelmintic, athlete's foot, chicken pox, dengue, typhus, typhoid fever, measles, oral thrush, ringworm, snake bite, <i>Tinea versicolor</i>	65	16	0.77	<i>Spondias purpurea</i>	100
2	Neoplasms	Cancer	4	2	0.67	<i>Morinda citrifolia</i>	75
6	Mental, behavioural or neurodevelopmental disorders	Mental disorder	2	1	1.00	<i>Donax canniformis</i>	50
9	Diseases of the visual system	Blurry vision, cataract, conjunctivitis, sore eyes	20	6	0.74	<i>Euphorbia hirta</i>	69
11	Diseases of the circulatory system	Edema	8	5	0.43	<i>Crinum</i> sp.	100
12	Diseases of the respiratory system	Cough, pulmonary problems	63	18	0.73	<i>Vitex negundo</i>	100
13	Diseases of the digestive system	Appendicitis, bloated stomach, constipation, diarrhea, gas pain, heartburn, intestinal cleansing, nausea, gallbladder problems, liver problems, stomachache, stomach ulcer, toothache, tooth decay, vomiting blood	165	45	0.73	<i>Hyptis suaveolens</i>	100
14	Diseases of the skin	Boil, black eye, dandruff, hair growth, hair loss, lump, pus, skin abscess, skin disease, soap	42	17	0.62	<i>Tabernaemontana pandacaqui</i>	100
16	Diseases of the genitourinary system	Kidney stones, uterine problems, urinary tract infection (UTI)	27	9	0.69	<i>Imperata cylindrica/ Homonoia riparia</i>	75/75
18	Pregnancy, childbirth, or the puerperium	Abortifacient, enhance breast milk production, meconium aspiration syndrome, postpartum care and recovery, promote placenta and fetus development	72	21	0.72	<i>Pittosporum pentandrum</i>	100
21	Symptoms, signs or clinical findings, not elsewhere classified	Dizziness, fever, headache, <i>hiwit</i> (sorcery), <i>inaswang</i> (witchcraft), <i>karmen-karmen</i> (amulet), lump, migraine, relapse, spasm	115	38	0.68	<i>Jatropha curcas</i>	75
22	Injury, poisoning or certain other consequences of external causes	Burn, fracture, cuts/wounds	69	20	0.72	<i>Jatropha curcas/ Parameria laevigata</i>	75/100



**Figure 2.** The percentage of medicinal plant families used by the indigenous Ati tribe in Sitio Pantad, Brgy. Igalawagan, Tobias Fornier, Antique, Philippines



**Figure 3.** Medicinal plant growth habits



**Figure 4.** Plant part used for medical application or purpose

**Figure 5.** Preparation and administration of medicinal plants in Antique. Al, apply latex; Ad, apply part/s directly; Am, amulet and sign; Ba, bath decoction; Bu, burn and use ash; Cp, crushing/pounding and apply extract; Dd, drink decoction; De, drink extract; Ed, eat, chew, and drink; In, infuse in oil or vinegar; So, soaking in water; Ov, process into oil or vinegar.

Category 13: diseases of the digestive system recorded the highest use report and highest number of medicinal plant species used. It documented 15 diseases or purpose (appendicitis, bloated stomach, constipation, diarrhea, gas pain, heartburn, intestinal cleansing, nausea, gallbladder problems, liver problems, stomachache, stomach ulcer, toothache, tooth decay, vomiting blood) and *Hyptis suaveolens* (L.) Poit. was frequently used species.

### Fidelity level

The FL was used to evaluate the relative importance of a medicinal plant to treat a particular disease or health problem. A high value suggested that a particular medicinal plant species were cited to treat a specific disease and were highly suggested and recommended by many informants in the tribe. Seven medicinal plants have a 100% fidelity value: *S. purpurea* for oral thrush; *Crinum* sp. for edema; *Vitex negundo* L. for cough; *H. suaveolens* for stomachache, bloated stomach, and diarrhea; *T. pandacaqui* for pus and boils; *Pittosporum pentandrum* (Blanco) Merr. for postpartum care and recovery; and *Parameria laevigata* (Juss.) Moldenke for skin disease.

### Discussion

The ethnobotanical study conducted in the Ati community in Tobias Fornier, Antique showed their rich cultural and traditional practice of ethnomedicine. The documentation of 108 medicinal plant species in 44 families showcased the diverse flora of the area. Though the tribe is settled in a small community, they were able to utilize the nearby mountains and river plains for plant resources. The result of this study is a valuable contribution to the limited ethnomedicinal information used by the indigenous peoples especially in the Ati tribe in Panay Island.

The family Fabaceae were best represented with 15 medicinal plant species used in 21 different diseases or purposes across eight categories. The family is also known as Leguminosae or the bean, legume, and pea family. It is the third-largest family of flowering plants after Orchidaceae and Asteraceae and second in terms of economic and agricultural importance after Poaceae. The family is composed of about 727 genera and 19,327 widely distributed species that include numerous plants used for animal and human food, fertilizers, timber, medicines, and pharmaceuticals (Wojciechowski et al. 2006). They belong to the top five families with rich therapeutic medicinal values in rural and indigenous populations of most regions of the world. They contain variety of chemical compounds with high level of biological activity (Morales and Ladio 2012). Fabaceae were also widely utilized by other Ati (Aeta/Negrito) tribes across the country (Ong and Kim 2014; Tantengco et al. 2018; Pablo 2019).

The use of leaves as the most preferred medicinal plant part by the Ati tribe in Antique is parallel to other studies conducted in other Ati (Aeta/Negrito) communities (Ong and Kim 2014; Tantengco et al. 2018; Pablo 2019; Cordero et al. 2020) and other indigenous groups (Balangcod and Balangcod 2011; Olowa et al 2012; Abe and Ohtani 2013; Balangcod and Balangcod 2015; Balinado et al. 2017; Baddu and Ouano 2018; Dapar et al. 2020) in the country. It is the frequently used part for therapeutic use because it contains and stores secondary metabolites that can inhibit microbial growth in different ways and can break down cellular membrane in microorganisms (Chanda and Kaneria 2011). According to phytochemical and pharmacological studies, leaves showed the highest antioxidant property, maximum antibiotic activity, and anti-diabetic potential as compared to other parts in various medicinal plants (Jain et

al. 2019). In a tropical country like the Philippines, leaves can be harvested all year round and readily available and accessible when needed for medicinal purposes compare to other plant parts.

The Ati tribe used decoction for drinking, bathing for mothers after giving birth, sponge bath for infants and children, and apply as wash for cuts, wounds, and skin disease. The decoction of polyherbal in traditional medicine is very evident in rural (Balinado and Chan 2017) and indigenous groups in the country (Ong and Kim 2014; Cordero et al. 2020). In Chinese (Yang and Ross 2010) and Ayurvedic herbal medicine (Verma et al. 2016), decoction is also the most common form of preparation and usually taken orally. In Chinese medicine, it is prepared by placing the dried medicinal plants in a ceramic pot with water that is 3-4cm above the herbs and soaked for an hour. The herbs are boiled and simmer for 20 minutes then the decoction is strained. Boil the herbs for the second time with less water, then combine the decoctions, and divided them into two-three doses. The absorption and effectivity of drinking decoction are much higher than that of other traditional types of preparation. It is usually used for more serious and severe diseases and conditions. It can also be used topically as bath for the whole body or for the affected parts of the body (Yang and Ross 2010).

*Euphorbia hirta* had the highest use value indicated by the highest number of users report from the informants. It is normally used for visual problems, dengue, typhoid, and headache by the Ati people. It is used in ethnopharmacology worldwide for gastrointestinal disorders, bronchial and respiratory diseases, and visual illness. It also shows antibiotic, anti-inflammatory, anticancer, antioxidant, antifertility, and antigalactogenic properties (Kumar et al. 2010). In the Philippines, it's been used in folk medicine to treat cataract (Madulid et al. 1989), skin disease (Tantiado 2012), arthritis, dislocation/fracture, sprain (Abe and Ohtani 2013), fever (Ragragio et al. 2013), sore eyes, cuts and wounds (Ong and Kim 2014), dengue (de Guzman et al. 2016).

Plants with the highest UV and FL were *S. purpurea* for oral thrush, *T. pandacaqui* for skin problems (pus, boil, skin diseases), and *H. suaveolens* for digestive system disorders (stomachache, diarrhea, bloated stomach). *S. purpurea* has bioactive compounds with antioxidant and antiulcer properties (de Almeida et al. 2017) and used traditionally for gastric disorders, diabetes, and cholesterol (Marisco and Pungartnik 2015). *H. suaveolens* contains phytochemicals such as alkaloids, flavonoids, terpenoids, and tannins with antioxidant, antimicrobial, anthelmintic, anti-inflammatory, antidiabetic, and wound healing activities (Ngozi et al. 2014). *T. pandacaqui* contains alkaloids that have anti-inflammatory, antipyretic and antinociceptive activities (Taesotikul et al. 2003).

The documentation of the medicinal plants used by the indigenous Ati tribe is an important contribution to the limited information of the traditional and complementary alternative medicine in Panay Island and in Western Visayas. The medicinal practice and tradition they used were greatly influenced by their culture and religious beliefs. The result of this study serves as an ethnobotanical base for drug

research and formulation and as awareness for preserving ethnomedicine as a safe and effective alternative means in the health care delivery system.

### ACKNOWLEDGEMENTS

The authors would like to thank the Ati Tribe members of Sitio Pantad for sharing their ethnobotanical knowledge and practices and for welcoming and accommodating the first author during her stay in the community. Grateful appreciation is also given to the NCIP-ACSC and NCIP Region VI/VII officers for the issuance of the Certification Precondition (R6-2019-04-028) and to the DENR-Region VI for the Wildlife gratuitous permit. The first author would like to thank the Commission on Higher Education-Scholarship for Graduate Studies Local (K-12) for the scholarship.

### REFERENCES

- Abe R, Ohtani K. 2013. An ethnobotanical study of medicinal plants and traditional therapies on Batan Island, the Philippines. *J Ethnopharmacol* 145 (2): 554-65.
- Baddu V, Ouano N. 2018. Ethnobotanical survey of medicinal plants used by the Y'Apayaos of Sta. Praxedes in the Province of Cagayan, Philippines. *Mindanao J Sci Technol* 16: 128-153.
- Balinado L, Chan M. 2017. An ethnomedicinal study of plants and traditional health care practices in District 7, Cavite, Philippines. International Conference on Chemical, Agricultural, Biological and Medical Sciences (CABMS-17) Manila, Philippines, January 23-24 2017.
- Balangcod T, Balangcod AK. 2011. Ethnomedical knowledge of plants and healthcare practices among the Kalanguya tribe in Tinoc, Ifugao, Luzon, Philippines. *Indian J Tradit Knowl* 10 (2): 227-238.
- Balangcod T, Balangcod K. 2015. Ethnomedicinal plants in Bayabas, Sablan, Benguet Province, Luzon, Philippines. *E J Biol* 11 (3): 63-73.
- Beyer O. 1917. Population of the Philippine islands in 1916 (población de las islas Filipinas en 1916) prepared under the direction of, preparado bajo la dirección de H. Otley Beyer. Philippine Education Co. Inc., Manila, Philippines.
- CBD. 2019. Philippines: The 6th National Report to the Convention on Biological Diversity. Convention on Biological Diversity. [https://asean.chm-cbd.net/sites/test-acb/files/2020-04/6NR\\_PHL.pdf](https://asean.chm-cbd.net/sites/test-acb/files/2020-04/6NR_PHL.pdf)
- Chanda S, Kaneria M. 2011. Indian nutraceutical plant leaves as a potential source of natural antimicrobial agents. Vilas M (ed.). Science against Microbial Pathogens: Communicating Current Research And Technological Advances. Formatex Research Center, Badajoz, Spain.
- Cordero C, Ligsay A, Alejandro GJD. 2020. Ethnobotanical documentation of medicinal plants used by the Ati tribe in Malay, Aklan, Philippines. *J Complement Med Res* 11 (1): 170-198.
- Dapar ML, Alejandro GJD, Meve U, Liede-Schumann S. 2020. Quantitative ethnopharmacological documentation and molecular confirmation of medicinal plants used by the Manobo tribe of Agusan del Sur, Philippines. *J Ethnobiol Ethnomed* 16 (14): 1-60.
- de Almeida CL, Brito S, De Santana T, Costa HB, Carvalho Jr. CH, da Silva M, de Almeida LL, Rolim LA, dos Santos VL, Wanderley AG, da Silva TG. 2017. *Spondias purpurea* L. (Anacardiaceae): Antioxidant and antiulcer activities of the leaf hexane extract. *Oxid Med Cell Longev*. DOI:10.1155/2017/6593073.
- de Guzman G, Dacanay A, Andanay B, Alejandro GJD. 2016. Ethnopharmacological studies on the uses of *Euphorbia hirta* in the treatment of dengue in selected indigenous communities in Pangasinan (Philippines). *J Intercult Ethnopharmacol* 5 (3): 239-243.
- de la Peña LC. 2009. The power to influence and to protect: interconnectedness of the human bodies. *Liceo J Higher Educ Res* 6 (1): 25-36.
- DIVA-GIS. 2012. Version 7.5 Free Spatial Data by Country. <https://www.diva-gis.org/>
- Eberhard D, Simons G, Fennig C. 2020. Ethnologue: Languages of the World (23rd ed) Dallas, Texas: SIL International. <http://www.ethnologue.com>
- Friedman J, Yaniv Z, Dafni A, Palewitch D. 1986. A preliminary classification of the healing potential of medicinal plants, based on a rational analysis of an ethnopharmacological field survey among Bedouins in the Negev Desert, Israel. *J Ethnopharmacol* 16: 275-287
- Fornier J. 1998. Economic developments in Antique Province: 1800-1850. *Philipp Stud* 46 (4): 407-428.
- Headland T. 1987. Negrito Religions: Negritos of the Philippine Islands. In: Eliade M (ed.). *The Encyclopedia of Religion* 10. Macmillan, New York.
- Heinrich M, Ankli A, Frei B, Weimann C, Sticher O. 1998. Medicinal plants in Mexico: Healers' consensus and cultural importance. *Soc Sci Med* 47 (11): 1859-1871.
- Jain C, Khatan S, Vijayvergia R. 2019. Bioactivity of secondary metabolites of various plants: a review. *Int J Pharm Sci Res* 10 (2): 494-504.
- Kumar S, Malhotra R, Kumar D. 2010. *Euphorbia hirta*: Its chemistry, traditional and medicinal uses, and pharmacological activities. *Pharmacogn Rev* 4 (7): 58-61.
- Longuefosse JL, Nossin E. 1996. Medical ethnobotany survey in Martinique. *J Ethnopharmacol* 53 (3): 117-142.
- Madulid DA, Gaerlan FJM, Romero EM, Agoon EMG. 1989. Ethnopharmacological study of the Ati tribe in Nagpana, Barotac Viejo, Iloilo. *Acta Manil* 38: 25-40.
- Marisco G, Pungartnik C. 2015. *Spondias purpurea* L. (Anacardiaceae): Traditional uses, chemical composition and biological activities. *Sci Amazon* 4 (2): 10-18.
- Morales S, Ladio A. 2012. The usefulness of edible and medicinal Fabaceae in Argentine and Chilean Patagonia: Environmental availability and other sources of supply. *J Evid Based Compl Altern Med*. DOI: 10.1155/2012/901918.
- NCIP. 2019. Community Population (Census) Province of Antique. National Commission on Indigenous Peoples Antique/Aklan Community Service Center. San Jose Buenavista, Antique.
- Ngozi U, Ugochukwo N, Ifeoma U, Charity A, Chinyelu E. 2014. The efficacy of *Hyptis suaveolens*: A review of its nutritional and medicinal applications. *Euro J Med Plants* 4 (6): 661-674.
- NEDA. 2017. Philippine Development Plan 2017-2022. National Economic and Development Authority. <http://pdp.neda.gov.ph/>
- Olowo L, Torres MA, Aranico E, Demayo C. 2012. Medicinal plants used by the Higaanon Tribe of Rogongon, Iligan City, Mindanao, Philippines. *Adv Environ Biol* 6 (4): 1442-1449.
- Ong HG, Kim YD. 2014. Quantitative ethnobotanical study of the medicinal plants used by the Ati Negrito indigenous group in Guimaras Island, Philippines. *J Ethnopharmacol* 157: 228-242.
- Ong P, Afuang L, Rosell-Ambal RG. 2002. Philippine Biodiversity Conservation Priorities: A Second Iteration of the National Biodiversity Strategy and Action Plan. Department of Environment and Natural Resources-Protected Areas and Wildlife Bureau, Conservation International Philippines, Biodiversity Conservation Program. University of the Philippines Center for Integrative and Development Studies, and Foundation for the Philippine Environment, Quezon City, Philippines.
- Pablo CG. 2019. Botika sa Kalikasan: Medicinal plants used by Aetas of Sitio Parapal Hermosa Bataan, Philippines. *J Soc Health* 2 (1): 101-127.
- Padilla Jr. S. 2013. Anthropology and GIS: Temporal and spatial distribution of the Philippine Negrito groups. *Hum Biol* 85 (1): 209-30.
- PCHRD. 2013. Philippine Council from Health Research and Development. 2013. Elderly in indigenous people communities need medical service at home, study affirms. Philippine Council from Health Research and Development. Department of Science and Technology. <http://www.pchrd.dost.gov.ph/>
- Pelser P, Barcelona J, Nickrent D. 2011. Co's Digital Flora of the Philippines. [www.philippineplants.org](http://www.philippineplants.org)
- Phillips O, Gentry A. 1993. The useful plants of Tambopata, Peru: I. Statistical hypotheses tests with a new quantitative technique. *Econ Bot* 47 (1): 15-32.
- POWO. 2019. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. <http://www.plantsoftheworldonline.org/>

- Ragragio E, Zayas CN, Obico JJ. 2013. Useful plants of selected Ayta communities from Porac, Pampanga, Twenty years after the eruption of Mt. Pinatubo. *Philipp J Sci* 142 (3): 169-181.
- Rahmann R, Maceda M. 1958. Some notes on the Negritos of Iloilo, Island of Panay, Philippines. *Anthropos* 53: 864-876.
- Rahmann R, Maceda M. 1962. Notes on the Negritos of Antique, Island of Panay, Philippines. *Anthropos* 57 (3/6): 626-643.
- Stuartxchange. 2019. Lists of Philippine Herbal Medicinal Plants. <http://www.stuartxchange.org/CompleteList.html>
- Tantengco OA, Condes ML, Estadilla HH, Ragragio E. 2018. Ethnobotanical survey of medicinal plants used by Ayta Communities in Dinalupihan, Bataan, Philippines. *Pharmacog J* 10 (5): 859-70.
- Tantiado R. 2012. Survey on Ethnopharmacology of Medicinal Plants in Iloilo, Philippines. *Inter J Bio Sci BioTech* 4 (4): 11-26.
- Taesotikul T, Panthong A, Kanjanapothi D, Verpoorter R, Scheffer JJ. 2003. Anti-inflammatory, antipyretic and antinociceptive activities of *Tabernaemontana pandacaqui* Poir. *J Ethnopharmacol* 84 (1): 31-35.
- The Plant List. 2013. Version 1.1. <http://www.theplantlist.org>
- Tropicos. 2019. Missouri Botanical Garden. <http://www.tropicos.org>
- UNDP. 2010. Fast Facts: Indigenous Peoples in the Philippines. United Nations Development Programme. <http://www.ph.undp.org/>
- Verma A, Janani H, Yadav S, Galib R, Prajapati PK. 2016. Pharmaceutical and analytical studies on Guduchi Kwatha prepared by varying proportions of water. *J Ayu Herb Med* 2 (4): 125-130.
- Worcester D. 1913. The Non-Christian Peoples of the Philippines Islands. *The National Geographic Magazine* 24 (11). National Geographic Society, Washington, D.C.
- WHO. 2020. ICD-11 for Mortality and Morbidity Statistics Version: 09/2020. World Health Organization, Geneva. <https://icd.who.int/browse11/l-m/en>
- Wojciechowski M, Mahn J, Jones B. 2006. Fabaceae. Legumes Version 14. The Tree of Life Web Project. <http://tolweb.org/>
- WFO. 2019. World Flora Online. <http://www.worldfloraonline>
- Yang Y, Ross J. 2010. Theories and Concepts in the Composition of Chinese Herbal Formulas. *Chinese Herbal Formulas*. Churchill Livingstone, Edinburgh.
- Zayas CN. 2008. Trade and patronage of Ati materia medica in the Visayas. In: Paz CJ (ed) *Ginhawa, Kapalaran, Dalamhati* (Essays on Well-being, Opportunity/Destiny and Anguish). University of the Philippines Press, Quezon City.